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THE ENCYCLOPÆDIA BRITANNICA

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ELEVENTH EDITION

VOLUME III SLICE VII

Bible to Bisectrix

Articles in This Slice

BIBLE. The word "Bible," which in English, as in medieval Latin, is treated as a singular noun, is in its original Greek form a plural, τὰ βιβλία, *the* (sacred) *books*—correctly expressing the fact that the sacred writings of Christendom (collectively described by this title) are made up of a number of independent records, which set before us the successive stages in the history of revelation. The origin of each of these records forms a distinct critical problem, and for the discussion of these questions of detail the reader is referred to the separate articles on the Biblical books. An account of the Bible as a whole involves so many aspects of interest, that, apart from the separate articles on its component books, the general questions of importance arising out of its present shape require to be discussed in separate sections of this article. They are here divided accordingly, into two main divisions:—(A) Old Testament, and (B) New Testament; and under each of these are treated (1) the Canon, (2) the texts and versions, (3) textual criticism, (4) the "higher criticism," *i.e.* a general historical account (more particularly considered for separate books in the articles on them) of the criticism and views based on the substance and matter, as apart from criticism devoted to the correction and elucidation of the text, and (5) chronology. For the literary history of the translated *English Bible*, see the separate article under Bible, English.

(A) Old Testament

1. *Canon.*

We shall begin by giving a general account of the historical and literary conditions under which the unique literature of the Old Testament sprang up, of the stages by which it gradually reached its present form, and (so far as this is possible) of the way in which the Biblical books were brought together in a canonical collection. There exists no formal historical account of the formation of the Old Testament canon. The popular idea that this canon was closed by Ezra has no foundation in antiquity. Certainly in the apocryphal book of 2 Esdras, written towards the end of the 1st century A.D., we read (xiv. 20-26, 38-48), that, the law being burnt, Ezra, at his own request, was miraculously inspired to rewrite it; he procured accordingly five skilled scribes, and dictated to them for forty days, during which time they wrote 94 books, *i.e.* not only (according to the Jewish reckoning) the 24 books of the Old Testament, but 70 apocryphal books as well, which, being filled, it is said, with a superior, or

esoteric wisdom, are placed upon even a higher level (vv. 46, 47) than the Old Testament itself. No argument is needed to show that this legend is unworthy of credit; even if it did deserve to be taken seriously, it still contains nothing respecting either a completion of the canon, or even a collection, or redaction, of sacred books by Ezra. Yet it is frequently referred to by patristic writers; and Ezra, on the strength of it, is regarded by them as the genuine restorer of the lost books of the Old Testament (see Ezra).

In 2 Macc. ii. 13 it is said that Nehemiah, "founding a library, gathered together the things concerning the kings and prophets, and the (writings) of David, and letters of kings about sacred gifts." These statements are found in a part of 2 Macc. which is admitted to be both late and full of untrustworthy matter; still, the passage *may* preserve an indistinct reminiscence of an early stage in the formation of the canon, the writings referred to being possibly the books of Samuel and Kings and some of the Prophets, a part of the Psalter, and documents such as those excerpted in the book of Ezra, respecting edicts issued by Persian kings in favour of the Temple. But obviously nothing definite can be built upon a passage of this character.

The first traces of the idea current in modern times that the canon of the Old Testament was closed by Ezra are found in the 13th century A.D. From this time, as is clearly shown by the series of quotations in Ryle's *Canon of the Old Testament*, p. 257 ff. (2nd ed., p. 269 ff.), the legend—for it is nothing better—grew, until finally, in the hands of Elias Levita (1538), and especially of Johannes Buxtorf (1665), it assumed the form that the "men of the Great Synagogue,"—a body the real existence of which is itself very doubtful, but which is affirmed in the Talmud to have "written" (!) the books of Ezekiel, the Minor Prophets, Daniel and Esther—with Ezra as president, first collected the books of the Old Testament into a single volume, restored the text, where necessary, from the best MSS., and divided the collection into three parts, the Law, the Prophets and the "Writings" (the Hagiographa). The reputation of Elias Levita and Buxtorf led to this view of Ezra's activity being adopted by other scholars, and so it acquired general currency. But it rests upon no authority in antiquity whatever.

The statement just quoted, however, that in the Jewish canon the books of the Old Testament are divided into three parts, though the arrangement is wrongly referred to Ezra, is in itself both correct and important. "The Law, the Prophets and the Writings (*i.e.* the Hagiographa)" is the standing Jewish expression for the Old Testament; and in every ordinary Hebrew Bible the books are arranged accordingly in the following three divisions:—

1. The Torah (or "Law"), corresponding to our "Pentateuch" (5 books).

2. The "Prophets," consisting of eight books, divided into two groups:—

(*a*) The "Former Prophets"; Joshua, Judges, Samuel; Kings.[1]

(*b*) The "Latter Prophets"; Isaiah, Jeremiah, Ezekiel, the Minor Prophets (called by the Jews "the Twelve," and counted by them as *one* book).

3. The "Writings," also sometimes the "Sacred Writings," *i.e.*, as we call them, the "Hagiographa," consisting of three groups, containing in all eleven books:—

(*a*) The poetical books, Psalms, Proverbs, Job.

(*b*) The five *Megilloth* (or "Rolls")—grouped thus together in later times, on account of the custom which arose of reading them in the synagogues at five sacred seasons—Song of Songs, Ruth, Lamentations, Ecclesiastes, Esther.

(*c*) The remaining books, Daniel, Ezra and Nehemiah (forming *one* book), Chronicles.

There are thus, according to the Jewish computation, twenty-four "books" in the Hebrew canon. The threefold division of the canon just given is recognized in the Talmud, and followed in all Hebrew MSS., the only difference being that the books included in the Latter Prophets and in the Hagiographa are not always arranged in the same order. No book, however, belonging to one of these three divisions is ever, by the Jews, transferred to another. The expansion of the Talmudic twenty-four to the thirty-nine Old Testament books of the English Bible is effected by reckoning the Minor Prophets one by one, by separating Ezra from Nehemiah, and by subdividing the long books of Samuel, Kings and Chronicles. The different order of the books in the English Bible is due to the fact that when the Hebrew Bible was translated into Greek between the 3rd and 1st centuries B.C., the Hebrew tripartite division was disregarded, and the books (including those now known as the "Apocrypha") were grouped mostly by subjects, the historical books being placed first (Genesis—Esther), the poetical books next (Job—Song of Songs), and the prophetical books last (Isaiah—Malachi). Substantially the same order was followed in the Vulgate. The Reformers separated the books which had no Hebrew original (*i.e.* the Apocrypha) from the rest, and placed them at the end; the remaining books, as they stood in the Vulgate, were then in the order which they still retain in the English Bible.

The tripartite division of the Hebrew canon thus recognized by Jewish tradition can, however, be traced back far beyond the Talmud. The Proverbs of Jesus, the son of Sirach (*c.* 200 B.C.), which form now the apocryphal book Ecclesiasticus, were translated into Greek by the grandson of the author at about 130 B.C.; and in the preface prefixed by him to his translation he speaks of "the law, and the prophets, and the other books of our fathers," and again of "the law, and the prophets, and the rest of the books," expressions which point naturally to the same threefold division which was afterwards universally recognized by the Jews. The terms used, however, do not show that the Hagiographa was already completed, as we now have it; it would be entirely consistent with them, if, for instance, particular books, as Esther, or Daniel, or Ecclesiastes, were only added to the collection subsequently. Another allusion to the tripartite division is also no doubt to be found in the expression "the law, the prophets, and the psalms," in Luke xxiv. 44. A collection of sacred books, including in particular the prophets, is also referred to in Dan. ix. 2 (R. V.), written about 166 B.C.

This threefold division of the Old Testament, it cannot reasonably be doubted, rests upon an historical basis. It represents three successive stages in the history of the collection. The Law was the first part to be definitely recognized as authoritative, or canonized; the "Prophets" (as defined above) were next accepted as canonical; the more miscellaneous collection of books comprised in the Hagiographa was recognized last. In the absence of all external evidence respecting the formation of the canon, we are driven to internal evidence in our endeavour to fix the dates at which these three collections were thus canonized. And internal evidence points to the conclusion that the Law could scarcely have been completed, and accepted formally, as a whole, as canonical before 444 B.C. (cf. Neh. viii.-x.); that the "Prophets" were completed and so recognized about 250 B.C., and the Hagiographa between about 150 and 100 B.C. (See further Ryle's *Canon of the Old Testament*.)

Having thus fixed approximately the *terminus ad quem* at which the Old Testament was completed, we must now begin at the other end, and endeavour to sketch in outline the process by which it gradually reached its completed form. And here it will be found to be characteristic of nearly all the longer books of the Old Testament, and in some cases even of the shorter ones as well, that they were not completed by a single hand, but that they were gradually expanded, and reached their present form by a succession of stages.

Among the Hebrews, as among many other nations, the earliest beginnings of literature were in all probability poetical. At least the opening phrases of the song of Moses in Exodus xv.; the song of Deborah in Judges v.; the fragment from the "Book of the Wars of Yahweh," in Numbers xxi. 14, 15; the war-ballad, celebrating an Israelitish victory, in Numbers xxi. 27-30; the extracts from the "Book of Jashar" (or "of the Upright," no doubt a title of Israel) quoted in Joshua x. 12, 13 ("Sun, stand thou still upon Gibeon," &c.); in 2 Sam. i. (David's elegy over Saul and Jonathan); and, very probably, in the Septuagint of 1 Kings viii. 13 [Sept. 53], as the source of the poetical fragment in vv. 12, 13, describing Solomon's building of the Temple, show how great national occurrences and the deeds of ancient Israelitish heroes stimulated the national genius for poetry, and evoked lyric songs, suffused with religious feeling, by which their memory was perpetuated. The poetical descriptions of the character, or geographical position, of the various tribes, now grouped together as the Blessings of Jacob (Gen. xlix.) and Moses (Deut. xxxiii.), may be mentioned at the same time. These poems, which are older, and in most cases considerably older, than the

narratives in which they are now embedded, if they were collected into books, must have been fairly numerous, and we could wish that more examples of them had been preserved. 851

The historical books of the Old Testament form two series: one, consisting of the books from Genesis to 2 Kings (exclusive of Ruth, which, as we have seen, forms in the Hebrew canon part of the Hagiographa), embracing the period from the Creation to the destruction of Jerusalem by the Chaldaeans in 586 B.C.; the other, comprising the books of Chronicles, Ezra and Nehemiah, beginning with Adam and ending with the second visit of Nehemiah to Jerusalem in 432 B.C. These two series differ from one another materially in scope and point of view, but in one respect they are both constructed upon a similar plan; no entire book in either series consists of a single, original work; but older writings, or sources, have been combined by a compiler—or sometimes, in stages, by a succession of compilers—in such a manner that the points of juncture are often clearly discernible, and the sources are in consequence capable of being separated from one another. The authors of the Hebrew historical books, as we now have them, do not, as a rule, as a modern author would do, *rewrite* the matter in their own language; they *excerpt* from pre-existing documents such passages as are suitable to their purpose, and incorporate them in their work, sometimes adding at the same time matter of their own. Hebrew writers, however, exhibit usually such strongly marked individualities of style that the documents or sources, thus combined, can generally be distinguished from each other, and from the comments or other additions of the compiler, without difficulty. The literary differences are, moreover, often accompanied by differences of treatment, or representation of the history, which, where they exist, confirm independently the conclusions of the literary analysis. Although, however, the historical books generally are constructed upon similar principles, the method on which these principles have been applied is not quite the same in all cases. Sometimes, for instance, the excerpts from the older documents form long and complete narratives; in other cases (as in the account of the Flood) they consist of a number of short passages, taken alternately from two older narratives, and dovetailed together to make a continuous story; in the books of Judges and Kings the compiler has fitted together a series of older narratives in a framework supplied by himself; the Pentateuch and book of Joshua (which form a literary whole, and are now often spoken of together as the *Hexateuch*) have passed through more stages than the books just mentioned, and their literary structure is more complex.

The Hexateuch (Gen.-Josh.).—The traditions current among the Israelites respecting the origins and early history of their nation—the patriarchal period, and the times of Moses and Joshua—were probably first cast into a written form in the 10th or 9th century B.C. by a prophet living in Judah, who, from the almost exclusive use in his narrative of the sacred name "Jahveh" ("Jehovah"),—or, as we now commonly write it, Yahweh,—is referred to among scholars by the abbreviation "J." This writer, who is characterized by a singularly bright and picturesque style, and also by deep religious feeling and insight, begins his narrative with the account of the creation of man from the dust, and tells of the first sin and its consequences (Gen. ii. 4^b-iii. 24); then he gives an account of the early growth of civilization (Gen. iv.), of the Flood (parts of Gen. vi.-viii.), and the origin of different languages (xi. 1-9); afterwards in a series of vivid pictures he gives the story, as tradition told it, of the patriarchs, of Moses and the Exodus, of the journey through the wilderness, and the conquest of Canaan. It would occupy too much space to give here a complete list of the passages belonging to "J"; but examples of his narrative (with the exception here and there of a verse or two belonging to one of the other sources described below) are to be found, for instance, in Gen. xii., xiii., xviii.-xix. (the visit of the three angels to Abraham, and the judgment on Sodom and Gomorrah), xxiv. (Abraham's servant sent to find a wife for Isaac), xxvii. 1-45 (Jacob obtaining his father's blessing), xxxii., xliii., xliv. (parts of the history of Joseph); Ex. iv.-v. (mostly), viii. 20-ix. 7, x. 1-11, xxxiii. 12-xxxiv. 26 (including, in xxxiv. 17-26, a group of regulations, of a simple, undeveloped character, on various religious observances); Num. x. 29-36, and most of Num. xi.

Somewhat later than "J," another writer, commonly referred to as "E," from his preference for the name *Elohim* ("God") rather than "Jehovah," living apparently in the northern kingdom, wrote down the traditions of the past as they were current in northern Israel, in a style resembling generally that of "J," but not quite as bright and vivid, and marked by small differences of expression and representation. The first traces of "E" are found in the life of Abraham, in parts of Gen. xv.; examples of other passages belonging to this source are:—Gen. xx. 1-17, xxi. 8-32, xxii. 1-14, xl.-xlii. and xlv. (except a few isolated passages); Ex. xviii., xx.-xxiii. (including the decalogue—in its original, terser form, without the explanatory additions now attached to several of the commandments—and the collection of laws, known as the "Book of the Covenant," in xxi.-xxiii.), xxxii., xxxiii. 7-11; Num. xii., most of Num. xxii.-xxiv. (the history of Balaam); Josh. xxiv. "E" thus covers substantially the same ground as "J," and gives often a parallel, though somewhat divergent, version of the same events. The laws contained in Ex. xx. 23-xxiii. 19 were no doubt taken by "E" from a pre-existing source; with the regulations referred to above as incorporated in "J" (Ex. xxxiv. 17-26), they form the oldest legislation of the Hebrews that we possess; they consist principally of *civil* ordinances, suited to regulate the life of a community living under simple conditions of society, and chiefly occupied in agriculture, but partly also of elementary regulations respecting religious observances (altars, sacrifices, festivals, &c.).

Not long, probably, after the fall of the northern kingdom in 722 B.C., a prophet of Judah conceived the plan of compiling a comprehensive history of the traditions of his people. For this purpose he selected extracts from the two narratives, "J" and "E," and combined them together into a single narrative, introducing in some places additions of his own. This combined narrative is commonly known as "JE." As distinguished from the Priestly Narrative (to be mentioned presently), it has a distinctly *prophetical* character; it treats the history from the standpoint of the prophets, and the religious ideas characteristic of the prophets often find expression in it. Most of the best-known narratives of the patriarchal and Mosaic ages belong to "JE." His style, especially in the parts belonging to "J," is graphic and picturesque, the descriptions are vivid and abound in detail and colloquy, and both emotion and religious feeling are warmly and sympathetically expressed in it.

Deuteronomy.—In the 7th century B.C., during the reign of either Manasseh or Josiah, the narrative of "JE" was enlarged by the addition of the *discourses of Deuteronomy*. These discourses purport to be addresses delivered by Moses to the assembled people, shortly before his death, in the land of Moab, opposite to Jericho. There was probably some tradition of a farewell address delivered by Moses, and the writer of Deuteronomy gave this tradition form and substance. In impressive and persuasive oratory he sets before Israel, in a form adapted to the needs of the age in which he lived, the fundamental principles which Moses had taught. Yahweh was Israel's only god, who tolerated no other god beside Himself, and who claimed to be the sole object of the Israelite's reverence. This is the fundamental thought which is insisted on and developed in Deuteronomy with great eloquence and power. The truths on which the writer loves to dwell are the sole godhead of Yahweh, His spirituality (ch. iv.), His choice of Israel, and the love and faithfulness which He had shown towards it, by redeeming it from slavery in Egypt, and planting it in a free and fertile land; from which are deduced the great practical duties of loyal and loving devotion to Him, an uncompromising repudiation of all false gods, the rejection of all heathen practices, a cheerful and ready obedience to His will, and a warm-hearted and generous attitude towards man. Love of God is the primary spring of human duty (vi. 5). In the course of his argument (especially in chs. xii.-xxvi.), the writer takes up most of the laws, both civil and ceremonial, which (see above) had been incorporated before in "J" and "E," together with many besides which were current in Israel; these, as a rule, he expands, applies or enforces with motives; for obedience to them is not to be rendered merely in deference to external authority, it is to be prompted by right moral and religious motives. The ideal of Deuteronomy is a community of which every member is full of love and reverence towards his God, and of sympathy and regard for his fellow-men. The "Song" (Deut. xxxii.) and "Blessing" (Deut. xxxiii.) of Moses are not by the author of the discourses; and the latter, though not Mosaic, is of considerably earlier date. 852

The influence of Deuteronomy upon subsequent books of the Old Testament is very perceptible. Upon its promulgation it speedily became the book which both gave the religious ideals of the age, and moulded the phraseology in which these ideals were expressed. The style of Deuteronomy, when once it had been formed, lent itself readily to imitation; and thus a school of writers, imbued with its spirit, and using its expressions, quickly arose, who have left their mark upon many parts of the Old Testament. In particular, the parts of the combined narrative "JE," which are now included in the book of Joshua, passed through the hands of a Deuteronomic editor, who made considerable additions to them—chiefly in the form of speeches placed, for instance, in the mouth of Joshua, or expansions of the history, all emphasizing principles inculcated in Deuteronomy and expressed in its characteristic phraseology (*e.g.* most of Josh. i., ii. 10-11, iii. 2-4, 6-9, x. 28-43, xi. 10-23, xii., xiii. 2-6, 8-12,

xxiii.). From an historical point of view it is characteristic of these additions that they *generalize* Joshua's successes, and represent the conquest of Canaan, effected under his leadership, as far more complete than the earlier narratives allow us to suppose was the case. The compilers of Judges and Kings are also (see below) strongly influenced by Deuteronomy.

The *Priestly* sections of the Hexateuch (known as "P") remain still to be considered. That these are later than "JE," and even than Deut., is apparent—to mention but one feature—from the more complex ritual and hierarchical organization which they exhibit. They are to all appearance the work of a school of priests, who, after the destruction of the Temple in 586 B.C., began to write down and codify the ceremonial regulations of the pre-exilic times, combining them with an historical narrative extending from the Creation to the establishment of Israel in Canaan; and who completed their work during the century following the restoration in 537 B.C. The chief object of these sections is to describe in detail the leading institutions of the theocracy (Tabernacle, sacrifices, purifications, &c.), and to refer them to their traditional origin in the Mosaic age. The history as such is subordinate; and except at important epochs is given only in brief summaries (*e.g.* Gen. xix. 29, xli. 46). Statistical data (lists of names, genealogies, and precise chronological notes) are a conspicuous feature in it. The legislation of "P," though *written down* in or after the exile, must not, however, be supposed to be the *creation* of that period; many elements in it can be shown from the older literature to have been of great antiquity in Israel; it is, in fact, based upon *pre-exilic Temple usage*, though in some respects it is a development of it, and exhibits the form which the older and simpler ceremonial institutions of Israel ultimately assumed. In "P's" picture of the Mosaic age there are many *ideal* elements; it represents the priestly ideal of the past rather than the past as it actually was. The following examples of passages from "P" will illustrate what has been said:—Gen. i. 1-ii. 4[a], xvii. (institution of circumcision), xxiii. (purchase of the cave of Machpelah), xxv. 7-17, xlvi. 6-27; Ex. vi. 2-vii. 13, xxv.-xxxi. (directions for making the Tabernacle, its vessels, dress of the priests, &c.), xxxv.-xl. (execution of these directions); Lev. (the whole); Num. i. 1-x. 28 (census of people, arrangement of camp, and duties of Levites, law of the Nazirite, &c.), xv., xviii., xix., xxvi.-xxxi., xxxiii.-xxxvi.; Josh. v. 10-12, the greater part of xv.-xix. (distribution of the land among the different tribes), xxi. 1-42. The style of "P" is strongly marked—as strongly marked, in fact, as (in a different way) that of Deuteronomy is; numerous expressions not found elsewhere in the Hexateuch occur in it repeatedly. The section Lev. xvii.-xxvi. has a character of its own; for it consists of a substratum of older laws, partly moral (chs. xviii.-xx. mostly), partly ceremonial, with a hortatory conclusion (ch. xxvi.), with certain very marked characteristics (from one of which it has received the name of the "Law of Holiness"), which have been combined with elements belonging to, or conceived in the spirit of, the main body of "P."

Not long after "P" was completed, probably in the 5th century B.C., the whole, consisting of "JE" and Deuteronomy, was combined with it; and the existing Hexateuch was thus produced.

Judges, Samuel and Kings.—The structure of these books is simpler than that of the Hexateuch. The book of Judges consists substantially of a series of older narratives, arranged together by a compiler, and provided by him, where he deemed it necessary, with introductory and concluding comments (*e.g.* ii. 11-iii. 6, iii. 12-15[a], 30, iv. 1-3, 23, 24, v. 31[b]). The compiler is strongly imbued with the spirit of Deuteronomy; and the object of his comments is partly to exhibit the chronology of the period as he conceived it, partly to state his theory of the religious history of the time. The compiler will not have written before *c.* 600 B.C.; the narratives incorporated by him will in most cases have been considerably earlier. The books of Samuel centre round the names of Samuel, Saul and David. They consist of a series of narratives, or groups of narratives, dealing with the lives of these three men, arranged by a compiler, who, however, unlike the compilers of Judges and Kings, rarely allows his own hand to appear. Some of these narratives are to all appearance nearly contemporary with the events that they describe (*e.g.* 1 Sam. ix. 1-x. 16, xi. 1-11, 15, xiii.-xiv., xxv.-xxxi.; 2 Sam. ix.-xx.); others are later. In 1 Sam. the double (and discrepant) accounts of the appointment of Saul as king (ix. 1-x. 16, xi. 1-11, 15, and viii., x. 17-27, xii.), and of the introduction of David to the history (xvi. 14-23 and xvii. 1-xviii. 5) are noticeable; in ix. 1-x. 16, xi. 1-11, 15, the monarchy is viewed as God's gracious gift to His people; in viii., x. 17-27, xii., which reflect the feeling of a much later date, the monarchy is viewed unfavourably, and represented as granted by God unwillingly. The structure of the book of Kings resembles that of Judges. A number of narratives, evidently written by prophets, and in many of which also (as those relating to Elijah, Elisha and Isaiah) prophets play a prominent part, and a series of short statistical notices, relating to political events, and derived probably from the official annals of the two kingdoms (which are usually cited at the end of a king's reign), have been arranged together, and sometimes expanded at the same time, in a framework supplied by the compiler. The framework is generally recognizable without difficulty. It comprises the chronological details, references to authorities, and judgments on the character of the various kings, especially as regards their attitude to the worship at the high places, all cast in the same literary mould, and marked by the same characteristic phraseology. Both in point of view and in phraseology the compiler shows himself to be strongly influenced by Deuteronomy. The two books appear to have been substantially completed before the exile; but short passages were probably introduced into them afterwards. Examples of passages due to the compiler: 1 Kings ii. 3-4, viii. 14-61 (the prayer of dedication put into Solomon's mouth), ix. 1-9, xi. 32[b]-39, xiv. 7-11, 19-20, 21-24, 29-31, xv. 1-15, xxi. 20[b]-26; 2 Kings ix. 7-10[a], xvii. 7-23.

The Latter Prophets.—Isaiah, Jeremiah, Ezekiel, the Twelve. The writings of the canonical prophets form another important element in the Old Testament, also, like the historical books, of gradual growth. Beginning with Amos and Hosea, they form a series which was not completed till more than three centuries had passed away. The activity of the prophets was largely called forth by crises in the national history. They were partly moral reformers, partly religious teachers, partly political advisers. They held up before a backsliding people the ideals of human duty, of religious truth and of national policy. They expanded and developed, and applied to new situations and circumstances of the national life, the truths which in a more germinal form they had inherited from their ancestors. The nature and attributes of God; His gracious purposes towards man; the relation of man to God, with the practical consequences that follow from it; the true nature of religious service; the call to repentance as the condition of God's favour; the ideal of character and action which each man should set before himself; human duty under its various aspects; the responsibilities of office and position; the claims of mercy and philanthropy, justice and integrity; indignation against the oppression of the weak and the unprotected; ideals of a blissful future, when the troubles of the present will be over, and men will bask in the enjoyment of righteousness and felicity,—these, and such as these, are the themes which are ever in the prophets' mouths, and on which they enlarge with unwearying eloquence and power.

For the more special characteristics of the individual prophets, reference must be made to the separate articles devoted to each; it is impossible to do more here than summarize briefly the literary structure of their various books.

Isaiah.—The book of Isaiah falls into two clearly distinguished parts, viz. chs. i.-xxxix., and xl.-lxvi. Chs. xl.-lxvi., however, are not by Isaiah, but are the work of a prophet who wrote about 540 B.C., shortly before the conquest of Babylon by Cyrus, and whose aim was to encourage the Israelites in exile, and assure them of the certainty of their approaching restoration to Canaan. (According to many recent critics, this prophet wrote only chs. xl.-lv., chs. lvi.-lxvi. being added subsequently, some time after the return.) The genuine prophecies of Isaiah are contained in chs. i.-xii., xiv. 24-xxiii., xxviii.-xxxiii., xxxvii. 22-32,—all written between 740 and 700 B.C. (or a little later), and all (except ch. vi.) having reference to the condition of Judah and Israel, and the movements of the Assyrians during the reigns of Ahaz and Hezekiah. The opinion has, however, latterly gained ground that parts even of these chapters are of later origin than Isaiah's own time. Of the rest of chs. i.-xxxix. this is generally admitted. Thus chs. xiii. 1-xiv. 23, xxi. 1-10, xxxiv.-xxxv. belong to the same age as chs. xl.-lxvi., xiii. 1-xiv. 23, and xxi. 1-10, looking forward similarly to the approaching fall of Babylon; chs. xxiv.-xxvii. have a character of their own, and form an apocalypse written not earlier than the 5th century B.C.; chs. xxxvi.-xxxix., describing incidents in which Isaiah took a part, consist of narratives excerpted from 2 Kings xviii. 13-xx. with the addition of Hezekiah's song (xxxviii. 9-20). It is evident from these facts that the book of Isaiah did not assume its present form till considerably after the return of the Jews from exile in 537, when a compiler, or series of compilers, arranged the genuine prophecies of Isaiah which had come to his hands, together with others which at the time were attributed to Isaiah, and gave the book its present form.

Jeremiah.—Jeremiah's first public appearance as a prophet was in the 13th year of Josiah (Jer. i. 2, xxv. 3), *i.e.* 626 B.C., and his latest prophecy (ch. xliv.) was delivered by him in Egypt, whither he was carried, against his will, by some of the Jews who

had been left in Judah, shortly after the fall of Jerusalem in 586. Jeremiah was keenly conscious of his people's sin; and the aim of most of his earlier prophecies is to bring his countrymen, if possible, to a better mind, in the hope that thereby the doom which he sees impending may be averted—an end which eventually he saw clearly to be unattainable. Jeremiah's was a sensitive, tender nature; and he laments, with great pathos and emotion, his people's sins, the ruin to which he saw his country hastening, and the trials and persecutions which his predictions of disaster frequently brought upon him. A large part of his book is biographical, describing various incidents of his ministry. Prophecies of restoration are contained in chs. xxx.-xxxiii. The prophecies of the first twenty-three years of his ministry, as we are expressly told in ch. xxxvi., were first written down in 604 B.C. by his friend and amanuensis Baruch, and the roll thus formed must have formed the nucleus of the present book. Some of the reports of Jeremiah's prophecies, and especially the biographical narratives, also probably have Baruch for their author. But the chronological disorder of the book, and other indications, show that Baruch could not have been the *compiler* of the book, but that the prophecies and narratives contained in it were collected together gradually, and that it reached its present form by a succession of stages, which were not finally completed till long after Israel's return from Babylon. The long prophecy (l. 1-li. 58), announcing the approaching fall of Babylon, is not by Jeremiah, and cannot have been written till shortly before 538 B.C.

Ezekiel.—Ezekiel was one of the captives who were carried with Jehoiachin in 597 B.C. to Babylonia, and was settled with many other exiles at a place called Tel-abib (iii. 15). His prophecies (which are regularly dated) are assigned to various years from 592 to 570 B.C. The theme of the first twenty-four chapters of his book is the impending fall of Jerusalem, which took place actually in 586, and which Ezekiel foretells in a series of prophecies, distinguished by great variety of symbolism and imagery. Chs. xxv.-xxxii. are on various foreign nations, Edom, Tyre, Egypt, &c. Prophecies of Israel's future restoration follow in chs. xxxiii.-xlviii., chs. xl.-xlviii. being remarkable for the minuteness with which Ezekiel describes the organization of the restored community, as he would fain see it realized, including even such details as the measurements and other arrangements of the Temple, the sacrifices to be offered in it, the duties and revenues of the priests, and the redistribution of the country among the twelve tribes. The book of Ezekiel bears throughout the stamp of a single mind; the prophecies contained in it are arranged methodically; and to all appearance—in striking contrast to the books of Isaiah and Jeremiah—it received the form in which we still have it from the prophet himself.

The Twelve Minor Prophets.—These, as was stated above, were reckoned by the Jews as forming a single "book." The two earliest of the Minor Prophets, Amos and Hosea, prophesied in the northern kingdom, at about 760 and 740 B.C. respectively; both foresaw the approaching ruin of northern Israel at the hands of the Assyrians, which took place in fact when Sargon took Samaria in 722 B.C.; and both did their best to stir their people to better things. The dates of the other Minor Prophets (in some cases approximate) are: Micah, *c.* 725-*c.* 680 B.C. (some passages perhaps later); Zephaniah, *c.* 625; Nahum, shortly before the destruction of Nineveh by the Manda in 607; Habakkuk (on the rise and destiny of the Chaldaean empire) 605-600; Obadiah, after the destruction of Jerusalem by the Chaldaeans in 586; Haggai, 520; Zechariah, i.-viii. (as in Haggai, promises and encouragements connected with the rebuilding of the Temple) 520 and 518; Malachi, *c.* 460-450; Joel, 5th century B.C.; Jonah, 4th century B.C. The latest prophecies in the book are, probably, those contained in Zech. ix.-xiv. which reflect entirely different historical conditions from Zech. i.-viii. (520 and 518 B.C.), and may be plausibly assigned to the period beginning with the conquests of Alexander the Great, between 332 and *c.* 300 B.C. Why these prophecies were attached to Zech. i.-viii. must remain matter of conjecture; but there are reasons for supposing that, together with the prophecy of Malachi, they came to the compiler of the "book" of the Twelve Prophets anonymously, and he simply attached them at the point which his collection had reached (*i.e.* at the end of Zech. viii.).

The Psalms.—The Psalter is that part of the Old Testament in which the *devotional* aspect of the religious character finds its completest expression; and in lyrics of exquisite tenderness and beauty the most varied emotions are poured forth by the psalmists to their God—despondency and distress, penitence and resignation, hope and confidence, jubilation and thankfulness, adoration and praise. The Psalter, it is clear from many indications, is not the work of a single compiler, but was formed gradually. A single compiler is not likely to have introduced double recensions of one and the same psalm (as Ps. liii. = Ps. xiv., Ps. lxx. = Ps. xi. 13-17, Ps. cviii. = Ps. lvii. 7-11 + lx. 5-12); in the Hebrew canon the Psalter is composed of five books (i.-xli., xlii.-lxxii., lxxiii.-lxxxix., xc.-cvi., cvii.-cl.); and in many parts it is manifestly based upon independent smaller collections; for it contains groups of psalms headed "David," the "sons of Korah," "Asaph," "Songs of Ascents." Each of the five books of which it is composed contains psalms which show that its compilation cannot have been completed till after the return from the Captivity; and indeed, when the individual psalms are studied carefully it becomes apparent that in the great majority of cases they presuppose the historical conditions, or the religious experiences, of the ages that followed Jeremiah. Thus, though it is going too far to say that there are no pre-exilic psalms, the Psalter, as a whole, is the expression of the deeper spiritual feeling which marked the later stages of Israel's history. It has been not inaptly termed the Hymn-book of the second Temple. Its compilation can hardly have been finally completed before the 3rd century B.C.; if it is true, as many scholars think, that there are psalms dating from the time of the Maccabee struggle (Ps. xliv., lxxiv., lxxix., lxxxiii, and perhaps others), it cannot have been completed till after 165 B.C.

The Book of Proverbs.—This is the first of the three books belonging to the "Wisdom-literature" of the Hebrews, the other two books being Job and Ecclesiastes. The Wisdom-literature of the Hebrews concerned itself with what we should call the philosophy of human nature, and sometimes also of physical nature as well; its writers observed human character, studied action in its consequences, laid down maxims for education and conduct, and reflected on the moral problems which human society presents. The book of Proverbs consists essentially of generalizations on human character and conduct, with (especially in chs. i.-ix.) moral exhortations addressed to an imagined "son" or pupil. The book consists of eight distinct portions, chs. i.-ix. being introductory, the proverbs, properly so called, beginning at x. 1 (with the title "The Proverbs of Solomon"), and other, shorter collections, beginning at xxii. 17, xxiv. 23, xxv. 1, xxx. 1, xxxi. 1, xxxi. 10 respectively. The book, it is evident, was formed gradually. A small nucleus of the proverbs may be Solomon's; but the great majority represent no doubt the generalizations of a long succession of "wise men." The introduction, or "Praise of Wisdom," as it has been called (chs. i.-ix), commending the maxims of Wisdom as a guide to the young, will have been added after most of the rest of the book was already complete. The book will not have finally reached its present form before the 4th century B.C. Some scholars believe that it dates entirely from the Greek period (which began 332 B.C.); but it may be doubted whether there are sufficient grounds for this conclusion.

Job.—The book of Job deals with a problem of human life; in modern phraseology it is a work of *religious philosophy*. Job is a righteous man, overwhelmed with undeserved misfortune; and thus the question is raised, Why do the righteous suffer? Is their suffering consistent with the justice of God? The dominant theory at the time when Job was written was that all suffering was a punishment of sin; and the aim of the book is to controvert this theory. Job's friends argue that he must have been guilty of some grave sin; Job himself passionately maintains his innocence; and on the issue thus raised the dialogue of the book turns. The outline of Job's story was no doubt supplied by tradition; and a later poet has developed this outline, and made it a vehicle for expressing his new thoughts respecting a great moral problem which perplexed his contemporaries. A variety of indications (see Job) combine to show that the book of Job was not written till after the time of Jeremiah—probably, indeed, not till after the return from exile. The speeches of Elihu (chs. xxxii.-xxxvii.) are not part of the original poem, but were inserted in it afterwards.

There follow (in the Hebrew Bible) the five short books, which, as explained above, are now known by the Jews as the *Megilloth*, or "Rolls," viz. Song of Songs, Ruth, Lamentations, Ecclesiastes and Esther. Of these, the *Song of Songs*, in exquisite poetry, extols the power and sweetness of pure and faithful human love. The date at which it was written is uncertain; there are features in it which point to its having been the work of a poet living in north Israel, and writing at an early date; but most recent scholars, on account chiefly of certain late expressions occurring in it, think that it cannot have been written earlier than the 4th or 3rd century B.C. In the graceful and tender idyll of *Ruth*, it is told how Ruth, the Moabitess, and a native consequently of a country hostile theocratically to Israel, adopted Israel's faith (i. 16), and was counted worthy to become an ancestress of David. The date of Ruth is disputed; Driver has defended a pre-exilic date for it, but the general opinion of modern scholars is that it belongs to the 5th century B.C. The *Lamentations* consist of five elegies on the fall of Jerusalem, and the sufferings which

its people experienced in consequence; they must all have been composed not long after 586 B.C. *Ecclesiastes*, the third book belonging (see above) to the Wisdom-literature, consists of moralizings, prompted by the dark times in which the author's lot in life was cast, on the disappointments which seemed to him to be the reward of all human endeavour, and the inability of man to remedy the injustices and anomalies of society. If only upon linguistic grounds—for the Hebrew of the book resembles often that of the Mishnah more than the ordinary Hebrew of the Old Testament—Ecclesiastes must be one of the latest books in the Hebrew canon. It was most probably written during the Greek period towards the end of the 3rd century B.C. The book of *Esther*, which describes, with many legendary traits, how the beautiful Jewess succeeded in rescuing her people from the destruction which Haman had prepared for them, will not be earlier than the closing years of the 4th century B.C., and is thought by many scholars to be even later.

The Book of Daniel.—The aim of this book is to strengthen and encourage the pious Jews in their sufferings under the persecution of Antiochus Epiphanes, 168-165 B.C. Chs. i.-vi. consist of narratives, constructed no doubt upon a traditional basis, of the experiences of Daniel at the Babylonian court, between 605 and 538 B.C., with the design of illustrating how God, in times of trouble, defends and succours His faithful servants. Chs. vii.-xii. contain a series of visions, purporting to have been seen by Daniel, and describing, sometimes (especially in ch. xi.) with considerable minuteness, the course of events from Alexander the Great, through the two royal lines of the Ptolemies and the Seleucidae, to Antiochus Epiphanes, dwelling in particular on the persecuting measures adopted by Antiochus against the Jews, and promising the tyrant's speedy fall (see *e.g.* viii. 9-14, 23-25, xi. 21-45). Internal evidence shows clearly that the book cannot have been written by Daniel himself; and that it must in fact be a product of the period in which its interest culminates, and the circumstances of which it so accurately reflects, *i.e.* of 168-165 B.C.

Chronicles, Ezra and Nehemiah.—These books form the second series of historical books referred to above, Ezra and Nehemiah carrying on the narrative of Chronicles, and forming its direct sequel. 1 Chr. i.-ix. consists mostly of tribal genealogies, partly based upon data contained in the older books (Gen.-Kings), partly including materials found by the compiler elsewhere. 1 Chr. x.-2 Chr. xxxvi. consists of a series of excerpts from the books of Samuel and Kings—sometimes transcribed without substantial change, at other times materially altered in the process—combined with matter, in some cases limited to a verse or two, in others extending to several chapters, contributed by the compiler himself, and differing markedly from the excerpts from the older books both in phraseology and in point of view. The books of Ezra and Nehemiah are of similar structure; here the sources excerpted are the Memoirs of Ezra and Nehemiah, written by themselves in the *first* person; viz. Ezra vii. 12-ix. (including the decree of Artaxerxes, vii. 12-26); Neh. i. 1-vii. 73[a], xii. 31-41, xiii.; and a narrative written in Aramaic (Ezra iv. 8-vi. 18); Ezra x. and Neh. viii.-x. also are in all probability based pretty directly upon the Memoirs of Ezra; the remaining parts of the books are the composition of the compiler. The additions of the compiler, especially in the Chronicles, place the old history in a new light; he invests it with the associations of his own day; and pictures pre-exilic Judah as already possessing the fully developed ceremonial system, under which he lived himself, and as ruled by the ideas and principles current among his contemporaries. There is much in his representation of the past which cannot be historical. For examples of narratives which are his composition see 1 Chr. xv. 1-24, xvi. 4-42, xxii. 2-xxix.; 2 Chr. xiii. 3-22, xiv. 6-xv. 15, xvi. 7-11, xvii., xix. 1-xx. 30, xxvi. 16-20, xxix. 3-xxxi. 21. On account of the interest shown by the compiler in the ecclesiastical aspects of the history, his work has been not inaptly called the "Ecclesiastical Chronicle of Jerusalem." From historical allusions in the book of Nehemiah, it may be inferred that the compiler wrote at about 300 B.C.

(S. R. D.)

2. *Texts and Versions.*

Text.—The form in which the Hebrew text of the Old Testament is presented to us in all MSS. and printed editions is that of the Massoretic text, the date of which is usually placed somewhere between the 6th and 8th centuries of the Christian era. It is probable that the present text became fixed as early as the 2nd century A.D., but even this earlier date leaves a long interval between the original autographs of the Old Testament writers and our present text. Since the fixing of the Massoretic text the task of preserving and transmitting the sacred books has been carried out with the greatest care and fidelity, with the result that the text has undergone practically no change of any real importance; but before that date, owing to various causes, it is beyond dispute that a large number of corruptions were introduced into the Hebrew text. In dealing, therefore, with the textual criticism of the Old Testament it is necessary to determine the period at which the text assumed its present fixed form before considering the means at our disposal for controlling the text when it was, so to speak, in a less settled condition.

Massoretic text.

An examination of the extant MSS. of the Hebrew Old Testament reveals two facts which at first sight are somewhat remarkable. The first is that the oldest dated MS., the *Codex Babylonicus Petropolitanus*, only goes back to the year A.D. 916, though it is probable that one or two MSS. belong to the 9th century. The second fact is that all our Hebrew MSS. represent one and the same text, viz. the Massoretic. This text was the work of a special gild of trained scholars called Massoretes (בעלי המסרת) or "masters of tradition" (מסורה or less correctly [2],מסרת whose aim was not only to preserve and transmit the consonantal text which had been handed down to them, but also to ensure its proper pronunciation. To this end they provided the text with a complete system of vowel points and accents.[3] Their labours further included the compilation of a number of notes, to which the term Massorah is now usually applied. These notes for the most part constitute a sort of index of the peculiarities of the text, and possess but little general interest. More important are those passages in which the Massoretes have definitely adopted a variation from the consonantal text. In these cases the vowel points attached to the written word (*Kĕthībh*) belong to the word which is to be substituted for it, the latter being placed in the margin with the initial letter of *Qĕrē* (= to be read) prefixed to it. Many even of these readings merely relate to variations of spelling, pronunciation or grammatical forms; others substitute a more decent expression for the coarser phrase of the text, but in some instances the suggested reading really affects the sense of the passage. These last are to be regarded either as old textual variants, or, more probably, as emendations corresponding to the *errata* or *corrigenda* of a modern printed book. They do not point to any critical editing of the text; for the aim of the Massoretes was essentially conservative. Their object was not to create a new text, but rather to ensure the accurate transmission of the traditional text which they themselves had received. Their work may be said to culminate in the vocalized text which resulted from the labours of Rabbi Aaron ben Asher in the 10th century.[4] But the writings of Jerome in the 4th, and of Origen in the 3rd century both testify to a Hebrew text practically identical with that of the Massoretes. Similar evidence is furnished by the Mishna and the Gemara, the Targums, and lastly by the Greek version of Aquila,[5] which dates from the first half of the 2nd century A.D. Hence it is hardly doubtful that the form in which we now possess the Hebrew text was already fixed by the beginning of the 2nd century. On the other hand, evidence such as that of the *Book of Jubilees* shows that the form of the text still fluctuated considerably as late as the 1st century A.D., so that we are forced to place the fixing of the text some time between the fall of Jerusalem and the production of Aquila's version. Nor is the occasion far to seek. After the fall of Jerusalem the new system of biblical exegesis founded by Rabbi Hillel reached its climax at Jamnia under the famous Rabbi Aqiba (d. *c.* 132). The latter's system of interpretation was based upon an extremely literal treatment of the text, according to which the smallest words or particles, and sometimes even the letters of scripture, were invested with divine authority. The inevitable result of such a system must have been the fixing of an officially recognized text, which could scarcely have differed materially from that which was finally adopted by the Massoretes. That the standard edition was not the result of the critical investigation of existing materials may be assumed with some certainty.[6] Indeed, it is probable, as has been suggested,[7] that the manuscript which was adopted as the standard text was an old and well-written copy, possibly one of those which were preserved in the Court of the Temple.

But if the evidence available points to the time of Hadrian as the period at which the Hebrew text assumed its present form, it is even more certain that prior to that date the various MSS. of the Old Testament differed very materially from one another. Sufficient proof of this statement is furnished by the Samaritan Pentateuch and the versions, more especially the Septuagint. Indications also are not wanting in the Hebrew text itself to show that in earlier times the text was treated with considerable

freedom. Thus, according to Jewish tradition, there are eighteen[8] passages in which the older scribes deliberately altered the text on the ground that the language employed was either irreverent or liable to misconception. Of a similar nature are the changes introduced into proper names, *e.g.* the substitution of *bosheth* (= shame) for *ba'al* in Ishbosheth (2 Sam. ii. 8) and Mephibosheth (2 Sam. ix. 6; cf. the older forms Eshbaal and Meribaal, 1 Chron. viii. 34, 35); the use of the verb "to bless" (ברך) in the sense of cursing (1 Kings xxi. 10, 13; Job i. 5, 11, ii. 5, 9; Ps. x. 3); and the insertion of "the enemies of" in 1 Sam. xxv. 22, 2 Sam. xii. 14. These intentional alterations, however, only affect a very limited portion of the text, and, though it is possible that other changes were introduced at different times, it is very unlikely that they were either more extensive in range or more important in character. At the same time it is clear both from internal and external evidence that the archetype from which our MSS. are descended was far from being a perfect representative of the original text. For a comparison of the different parallel passages which occur in the Old Testament (*e.g.* 1 and 2 Samuel, 1 and 2 Kings, and 1 and 2 Chronicles; 2 Kings xviii. 13-xx. 19 and Isaiah xxxvi.-xxxix; 2 Sam. xxii. and Ps. xviii.; Ps. xiv. and liii., &c.) reveals many variations which are obviously due to textual corruption, while there are many passages which in their present form are either ungrammatical, or inconsistent with the context or with other passages. Externally also the ancient versions, especially the Septuagint, frequently exhibit variations from the Hebrew which are not only intrinsically more probable, but often explain the difficulties presented by the Massoretic text. Our estimate of the value of these variant readings, moreover, is considerably heightened when we consider that the MSS. on which the versions are based are older by several centuries than those from which the Massoretic text was derived; hence the text which they presuppose has no slight claim to be regarded as an important witness for the original Hebrew. "But the use of the ancient versions" (to quote Prof. Driver[9]) "is not always such a simple matter as might be inferred.... In the use of the ancient versions for the purposes of textual criticism there are *three* precautions which must always be observed; we must reasonably assure ourselves that we possess the version itself in its original integrity; we must eliminate such variants as have the appearance of originating merely with the translator; the remainder, which will be those that are due to a difference of text in the MS. (or MSS.) used by the translator, we must then compare carefully, in the light of the considerations just stated, with the existing Hebrew text, in order to determine on which side the superiority lies."

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Versions.—In point of age the Samaritan Pentateuch furnishes the earliest external witness to the Hebrew text. It is not a version, but merely that text of the Pentateuch which has been preserved by the Samaritan community since the time of Nehemiah (Neh. xiii. 23-31), *i.e.* about 432 B.C.[10] It is written in the Samaritan script, which is closely allied to the old Hebrew as opposed to the later "square" character. We further possess a Samaritan Targum of the Pentateuch written in the Samaritan dialect, a variety of western Aramaic, and also an Arabic translation of the five books of the law; the latter dating perhaps from the 11th century A.D. or earlier. The Samaritan Pentateuch agrees with the Septuagint version in many passages, but its chief importance lies in the proof which it affords as to the substantial agreement of our present text of the Pentateuch, apart from certain intentional changes,[11] with that which was promulgated by Ezra. Its value for critical purposes is considerably discounted by the late date of the MSS., upon which the printed text is based.

Samaritan.

The Targums, or Aramaic paraphrases of the books of the Old Testament (see TARGUM), date from the time when Hebrew had become superseded by Aramaic as the language spoken by the Jews, *i.e.* during the period immediately preceding the Christian era. In their written form, however, the earlier Targums, viz. those on the Pentateuch and the prophetical books, cannot be earlier than the 4th or 5th century A.D. Since they were designed to meet the needs of the people and had a directly edificatory aim, they are naturally characterized by expansion and paraphrase, and thus afford invaluable illustrations of the methods of Jewish interpretation and of the development of Jewish thought. The text which they exhibit is virtually identical with the Massoretic text.

Aramaic.

The earliest among the versions as well as the most important for the textual criticism of the Old Testament is the Septuagint. This version probably arose out of the needs of the Greek-speaking Jews of Alexandria in the 3rd century B.C. According to tradition the law was translated into Greek during the reign of Ptolemy Philadelphus (284-247 B.C.), and, though the form (viz. the *Letter of Aristeas*) in which this tradition has come down to us cannot be regarded as historical, yet it seems to have preserved correctly both the date and the locality of the version. The name Septuagint, strictly speaking, only applies to the translation of the Pentateuch, but it was afterwards extended to include the other books of the Old Testament as they were translated. That the interval which elapsed before the Prophets and the Hagiographa were also translated was no great one is shown by the prologue to Sirach which speaks of "the Law, the Prophets and the rest of the books," as already current in a translation by 132 B.C. The date at which the various books were combined into a single work is not known, but the existence of the Septuagint as a whole may be assumed for the 1st century A.D., at which period the Greek version was universally accepted by the Jews of the Dispersion as Scripture, and from them passed on to the Christian Church.

Septuagint.

The position of the Septuagint, however, as the official Greek representative of the Old Testament did not long remain unchallenged. The opposition, as might be expected, came from the side of the Jews, and was due partly to the controversial use which was made of the version by the Christians, but chiefly to the fact that it was not sufficiently in agreement with the standard Hebrew text established by Rabbi Aqiba and his school. Hence arose in the 2nd century A.D. the three new versions of Aquila, Symmachus and Theodotion. Aquila was a Jewish proselyte of Pontus, and since he was a disciple of Rabbi Aqiba (d. A.D. 135), and (according to another Talmudic account) also of Rabbi Eliezer and Rabbi Joshua, the immediate predecessors of Aqiba, his version may be assigned to the first half of the 2nd century. It is characterized by extreme literalness, and clearly reflects the peculiar system of exegesis which was then in vogue among the Jewish rabbis. Its slavish adherence to the original caused the new translation to be received with favour by the Hellenistic Jews, among whom it quickly superseded the older Septuagint. For what remains of this version, which owing to its character is of the greatest value to the textual critic, we have until recently been indebted to Origen's *Hexapla* (see below); for, though Jerome mentions a *secunda editio*, no MS. of Aquila's translation has survived. Fragments[12], however, of two codices were discovered (1897) in the genizah at Cairo, which illustrate more fully the peculiar features of this version.

Versions of Aquila, Symmachus, Theodotion.

The accounts given of Theodotion are somewhat conflicting. Both Irenaeus and Epiphanius describe him as a Jewish proselyte, but while the former calls him an Ephesian and mentions his translation before that of Aquila, the latter states that he was a native of Pontus and a follower of Marcion, and further assigns his work to the reign of Commodus (A.D. 180-192); others, according to Jerome, describe him as an Ebionite. On the whole it is probable that Irenaeus has preserved the most trustworthy account.[13] Theodotion's version differs from those of Aquila and Symmachus in that it was not an independent translation, but rather a revision of the Septuagint on the basis of the current Hebrew text. He retained, however, those passages of which there was no Hebrew equivalent, and added translations of the Hebrew where the latter was not represented in the Septuagint. A peculiar feature of his translation is his excessive use of transliteration, but, apart from this, his work has many points of contact with the Septuagint, which it closely resembles in style; hence it is not surprising to find that later MSS. of the Septuagint have been largely influenced by Theodotion's translation. In the case of the book of Daniel, as we learn from Jerome (*praefatio in Dan.*), the translation of Theodotion was definitely adopted by the Church, and is accordingly found in the place of the original Septuagint in all MSS. and editions.[14] It is interesting to note in this connexion that renderings which agree in the most remarkable manner with Theodotion's version of Daniel are found not only in writers of the 2nd century but also in the New Testament. The most probable explanation of this phenomenon is that these renderings are derived from an early Greek translation, differing from the Septuagint proper, but closely allied to that which Theodotion used as the basis of his revision.

Symmachus, according to Eusebius and Jerome, was an Ebionite; Epiphanius represents him (very improbably) as a Samaritan who became a Jewish proselyte. He is not mentioned by Irenaeus and his date is uncertain, but probably his work is to be assigned to the end of the 2nd century. His version was commended by Jerome as giving the sense of the original, and in that respect it forms a direct contrast with that of Aquila. Indeed Dr Swete[15] thinks it probable that "he wrote with Aquila's version before him, (and that) in his efforts to recast it he made free use both of the Septuagint and of Theodotion."

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As in the case of Aquila, our knowledge of the works of Theodotion and Symmachus is practically limited to the fragments that have been preserved through the labours of Origen. This writer (see ORIGEN) conceived the idea of collecting all the existing

Origen's 'Hexapla.'

Greek versions of the Old Testament with a view to recovering the original text of the Septuagint, partly by their aid and partly by means of the current Hebrew text. He accordingly arranged the texts to be compared in six[16] parallel columns in the following order:—(1) the Hebrew text; (2) the Hebrew transliterated into Greek letters; (3) Aquila; (4) Symmachus; (5) the Septuagint; and (6) Theodotion. In the Septuagint column he drew attention to those passages for which there was no Hebrew equivalent by prefixing an obelus; but where the Septuagint had nothing corresponding to the Hebrew text he supplied the omissions, chiefly but not entirely from the translation of Theodotion, placing an asterisk at the beginning of the interpolation; the close of the passage to which the obelus or the asterisk was prefixed was denoted by the metobelus. That Origen did not succeed in his object of recovering the original Septuagint is due to the fact that he started with the false conception that the original text of the Septuagint must be that which coincided most nearly with the current Hebrew text. Indeed, the result of his monumental labours has been to impede rather than to promote the restoration of the genuine Septuagint. For the Hexaplar text which he thus produced not only effaced many of the most characteristic features of the old version, but also exercised a prejudicial influence on the MSS. of that version.

The *Hexapla* as a whole was far too large to be copied, but the revised Septuagint text was published separately by Eusebius and Pamphilus, and was extensively used in Palestine during the 4th century. During the same period two other recensions made their appearance, that of Hesychius which was current in Egypt, and that of Lucian which became the accepted text of the Antiochene Church. Of Hesychius little is known. Traces of his revision are to be found in the Egyptian MSS., especially the Codex Marchalianus, and in the quotations of Cyril of Alexandria. Lucian was a priest of Antioch who was martyred at Nicomedia in A.D. 311 or 312. His revision (to quote Dr Swete) "was doubtless an attempt to revise the κοινή (or 'common text' of the Septuagint) in accordance with the principles of criticism which were accepted at Antioch." To Ceriani is due the discovery that the text preserved by codices 19, 82, 93, 108, really represents Lucian's recension; the same conclusion was reached independently by Lagarde, who combined codex 118 with the four mentioned above.[17] As Field (*Hexapla*, p. 87) has shown, this discovery is confirmed by the marginal readings of the *Syro-Hexapla*. The recension (see Driver, *Notes on the Hebrew Text of the Books of Samuel*, p. 52) is characterized by the substitution of synonyms for the words originally used by the Septuagint, and by the frequent occurrence of double renderings, but its chief claim to critical importance rests on the fact that "it embodies renderings not found in other MSS. of the Septuagint which presuppose a Hebrew original self-evidently superior in the passages concerned to the existing Massoretic text."

Hesychius, Lucian.

Latin Versions.—Of even greater importance in this respect is the Old Latin version, which undoubtedly represents a Greek original prior to the *Hexapla*. "The earliest form of the version" (to quote Dr Kennedy[18]) "to which we can assign a definite date, namely, that used by Cyprian, plainly circulated in Africa." In the view of many authorities this version was first produced at Carthage, but recent writers are inclined to regard Antioch as its birthplace, a view which is supported by the remarkable agreement of its readings with the Lucianic recension and with the early Syriac MSS. Unfortunately the version is only extant in a fragmentary form, being preserved partly in MSS., partly in quotations of the Fathers. The non-canonical books of the Vulgate, however, which do not appear to have been revised by Jerome, still represent the older version. It was not until after the 6th century that the Old Latin was finally superseded by the Vulgate or Latin translation of the Old Testament made by Jerome during the last quarter of the 4th century. This new version was translated from the Hebrew, but Jerome also made use of the Greek versions, more especially of Symmachus. His original intention was to revise the Old Latin, and his two revisions of the Psalter, the Roman and the Gallican, the latter modelled on the *Hexapla*, still survive. Of the other books which he revised according to the Hexaplar text, that of Job has alone come down to us. For textual purposes the Vulgate possesses but little value, since it presupposes a Hebrew original practically identical with the text stereotyped by the Massoretes.

Vulgate.

Syriac Versions.—The Peshito (P'shitta) or "simple" revision of the Old Testament is a translation from the Hebrew, though certain books appear to have been influenced by the Septuagint. Its date is unknown, but it is usually assigned to the 2nd century A.D. Its value for textual purposes is not great, partly because the underlying text is the same as the Massoretic, partly because the Syriac text has at different times been harmonized with that of the Septuagint.

The Syro-Hexaplar version, on the other hand, is extremely valuable for critical purposes. This Syriac translation of the Septuagint column of the *Hexapla* was made by Paul, bishop of Tella, at Alexandria in A.D. 616-617. Its value consists in the extreme literalness of the translation, which renders it possible to recover the Greek original with considerable certainty. It has further preserved the critical signs employed by Origen as well as many readings from the other Greek versions; hence it forms our chief authority for reconstructing the *Hexapla*. The greater part of this work is still extant; the poetical and prophetical books have been preserved in the *Codex Ambrosianus* at Milan (published in photolithography by Ceriani, *Mon. Sacr. et Prof.*), and the remaining portions of the other books have been collected by Lagarde in his *Bibliothecae Syriacae*, &c.

Syro-Hexaplar.

Of the remaining versions of the Old Testament the most important are the Egyptian, Ethiopic, Arabic, Gothic and Armenian, all of which, except a part of the Arabic, appear to have been made through the medium of the Septuagint.

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(J. F. ST.)

3. *Textual Criticism.*

Distinction between Textual and Higher Criticism.

The aim of scientific Old Testament criticism is to obtain, through discrimination between truth and error, a full appreciation of the literature which constitutes the Old Testament, of the life out of which it grew, and the secret of the influence which these have exerted and still exert. For such an appreciation many things are needed; and the branches of Old Testament criticism are correspondingly numerous. It is necessary in the first instance to detect the errors which have crept into the text in the course of its transmission, and to recover, so far as possible, the text in its original form; this is the task of *Textual*, or as it is sometimes called in contradistinction to another branch, *Lower Criticism*. It then becomes the task of critical exegesis to interpret the text thus recovered so as to bring out the meaning intended by the original authors. This *Higher Criticism* partakes of two characters, literary and historical. One branch seeks to determine the scope, purpose and character of the various books of the Old Testament, the times in and conditions under which they were written, whether they are severally the work of a single author or of several, whether they embody earlier sources and, if so, the character of these, and the conditions under which they have reached us, whether altered and, if altered, how; this is *Literary Criticism*. A further task is to estimate the value of this literature as evidence for the history of Israel, to determine, as far as possible, whether such parts of the literature as are contemporary with the time described present correct, or whether in any respect one-sided or biased or otherwise incorrect, descriptions; and again, how far the literature that relates the story of long past periods has drawn upon trustworthy records, and how far it is possible to extract historical truth from traditions (such as those of the Pentateuch) that present, owing to the gradual accretions and modifications of intervening generations, a composite picture of the period described, or from a work such as Chronicles, which narrates the past under the influence of the conception that the institutions and ideas of the present must have been established and current in the past; all this falls under *Historical Criticism*, which, on its constructive side, must avail itself of all available and well-sifted evidence, whether derived from the Old Testament or elsewhere, for its

presentation of the history of Israel—its ultimate purpose. Finally, by comparing the results of this criticism as a whole, we have to determine, by observing its growth and comparing it with others, the essential character of the religion of Israel.

In brief, then, the criticism of the Old Testament seeks to discover what the words written actually meant to the writers, what the events in Hebrew history actually were, what the religion actually was; and hence its aim differs from the dogmatic or homiletic treatments of the Old Testament, which have sought to discover in Scripture a given body of dogma or incentives to a particular type of life or the like.

Biblical criticism, and in some respects more especially Old Testament criticism, is, in all its branches, very largely of modern growth. This has been due in part to the removal of conditions unfavourable to the critical study of the evidence that existed, in part to the discovery in recent times of fresh evidence. The unfavourable conditions and the critical efforts which were made in spite of them can only be briefly indicated.

Growth of criticism.

For a long time Biblical study lacked the first essential of sound critical method, viz. a critical text of the literature. Jewish study was exclusively based on the official Hebrew text, which was fixed, probably in the 2nd century A.D., and thereafter scrupulously preserved. This text, however, had suffered certain now obvious corruptions, and, probably enough, more corruption than can now, or perhaps ever will be, detected with certainty. The position of Christian (and Jewish Alexandrian) scholars was considerably worse; for, with rare exceptions, down to the 5th century, and practically without exception between the 5th and 15th centuries, their study was exclusively based on *translations*. Beneath the ancient Greek version, the Septuagint, there certainly underlay an earlier form of the Hebrew text than that perpetuated by Jewish tradition, and if Christian scholars could have worked through the version to the underlying Hebrew text, they would often have come nearer to the original meaning than their Jewish contemporaries. But this they could not do; and since the version, owing to the limitations of the translators, departs widely from the sense of the original, Christian scholars were on the whole kept much farther from the original meaning than their Jewish contemporaries, who used the Hebrew text; and later, after Jewish grammatical and philological study had been stimulated by intercourse with the Arabs, the relative disadvantages under which Christian scholarship laboured increased. Still there are not lacking in the early centuries A.D. important, if limited and imperfect, efforts in textual criticism. Origen, in his *Hexapla*, placed side by side the Hebrew text, the Septuagint, and certain later Greek versions, and drew attention to the variations: he thus brought together for comparison, an indispensable preliminary to criticism, the chief existing evidence to the text of the Old Testament. Unfortunately this great work proved too voluminous to be preserved entire; and in the form in which it was fragmentarily preserved, it even largely enhanced the critical task of later centuries. Jerome, perceiving the unsatisfactory position of Latin-speaking Christian scholars who studied the Old Testament at a *double remove* from the original—in Latin versions of the Greek—made a fresh Latin translation direct from the Hebrew text then received among the Jews. It is only in accordance with what constantly recurs in the history of Biblical criticism that this effort to approximate to the truth met at first with considerable opposition, and was for a time regarded even by Augustine as dangerous. Subsequently, however, this version of Jerome (the Vulgate) became the basis of Western Biblical scholarship. Henceforward the Western Church suffered both from the corruptions in the official Hebrew text and also from the fact that it worked from a version and not from the original, for a knowledge of Hebrew was rare indeed among Christian scholars between the time of Jerome and the 16th century.

But if the use of versions, or of an uncritical text of the original, was one condition unfavourable to criticism, another that was not less serious was the dominance over both Jews and Christians of unsound methods of interpretation—legal or dogmatic or allegorical. The influence of these can be traced as early as the Greek version (3rd century B.C. and later); allegorical interpretation is conspicuous in the Alexandrian Jewish scholar Philo (*q.v.*); it may be seen in many New Testament interpretations of the Old Testament (*e.g.* Gal. iii. 16, iv. 21-31), found a classical exponent in Origen, and, in spite of the opposition of the school of Antioch, pre-eminently of Theodore (d. A.D. 428), maintained its power virtually unbroken down to the Reformation. It is true that even by the most thorough-going allegorists the literal sense of Scripture was not openly and entirely disregarded; but the very fact that the study of Hebrew was never more than exceptional, and so early ceased to be cultivated at all, is eloquent of indifference to the original literal sense, and the very principle of the many meanings inherent in the sacred writings was hostile to sound interpretation; greater importance was attached to the “deeper” or “hidden” senses, *i.e.* to the various unreal interpretations, and when the literal sense conflicted with the dogmas or tradition of the Church its validity was wholly denied. The extraordinary ambiguity and uncertainty which allegorical interpretation tacitly ascribed to Scripture, and the ease with which heretical as well as orthodox teaching could be represented as “hidden” under the literal sense, was early perceived, but instead of this leading to any real check on even wild subjectivity in interpretation and insistence on reaching the literal sense, it created an ominous principle that maintained much of its influence long after the supremacy of allegorism was overthrown. This is the principle that all interpretation of Scripture must be according to the *Regula fidei*—that all interpretation which makes Scripture contradict or offend the traditions of the Church is wrong.

The spirit and the age of humanism and the Reformation effected and witnessed important developments in the study of the Old Testament. It was still long before any considerable results were achieved; but in various ways the dogmatic and traditional treatment of Scripture was undermined; the way was opened for a more real and historical method. It must suffice to refer briefly to two points.

1. Ignorance gave place to knowledge of the languages in which the Old Testament was written. In 1506 the distinguished humanist, Johann Reuchlin, who had begun the study of Hebrew under a Jewish teacher about 1492, published a work entitled *De Rudimentis Hebraicis* containing a Hebrew lexicon and a Hebrew grammar. In 1504 Konrad Pellikan (Pellicanus), whose study of Hebrew had profited from intercourse with Reuchlin, had published a brief introduction to the language. In 1514 the Complutensian Polyglott began to be printed and in 1522 was published. Various Jewish editions of the Hebrew Bible had already been printed—in part since 1477, entire since 1488; but this work contained the first Christian edition of the text. Certainly the editors did not intend hereby to exalt the original above the versions; for they placed the Vulgate in the centre of the page with the Hebrew on one side, the Greek on the other, *i.e.* as they themselves explained it, the Roman Church between the synagogue and the Greek Church, as Christ crucified between two thieves. Yet even so the publication of the Hebrew text by Christian scholars marks an important stage; henceforth the study of the original enters increasingly into Christian Biblical schojarship; it already underlay the translations which form so striking a feature of the 16th century. Luther’s German version (Pentateuch, 1523) and Tyndale’s English version (Pentateuch, 1530) were both made from the Hebrew. At first, and indeed down to the middle of the 17th century, Jewish traditions and methods in the study of Hebrew dominated Christian scholars; but in the 17th and 18th centuries the study of other Semitic languages opened up that comparative linguistic study which was systematized and brought nearer to perfection in the 19th century (which also witnessed the opening up of the new study of Assyrian) by scholars such as Gesenius, Ewald, Olshausen, Renan, Nöldeke, Stade and Driver. This has done much to render possible a more critical interpretation of the Old Testament.

2. An increasing stress was laid on the *literal* sense of Scripture. The leading Reformers—Luther, Zwingli, Melancthon—frequently expressed themselves against the prevailing view of the manifold sense of Scripture, and in particular questioned the legitimacy of allegorical interpretation—except for purposes of popular and practical exposition. The effort to get at and abide by the literal sense is characteristic of Calvin’s extensive exegetical works. True, practice did not always keep pace with theory, and the literal sense had to yield if it came into conflict with the “Faith”: the allegorical method for long obscured the meaning of the *Song of Songs*, and any departure from it was severely condemned; just as Theodore of Mopsuestia drew down on himself for maintaining the literal sense of the *Song* the condemnation of the Second Council of Constantinople (A.D. 553), so Sebastian Castellio owed (in part) to the same indiscretion his expulsion from Geneva in 1544. Even in the 16th and 17th centuries scholars like Grotius and Michaelis met with violent opposition for the same cause.

But, however slowly and irregularly, the new conditions and the new spirit affected the study of the Old Testament. It became subject to the same critical methods which since the Renaissance have been applied to other ancient literatures. Biblical criticism is part of a wider critical movement, but it is noticeable how, from stage to stage, Biblical scholars adopted the various critical methods which as applied to other literatures have been proved valid, rather than themselves initiated them. The textual

criticism of the classical literatures made way before the textual criticism of the Old Testament: Bentley's *Phalaris* (1699) preceded any thorough or systematic application of Higher Criticism to any part of the Old Testament; Niebuhr's *History of Rome* (1811) preceded Ewald's *History of Israel* (1843-1859).

Conditions of Textual Criticism in the Bible.

The fundamental principles of the Textual Criticism of the Old Testament are the same as those which apply to any other ancient text and need not be described here (see the article Textual Criticism). There are also, however, certain conditions peculiar to the text of the Old Testament. The significance of these and the extent to which they must govern the application of the general principles have even yet scarcely obtained full and general recognition. These, then, must be briefly described.

The earliest Hebrew MSS. of the Old Testament date from not earlier than the 9th century A.D., or nearly one thousand years after the latest parts of the Old Testament were written. These MSS., and the Hebrew Bibles as usually printed, contain in reality two perfectly distinct texts—the work of two different ages separated from one another by centuries: the one is a text of the Old Testament itself, the other a text of a later Jewish interpretation of the Old Testament. The text of the Old Testament consists of consonants only, for the alphabet of the ancient Hebrews, like that of their Moabite, Aramaean and Phoenician neighbours, contained no vowels; the text of the interpretation consists of vowels and accents only—for vowel signs and accents had been invented by Jewish scholars between the 5th and 9th centuries A.D.; the text of the Old Testament is complete in itself and intelligible, though ambiguous; but the text of the interpretation read by itself is unintelligible, and only becomes intelligible when read with the consonants (under, over, or in which they are inserted) of the text of the Old Testament. But the fact that the later text makes use of the earlier to make itself intelligible in no way destroys the fact that it is as entirely distinct a work from the earlier as is any commentary distinct from the work on which it comments. The first task of Old Testament textual criticism after the Reformation was to prove the independence of these two texts, to gain general recognition of the fact that vowels and accents formed no part of the original Hebrew text of the Old Testament. The conflict that arose over this question in the Christian Church was prolonged and bitter—in part because it unfortunately became inflamed by the contending interests of Roman Catholic and Protestant. The coeval origin of consonants and vowels had indeed been questioned or denied by the earliest reformers (Luther, Zwingli, Calvin), but later, in the period of Protestant scholasticism and under the influence of one school of Jewish Rabbis, Protestant scholars in particular, and especially those of the Swiss school, notably the Buxtorfs, had committed themselves to the view that the vowels formed an integral and original part of the text of the Old Testament; and this they maintained with all the more fervency because the ambiguity of the consonants without the vowels was a troublesome fact in the way of the extreme Protestant doctrine of the inspiration, verbal infallibility and sufficiency of Scripture, while it was by no means unwelcome to Catholic theologians with their doctrine of the need for an authoritative interpretation. Still in the end it was due in large measure to the learning and argumentative power devoted to this subject by the French Protestant scholar, Louis Capell, and, amongst others, by the English Protestant scholar, Brian Walton, that by the end of the 17th century this particular controversy was practically at an end; criticism had triumphed, and the later origin of the vowels was admitted. Yet, as often happens, the influence of tradition lingered long after it had been proved to be false; thus the R.V., instead of being an independent translation of the Hebrew text, is intended (with rare exceptions, as *e.g.* in Is. lix. 19, where R.V. translates the Hebrew text and R.V. margin the Jewish interpretation) to be merely a translation of the Jewish interpretation; and to the present day it is usual, though obviously uncritical and wrong, to describe perfectly legitimate translations of the received consonantal text, if they happen to presuppose other vowels than those provided by Jewish tradition, as based on emendation; even in the English edition of Haupt's *Sacred Books of the Old Testament* (see below) the possibility of this unfortunate misunderstanding is not altogether removed.

But the original text of the Old Testament long before it was combined with the text of the Jewish or Massoretic interpretation had already undergone a somewhat similar change, the extent of which was indeed far less, but also less clearly discoverable. This change consisted in the insertion into the original text of certain consonants which had come to be also used to express vowel sounds: *e.g.* the Hebrew consonant corresponding to *w* also expressed the vowel *o* or *u*, the consonant *h* the vowel *a*, and so forth. For reasons suggested partly by the study of Semitic inscriptions, partly by comparison of passages occurring twice within the Old Testament, and partly by a comparison of the Hebrew text with the Septuagint, it is clear that the authors of the Old Testament (or at least most of them) themselves made some use of these vowel consonants, but that in a great number of cases the vowel consonants that stand in our present text were inserted by transcribers and editors of the texts. Again, and for similar reasons, it is probable that in many cases, if not in all, the original texts were written without any clear division of the consonants into words. In view of all this, the first requisite for a critical treatment of the text of the Old Testament is to consider the consonants by themselves, to treat every vowel-consonant as *possibly* not original, and the existing divisions of the text into words as original only in those cases where they yield a sense better than any other possible division (or, at least, as good). Certainly all this brings us face to face with much ambiguity and demands increased skill in interpretation, but anything short of it falls short also of strict critical method. A perception of this has only been gradually reached, and is even now none too general.

Apart from these changes in the history of the text, it has, like all ancient texts, suffered from accidents of transmission, from the unintentional mistakes of copyists. This fact was, naturally enough and under the same dogmatic stress, denied by those scholars who maintained that the vowels were an integral part of the text. Here again we may single out Capellus as a pioneer in criticism, in his *Critica sacra sive de variis quae in sacris V. T. libris occurrunt lectionibus*, written in 1634, much studied in MS. by scholars before its publication in 1650, and unavailingly criticized by Buxtorf the younger in his *Anticritica seu vindiciae veritatis hebraicae* (1653). Capellus drew conclusions from such important facts as the occurrence of variations in the two Hebrew texts of passages found twice in the Old Testament itself, and the variations brought to light by a comparison of the Jewish and Samaritan texts of the Pentateuch, the Hebrew text and the Septuagint, the Hebrew text and New Testament quotations from the Old Testament.

In order that the principles already perceived by Capellus might be satisfactorily applied in establishing a critical text, many things were needed; for example, a complete collation of existing MSS. of the Jewish text and of the Samaritan text of the Pentateuch, the establishing of a critical text of the Septuagint, a careful study of the several versions directed to determining when real variants are implied and what they are. Some of this work has been accomplished: much of it remains to be done.

The Hebrew MSS. were collated by Kennicott and de Rossi at the close of the 18th century, with sufficient thoroughness to justify the important conclusion that all existing MSS. reproduce a single recension. The Samaritan MSS. are still very imperfectly collated; the same is true of the Syriac and other versions except the Septuagint. In regard to the Septuagint, though the work is by no means complete, much has been done. For collection of material the edition of Holmes and Parsons (Oxford, 1798-1827), with its magnificent critical apparatus, is pre-eminent; the preparation of a similar edition, on a rather smaller scale but embodying the results of fresh and more careful collation, was subsequently undertaken by Cambridge scholars.[19] These editions furnish the material, but neither attempts the actual construction of a critical text of the version. Some important contributions towards a right critical method of using the material collected have been made—in particular by Lagarde, who has also opened up a valuable line of critical work, along which much remains to be done, by his restoration of the Lucianic recension, one of the three great recensions of the Greek text of the Old Testament which obtained currency at the close of the 3rd and beginning of the 4th centuries A.D.

More especially since the time of Capellus the value of the Septuagint for correcting the Hebrew text has been recognized; but it has often been used uncritically, and the correctness of the Hebrew text underlying it in comparison with the text of the Hebrew MSS., though still perhaps most generally underestimated, has certainly at times been exaggerated.

Results of Criticism.

It has only been possible here to indicate in the briefest way what is involved in the collection and critical sifting of the extant evidence for the text of the Old Testament, how much of the work has been done and how much remains; and with equal brevity it must suffice to indicate the position which faces the textual critic when all that can be done in this way has been done. In so far as it is possible to recover the Hebrew text from which the Greek

version was made, it is possible to recover a form of the Hebrew text current about 280 B.C. in the case of the Pentateuch, some time before 100 B.C. in the case of most of the rest of the Old Testament. By comparison of the Hebrew MSS. it is not difficult to recover the recension which with few and unimportant variants they have perpetuated, and which may safely be regarded as differing but slightly from the text current and officially established before the end of the 2nd century A.D. By a comparison of these two lines of evidence we can approximate to a text current about 300 B.C. or later; but for any errors which had entered into the common source of these two forms of the text we possess no documentary means of detection whatsoever. The case then stands thus. Except by the obviously absurd assumption of the infallibility of copyists for the centuries before *c.* 300 B.C., we cannot escape the conclusion that *errors lurk even where no variants now exist*, and that *such errors can be corrected, if at all, only by conjectural emendation*. The dangers of conjectural emendation are well known and apparent; large numbers of such emendations have been ill-advised; but in the case of many passages the only alternative for the textual critic who is at once competent and honest is to offer such emendations or to indicate that such passages are corrupt and the means of restoring them lacking.

Conjectural emendations were offered by Capellus in the 17th, and by scholars such as C.F. Houbigant, Archbishop Seeker, Bishop Lowth and J.D. Michaelis in the 18th century. Some of these have approved themselves to successive generations of scholars, who have also added largely to the store of such suggestions; conjectural emendation has been carried furthest by upholders of particular metrical theories (such as Bickell and Duhm) which do not accommodate themselves well to the existing text, and by T.K. Cheyne (in *Critica Biblica*, 1903), whose restorations resting on a dubious theory of Hebrew history have met with little approval, though his negative criticism of the text is often keen and suggestive.

A model of the application of the various resources of Old Testament textual criticism to the restoration of the text is C.H. Cornill's *Das Buch des Propheten Ezechiel* (1886): outstanding examples of important systematic critical notes are J. Wellhausen's *Der Text der Bücher Samuelis* (1871) and S.R. Driver's *Notes on the Hebrew Text of the Books of Samuel* (1890). Haupt's *Sacred Books of the Old Testament*, edited by various scholars, was designed to present, when complete, a critical text of the entire Old Testament with critical notes. The results of textual criticism, including a considerable number of conjectural emendations, are succinctly presented in Kittel's *Biblia Hebraica* (1906); but the text here printed is the ordinary Massoretic (vocalized) text. The valuable editions of the Old Testament by Baer and Delitzsch, and by Ginsburg, contain *critical* texts of the Jewish interpretation of Scripture, and therefore necessarily *uncritical* texts of the Hebrew Old Testament itself: it lies entirely outside their scope to give or even to consider the evidence which exists for correcting the obvious errors in the text of the Old Testament as received and perpetuated by the Jewish interpreters. See also the authorities mentioned in the following section.

(G. B. G.*)

4. *Higher Criticism.*

We now pass on to consider the growth of literary and historic criticism, which constitute the *Higher Criticism* as already explained. Down to the Reformation conditions were unfavourable to such criticism; the prevailing dogmatic use of Scripture gave no occasion for inquiry into the human origins or into the real purport and character of the several books. Nevertheless we find some sporadic and tentative critical efforts or questions. The most remarkable of these was made *outside* the Church—a significant indication of the adverse effect of the conditions within; the Neo-platonist philosopher Porphyry[20] in the 3rd century A.D., untrammelled by church tradition and methods, anticipated one of the clearest and most important conclusions of modern criticism: he detected the incorrectness of the traditional ascription of Daniel to the Jewish captivity in Babylon and discerned that the real period of its composition was that of Antiochus Epiphanes, four centuries later. In the mind even of Augustine (*Locutio in Jos. vi. 25*) questions were raised by the occurrence of the formula "until this day" in Jos. iv. 9, but were stilled by a rather clever though wrong use of Jos. vi. 25; Abelard (*Heloissae Problema*, xli.) considers the problem whether the narrative of Moses's death in Deut. contains a prophecy by Moses or is the work of another and later writer, while the Jewish scholar Ibn Ezra (Abenezra), in a cryptic note on Deut. i. 1, which has been often quoted of late years, gathers together several indications that point, as he appears to perceive, to the post-Mosaic origin of the Pentateuch. Even rarer than these rare perceptions of the evidence of the quasi-historical books to their origin are such half-perceptions of the literary origin of the prophetical books as is betrayed by Ibn Ezra, who appears to question the Isaianic authorship of Is. xl.-lxvi., and by Photius, patriarch of Constantinople in the 9th century, who, according to Diestel (*Gesch. des A. T.*, 169), raises the question why the sixth chapter of Isaiah, containing the inaugural vision, does not stand at the beginning of the book.

Even after the Renaissance and the Reformation tradition continued influential. For though the Reformers were critical of the authority of ecclesiastical tradition in the matter of the interpretation and use of Scripture, they were not immediately interested in literary and historical criticism, nor concerned to challenge the whole body of traditional lore on these matters. At the same time we can see from Luther's attitude how the doctrine of the Reformers (unlike that of the Protestant scholastics who came later) admitted considerable freedom, in particular with reference to the extent of the canon, but also to several questions of higher criticism. Thus it is to Luther a matter of indifference whether or not Moses wrote the Pentateuch; the books of *Chronicles* he definitely pronounces less credible than those of *Kings*, and he considers that the books of *Isaiah, Jeremiah* and *Hosea* probably owe their present form to later hands. Carlstadt again definitely denied the Mosaic authorship of the Pentateuch on the ground that Moses could not have written the account of his own death and yet that Deut. xxxiv. cannot be separated from the rest of the Pentateuch. The later scholastic Protestant doctrine of verbal infallibility necessarily encouraged critical reaction and proved a widely extended retarding force far down into the 19th century. Nevertheless criticism advanced by slow degrees among individuals, now in the Roman Church, now in the number of those who sat loosely to the restrictions of either Roman or Protestant authority, and now among Protestant scholars and theologians.

The Reformers.

It would be impossible to refer here even briefly to all these, and it may be more useful to select for somewhat full description, as showing what could be achieved by, and what limitations beset, even a critical spirit in the 17th century, the survey of the origin of the Old Testament given by one such individual—Thomas Hobbes in his *Leviathan*[21] (published 1651) *c.* xxxiii. As far as possible this survey shall be cited verbatim:—

Hobbes.

> "Who were the original writers of the several books of Holy Scripture has not been made evident by any sufficient testimony of other history, which is the only proof of matter of fact; nor can be, by any argument of natural reason: for reason serves only to convince the truth, not of fact, but of consequence. The light therefore that must guide us in this question, must be that which is held out unto us from the books themselves: and this light, though it shew us not the author of every book, yet it is not unuseful to give us knowledge of the time wherein they were written."
>
> "And first, for the Pentateuch.... We read (Deut. xxxiv. 6) concerning the sepulchre of Moses 'that no man knoweth of his sepulchre to this day'; that is, to the day wherein those words were written. It is therefore manifest that these words were written after his interment. For it were a strange interpretation to say Moses spake of his own sepulchre, though by prophecy, that it was not found to that day wherein he was yet living." The suggestion that the last chapter only, not the whole Pentateuch, was written later, is met by Hobbes by reference to Gen. xii. 6 ("the Canaanite was then in the land") and Num. xxi. 14 (citation from a book relating the acts of Moses at the Red Sea and in Moab) and the conclusion reached that "the five books of Moses were written after his time, though how long after is not so manifest."
>
> "But though Moses did not compile those books entirely, and in the form we have them, yet he wrote all that which he is there said to have written: as, for example, the volume of the Law" contained "as it seemeth" in Deut. xi.-xxvii, "and this is that Law which ... having been lost, was long time after found again by Hilkiah and sent to King Josias (2 Kings xxii. 8)."
>
> The books of Joshua, Judges, Ruth, Samuel are proved much later than the times recorded in them by the numerous passages which speak of customs, conditions, &c., remaining "unto this day," and *Judges* in particular by xviii. 30, "where it said that 'Jonathan and his sons were priests to the tribe of Dan, until the day of the captivity of the land.'"

As for *Kings* and *Chronicles*, "besides the places which mention such monuments as, the writer saith, remained till his own days" (Hobbes here cites thirteen from Kings, two from Chron.), "it is argument sufficient that they were written after the captivity in Babylon, that the history of them is continued till that time. For the facts registered are always more ancient than the register; and much more ancient than such books as make mention of and quote the register, as these books do in divers places."

Ezra and Nehemiah were written after, Esther during, or after, the captivity; Job, which is not a history but a philosophical poem, at an uncertain date. The Psalms were written mostly by David, but "some of them after the return from the captivity, as the 137th and 126th, whereby it is manifest that the psalter was compiled and put into the form it now hath, after the return of the Jews from Babylon." The compilation of Proverbs is later than any of those whose proverbs are therein contained; but Ecclesiastes and Canticles are wholly Solomon's except the titles. There is little noticeable in Hobbes' dating of the prophets, though he considers it "not apparent" whether Amos wrote, as well as composed, his prophecy, or whether Jeremiah and the other prophets of the time of Josiah and Ezekiel, Daniel, Haggai and Zechariah, who lived in the captivity, *edited* the prophecies ascribed to them. He concludes: "But considering the inscriptions, or titles of their books, it is manifest enough that the whole Scripture of the Old Testament was set forth in the form we have it after the return of the Jews from their captivity in Babylon and before the time of Ptolemaeus Philadelphus."

Except in strangely making Zephaniah contemporary with Isaiah, Hobbes' conclusions, in so far as they differ from the traditional views, have been confirmed by the more thorough criticism of subsequent scholars. But apart from the special conclusions, the opening and closing considerations contain clear and important statements which still hold good. No fresh discoveries since the time of Hobbes have furnished any "testimony of other history" to the origin of the books of the Old Testament: this must still be determined by the statements and internal evidence of the Old Testament itself, and a deeper criticism has given to the final consideration that the Old Testament received its present form *after* the Exile a far greater significance than Hobbes perhaps guessed.

But the limitations of Hobbes' literary criticism judged from our present standpoint are great. The considerations from which he acutely and accurately draws far-reaching and important conclusions might be suggested by a very superficial examination of the literature; they involve, for example, no special philological knowledge. The effect of a deeper criticism has been (*a*) to give a more powerful support to some of Hobbes' conclusions; (*b*) to show that works (*e.g.* Ecclesiastes) whose traditional antiquity is left unquestioned by him are in reality of far more recent origin; (*c*) to eliminate the earlier sources or elements in the writings which Hobbes was content to date mainly or as a whole by their latest elements (*e.g. Pentateuch, Judges, Kings*), and thus to give to these earlier sources an historical value higher than that which would be safely attributed to them as indistinguishable parts of a late compilation.

Hobbes argues in the case of the *Pentateuch* that two authors are distinguishable—Moses and a much later compiler and editor. Spinoza, whose conclusions in his *Tractatus theologicopoliticus* (1671), *c.* viii. ix., had in general much in common with Hobbes, drew attention in particular to the confused mixture of law and narrative in the Pentateuch, the occurrence of duplicate narratives and chronological incongruities. Father Simon in his *Histoire critique du Vieux Testament* (1682) also argues that the Pentateuch is the work of more than one author, and makes an important advance towards a systematic analysis of the separate elements by observing that the style varies, being sometimes very curt and sometimes very copious "although the variety of the matter does not require it." But none of these makes any attempt to carry through a continuous analysis.

Astruc.

The first attempt of this kind is that of a French Catholic physician, Jean Astruc. In a work published anonymously in 1753 under the title of *Conjectures sur les mémoires originaux dont il paroît que Moyse s'est servi pour composer le livre de la Genèse*, he argued that in Genesis and Ex. i. ii. Moses had used different documents, and that of these the two chief were distinguished by their use of different divine names—Elohim and Yahweh; by the use of this clue he gave a detailed analysis of the passages belonging to the several documents. Astruc's criteria were too slight to give to all the details of his analysis anything approaching a final analysis; but later criticism has shown that his criteria, so far as they went, were valid, and his results, broadly speaking, sound though incomplete: and, moreover, they have abundantly justified his really important fundamental theory that the documents used by the compiler of the *Pentateuch* have been incorporated so much as they lay before him that we can get behind the compiler to the earlier sources and thus push back the evidence of much of the Pentateuch beyond the date of its compilation to the earlier date of the sources. In identifying the compiler with Moses, Astruc failed to profit from some of his predecessors: and the fact that he held to the traditional (Mosaic) origin of the Pentateuch may have prevented him from seeing the similar facts which would have led him to continue his analysis into the remaining books of the Pentateuch.

For subsequent developments, and the fruitful results of documentary analysis as applied to the Pentateuch and other composite books, which cannot be dealt with in any detail here, reference must be made to the special articles on the books of the Old Testament.

Lowth.

The year of the publication of Astruc's book saw also the publication of Bishop Lowth's *De sacra poesi Hebraeorum*; later Lowth published a new translation of Isaiah with notes (1778). Lowth's contribution to a more critical appreciation of the Old Testament lies in his perception of the nature and significance of parallelism in Hebrew poetry, in his discernment of the extent to which the prophetical books are poetical in form, and in his treatment of the Old Testament as the expression of the thought and emotions of a people—in a word, as *literature*. Both Lowth's works were translated and became influential in Germany.

Eichhorn.

In spite of these earlier achievements, it is J.G. Eichhorn who has, not without reason, been termed the "founder of modern Old Testament criticism." Certainly the publication of his *Einleitung* (*Introduction to the Old Testament*), in 1780-1783, is a landmark in the history of Old Testament criticism. An intimate friend of Herder, himself keenly interested in literature, he naturally enough treats the Old Testament as literature—like Lowth, but more thoroughly; and, as an Oriental scholar, he treats it as an Oriental literature. In both respects he was to be widely followed. His *Introduction*, consisting of three closely packed volumes dealing with textual as well as literary criticism, is the first comprehensive treatment of the entire Old Testament as literature. Much of the voluminous detailed work in this and other works is naturally enough provisional, but in the *Introduction* there emerge most of the broad conclusions of literary criticism (sometimes incomplete) which, after more than a century of keen examination by scholars unwilling to admit them, have passed by more or less general consent into the number of historical certainties or high probabilities. With his wide linguistic knowledge Eichhorn perceived that the language alone (though he also adduces other considerations) betrays the late origin of *Ecclesiastes*, which he places in the Persian Period (538-332 B.C.): *Canticles*, too, preserves linguistic features which are not of the Solomonic age. He analyses significant stylistic peculiarities such as occur, *e.g.*, in *Isaiah* xxiv.-xxvii. For various reasons (here following Koppe, who just previously in additions to his translation of Lowth's *Isaiah* had shown himself the pioneer of the higher criticism of the book of Isaiah) he argues that "in our *Isaiah* are many oracles not the work of this prophet." In other directions the still powerful influence of tradition affects Eichhorn. He maintains the exilic origin of parts of *Daniel*, though he is convinced (here again in part by language) of the later origin of other parts. His Pentateuchal criticism is limited by the tradition of Mosaic authorship: but even within these limits he achieves much. He carries through, as Astruc had done, the analysis of *Genesis* into (primarily) two documents; he draws the distinction between the Priests' Code, of the middle books of the Pentateuch, and *Deuteronomy*, the people's law book; and admits that even the books that follow Genesis consist of different documents, many incomplete and fragmentary (whence the theory became known as the "Fragment-hypothesis"), but all the work of Moses and some of his contemporaries.

Other literary critics of the same period or a little later are Alex. Geddes, a Scottish Catholic priest, who projected, and in part carried out (1792-1800), a critically annotated new translation of the Old Testament, and argued therein that the Pentateuch ultimately rests on a variety of sources partly written, partly oral, but was compiled in Canaan probably in the reign

of Solomon; K.D. Ilgen, the discoverer (1798) that there were two distinct documents in Genesis using the divine name Elohim, and consequently that there were *three* main sources in the books, not two, as Astruc and Eichhorn had conjectured; and J.S. Vater, the elaborator of the "Fragment-hypothesis."

De Wette.

But the next distinct stage is reached when we come to De Wette, whose contributions to Biblical learning were many and varied, but who was pre-eminent in *historical criticism*. He carried criticism beyond literary analysis and literary appreciation to the task of determining the worth of the documents as records, the validity of the evidence. His peculiar qualities were conspicuous in his early and exceedingly influential work—the *Beiträge zur Einleitung in das Alte Testament* (1806-1807). In the introduction to vol. ii. he carefully analyses the principles of sound historical method and the essentials of a trustworthy historical record. These principles he applied to the Old Testament, firstly to the *Books of Chronicles*, and then to the Pentateuch. The untrustworthiness of *Chronicles*—briefly admitted by Luther—he proved in detail, and so cleared the way for that truer view of the history and religion of Israel which the treatment of *Chronicles* as a trustworthy record of the past hopelessly obscured. In the criticism of the Pentateuch his most influential and enduring contributions to criticism are his proof that *Deuteronomy* is a work of the 7th century B.C., and his insistence that the theory of the Mosaic origin of all the institutions described in the Pentateuch is incompatible with the history of Israel as described in the historical books, *Judges*, *Samuel* and *Kings*.

Ewald.

Strong in historical criticism, De Wette was weak in historical construction. But what he failed to give, Ewald supplied, and if more of De Wette's than of Ewald's work still stands to-day, that is but an illustration of the melancholy fact that in history negative criticism is surer than positive construction. But Ewald's *History of the People of Israel* (1843-1859) was the first great attempt to synthesize the results of criticism and to present the history of Israel as a great reality of the past. By the force of his wide learning and even more of his personality, Ewald exercised for long an all-pervading and almost irresistible influence. He closes one epoch of Old Testament criticism; by his influence he retards the development of the next. Before passing to the new epoch it must suffice to make a simple reference to the philological work of Gesenius and Ewald, which assisted a sounder exegesis and so secured for later criticism a more stable basis.

Vatke; Reuss.

The next stage brings us to the critical theories or conclusions which at first gradually and then rapidly, in spite of the keenest criticisms directed against them both by those who clung more or less completely to tradition and by the representatives of the earlier critical school, gained increasing acceptance, until to-day they dominate Old Testament study. The historico-critical starting-point of the movement was really furnished by De Wette: but it was Vatke who, in his *Biblische Theologie wissenschaftlich dargestellt* (1835), first brought out its essential character. The fundamental peculiarity of the movement lies in the fact that it is a criticism of what is supreme in Israel—its religion, and that it has rendered possible a true appreciation of this by showing that, like all living and life-giving systems of thought, belief and practice, the religion of Israel was subject to development. It seized on the prophetic element, and not the ceremonial, as containing what is essential and unique in the religion of Israel. In literary criticism its fundamental thesis, stated independently of Vatke and in the same year by George in *Die älteren jüdischen Feste*, and in a measure anticipated by Reuss, who in 1832 was maintaining in his academical lectures that the prophets were older than the Law and the Psalms more recent than both, is that the chronological order of the three main sources of the Hexateuch is (1) the prophetic narratives (JE), (2) Deuteronomy, (3) the Priestly Code (P), the last being post-exilic. This entirely reversed the prevailing view that P with its exact details and developed ceremonial and sacerdotal system was at once the earliest portion of the Pentateuch and the *Grundschrift* or foundation of the whole—a view that was maintained by Ewald and, though with very important modifications, to the last by A. Dillmann (d. 1894). Inherent in this view of religious development and the new critical position were far-reaching changes in the literary, historical and religious criticism of the Old Testament: these have been gradually rendered clear as the fundamental positions on which they rest have been secured by the manifold work of two generations of scholars.

Graf; Kuenen; Wellhausen; Colenso.

Nearly a generation passed before Vatke's point of view gained any considerable number of adherents. This is significant. In part it may fairly be attributed to the retarding influence of the school of Ewald, but in large part also to the fact that Vatke, a pupil of Hegel, had developed his theory on *a priori* grounds in accordance with the principles of Hegel's philosophy of history. It was only after a fresh and keener observation of *facts* that the new theory made rapid progress. For that, when it came, much was due to the work of Graf (a pupil of Reuss, whose *Geschichtliche Bücher des Alten Testaments* appeared in 1866); to the Dutch scholar Kuenen, who, starting from the earlier criticism, came over to the new, made it the basis of his *Religion of Israel* (1869-1870), a masterly work and a model of sound method, and continued to support it by a long series of critical essays in the *Theologisch Tijdschrift*; and to Wellhausen, who displayed an unrivalled combination of grasp of details and power of historical construction: his *Prolegomena zur Geschichte Israels* was published in 1878 and translated into English in 1885; the history itself, *Israelitische u. jüdische Geschichte*, followed twenty years later, after much further critical work had been done in the meantime. Not a little also was due to Colenso (*The Pentateuch ... critically examined*, pt. i., 1862), who, though he never entirely accepted the new position, contributed by his searching analysis of the unreality of P's narrative to the formation (for example, in the mind of Kuenen) or ratification of the judgment on that work which is fundamental to the general theory.

This sketch of the critical movement has now been brought down to the point at which the comprehensive conclusions which still dominate Old Testament study gained clear expression and were shown to be drawn from the observation of a large body of facts. It does not fall within the scope of this article to examine the validity of these conclusions, nor even to notice the various subsidiary or consequential conclusions. Nor again is it possible to survey the more special developments of literary criticism which have later emerged, amongst which one of the most important has been the radical examination of the prophetic writings introduced and developed by (amongst others) Stade, Wellhausen, Duhm, Cheyne, Marti.[22] The starting-point of this newer criticism of the prophets is the clearer practical recognition of the fact that all pre-exilic prophecy has come down to us in the works of post-exilic editors, and that for the old statement of the problem of the prophetic books—What prophecies or elements in Isaiah, Jeremiah and the rest are later than these prophets?—is to be substituted the new critical question—From these post-exilic collections how are the pre-exilic elements to be extracted? Bound up with this question of literary criticism is the very important question of the origin and development of the Messianic idea.

But two things, the extent of the influence of criticism and the relation of archaeology and criticism, yet remain for consideration, in the course of which it will be possible just to indicate some other problems awaiting solution.

Influence of Criticism.

It is one thing for scholars to reach conclusions: it is another for these conclusions to exercise a wide influence in the Churches and over general culture. In the 16th century we find *obiter dicta* of the Reformers challenging traditional opinions on the origin and character of the Old Testament; in the 17th century, among certain isolated scholars, elementary critical surveys of the whole field, which exercised, however, no extensive influence. Nor was it till late in the 18th century that criticism seriously challenged the dominance of the Protestant scholastic treatment of the Old Testament on the one hand, and the rough and ready, uncritical explanations or depreciations of the Rationalists on the other. But Eichhorn's *Introduction* appealed to more than technical scholars: its influence was great, and from that time forward criticism gradually or even rapidly extended its sway in Germany. Very different was the case in England; after Geddes and Lowth, at the close of the 18th, till far down into the 19th century, the attitude even of scholars (with rare exceptions) was hostile to critical developments, and no independent critical work was done. Pusey indeed studied under Eichhorn, and in his *Historical Enquiry into the probable causes of the Rationalist Character lately predominant in German Theology* (1828-1830) speaks sympathetically of the attitude of the Reformers on the question of Scripture and in condemnation of the later Protestant scholastic doctrine; but even in this book he shows no receptivity for any of the actual critical conclusions of Eichhorn and his successors, and subsequently threw the weight of his learning against critical conclusions—notably in his *Commentary on Daniel* (1864). Dean Stanley owed something to Ewald and spoke warmly of him, but the Preface to the *History of the Jewish Church* in which he does so bears eloquent testimony to the general attitude towards Old Testament criticism in 1862, of which we have further proof in the almost unanimous disapprobation and far-

spread horror with which Colenso's *Pentateuch*, pt. i., was met on its publication in the same year.

From 1869 T.K. Cheyne worked indefatigably as a resourceful pioneer, but for many years, in view of the prevailing temper, with "extreme self-suppression" and "willingness to concede to tradition all that could with any plausibility be conceded." (Cheyne, *Origin of the Psalter*, p. 15); more especially is his influence observable after 1890, when he published his Bampton Lectures, the *Origin of the Psalter*, a work of vast learning and keen penetration, without restraint on the freedom of his judgment—always stimulating to students and fellow-workers, though by no means always carrying large numbers with him. From about 1880 the prevailing temper had changed; within a decade of this date the change had become great; since then the influence of Old Testament criticism has grown with increased acceleration. The change in the former period with regard to a single point, which is however typical of many, is briefly summed up by Dr Cheyne: "In 1880 it was still a heresy to accept with all its consequences the plurality of authorship of the Book of Isaiah; in 1890 to a growing school of church-students this has become an indubitable fact" (*Origin of the Psalter*, xv.). By 1906 this plurality of authorship had become almost a commonplace of the market. Many, particularly of late, have contributed to the wide distribution, if not of the critical spirit itself, yet at least of a knowledge of its conclusions. To two only of the most influential is it possible to make more definite reference—to W. Robertson Smith and S.R. Driver. From 1875 onwards Smith contributed to the 9th edition of the *Encyclopaedia Britannica* a long series of important articles, which, together with the articles of Cheyne, Wellhausen and others, made that work an important factor in the change which was to pass over English thought in regard to the Bible; in 1878, by his pleadings in the trial for heresy brought against him on the ground of these articles, he turned a personal defeat in the immediate issue into a notable victory for the cause which led to his condemnation; and subsequently (in 1880), in two series of lectures, afterwards published[23] and widely read, he gave a brilliant, and, as it proved, to a rapidly increasing number a convincing exposition of the criticism of the literature, history and religion of Israel, which was already represented in Germany by Wellhausen and in Holland by Kuenen. In 1891 Dr Driver published his *Introduction to the Literature of the Old Testament* (6th ed., 1897); less popular in form than Smith's lectures, it was a more systematic and comprehensive survey of the whole field of the literary criticism of the Old Testament. The position of the author as regius professor of Hebrew at Oxford and canon of Christ Church in succession to Pusey, and his well-established reputation as a profound Hebrew scholar, commanded wide attention; the qualities of the book itself—its marked sobriety, its careful discrimination between the differing degrees of probability attaching to various conclusions and suggestions, and in general its soundness of method—rapidly extended the understanding of what Old Testament criticism is and commanded acceptance of the well-established conclusions.

No less rapid has been the change in America during the same period, nor less numerous the scholars well equipped to pursue the detailed investigation involved in critical study or those who have shown ability in popular presentations of the critical standpoint.[24] Pre-eminent amongst these is C.A. Briggs, whose influence has been due in part to a large and varied body of work (*Biblical Study*, 1883, and many articles and volumes since) and in part to his organization of united critical, international and interconfessional labour, the chief fruits of which have been the *Hebrew Lexicon* (based on Gesenius, and edited by F. Brown, one of the most eminent of American scholars, S.R. Driver and himself), and the *International Critical Commentary*. Other important works in which English and American scholars have co-operated are the *Encyclopaedia Biblica* (1899-1903) and Hastings' *Bible Dictionary* (1898-1904)—the latter less radical, but yet on the whole based on acceptance of the fundamental positions of Vatke, Graf, Wellhausen. Between either of these and Smith's *Dictionary of the Bible* (1863) yawns a great gulf. Space forbids any attempt to sketch here the special growth of criticism in other countries, such as France, where the brilliant genius of Renan was in part devoted to the Old Testament, or within the Roman Catholic Church, which possesses in Père Lagrange, for example, a deservedly influential critical scholar, and in the *Revue Biblique* an organ which devotes much attention to the critical study of the Old Testament.

Rapid and extensive as has been the spread of critical methods, there have not been lacking *anticritica*. Many of these have been not only apologetic, but unscholarly; that is, however, not the case with all. In Dr James Orr's learned work, *The Problem of the Old Testament considered with reference to Recent Criticism* (1906), the author's chief aim is to prove insecure the fundamental positions of the now dominant school of criticism.

In view of extensive misconception occasioned by many of these *anticritica*, it needs to be pointed out that terms like "criticism," "higher criticism," "critics" are often loosely used: criticism is a method, its results are many. Again, many of the results or conclusions of criticism are mutually independent, while others are interrelated and depend for their validity on the validity of others. For example, among the generally or largely accepted critical conclusions are these: (1) Moses is not the author of the whole Pentateuch; (2) Isaiah is not the author of Is. xl.-lxvi.; (3) the book of Daniel was written in the 2nd century B.C.; (4) the Priestly Code is post-exilic; (5) most of the Psalms are post-exilic. Now 1, 2, 3 are absolutely independent—if 1 were proved false, 2 and 3 would still stand; and so with 2 and 3; so also 2 and 3 could be proved false without in any way affecting the validity of 4. On the other hand, if 1 were disproved, 4 would immediately fall through, and the strength of 5 would be weakened (as it would also by the disproof of 2), because the argument for the date of many Psalms is derived from religious ideas and the significance of these varies greatly according as the Priestly Code is held to be early or late. In view of the number of critical conclusions and the mutual independence of many of them, "higher criticism" can only be overthrown by proving the application of criticism to the Old Testament to be in itself unlawful, or else by proving the falseness or inconclusiveness of all its mutually independent judgments one by one. On examination, the authors of *anticritica* are generally found to disown, tacitly or openly, the first of these alternatives; for example, Prof. Sayce, who frequently takes the field against the "higher criticism," and denies, without, however, disproving, the validity of the literary analysis of the Hexateuch, nevertheless himself asserts that "no one can study the Pentateuch ... without perceiving that it is a compilation, and that its author, or authors, has made use of a large variety of older materials," and that "it has probably received its final shape at the hands of Ezra" (*Early History of the Hebrews*, 129 and 134). This is significant enough; Prof. Sayce, the most brilliant and distinguished of the "anti-critics," does not really reoccupy the position of the "able and pious men" of the mid-19th century, to whom "even to speak of any portion of the Bible as a history" was "an outrage upon religion" (Stanley, *Jewish Church*, Preface); these may still have pious, but they have no longer scholarly successors. Prof. Sayce travels farther back, it is true, but on critical lines: he abandons the Pentateuchal criticism of the 20th century, to reoccupy the critical position of Hobbes, Spinoza and Simon in the 17th century—whether reasonably or not must here be left an open question.

Archeology and Criticism.

Briefly, in conclusion, it remains to consider the relation of Archaeology to Criticism, partly because it is frequently asserted in the loose language just discussed that Archaeology has overthrown Criticism, or in particular the "higher criticism," and partly because Archaeology has stimulated and forced to the front certain important critical questions.

More especially since the middle of the 19th century the decipherment of Egyptian and Assyrian inscriptions and systematic excavation in Palestine and other parts of the East have supplied a multitude of new facts bearing more or less directly on the Old Testament. What has been the general effect of these new facts on traditional theories or critical conclusions?

(1) *Literary Criticism.*—No discovery has yielded any direct testimony as to the authorship of any book of the Bible, or as to the mode or date of its composition. Any documentary analysis of the Pentateuch may be right or wrong; but archaeology contributes nothing either one way or another as to the answer. On the other hand, archaeology has in some cases greatly strengthened the critical judgment that certain writings (*e.g. Daniel*, the story of Joseph in *Genesis*) are not contemporary with the events described.

(2) *Historical Criticism.*—Here the gain has been more direct; *e.g.* the Assyrian inscriptions have furnished independent evidence of the relations of certain Hebrew kings (Ahab, Jehu, Ahaz) with the Assyrians, and thus supported more or less completely the evidence of the Old Testament on these points: they have also served to clear up in part the confused chronology of the Hebrews as given in the books of *Kings*. But above all archaeology has immensely increased our knowledge of the nations among which Israel was placed, and of the political powers which from time to time held Palestine in subjection. In this way

archaeology has greatly helped to bring the history of Israel into relation with the history of the ancient East, and in so doing has raised important questions as to the origin of Hebrew culture. For example, the recent discovery of the Code of Khammurabi, which contains some remarkable resemblances to the Pentateuchal codes, raises the question of the relation of Hebrew to Babylonian law. On the other hand, there are certain great historical questions which have been greatly affected by criticism, but on which archaeology has hitherto shed no light. For example, much as archaeology has increased our knowledge of the conditions obtaining in Palestine before the Hebrew invasion, it has so far contributed nothing to our knowledge of the Hebrew nation before that time beyond the statement in the now famous stele of Merenptah (Mineptah) (*c.* 1270 B.C.), discovered in 1896, "Ysirael is desolated, its seed is not," and a few possible but vague and uncertain allusions to particular tribes. It has contributed nothing whatsoever to our knowledge of any Hebrew individual of this period,[25] and consequently what elements of history underlie the stories in Genesis, in so far as they relate to the Hebrew patriarchs, must still be determined, if at all, by a critical study of the Old Testament. The story in Gen. xiv. is no exception to this statement: archaeology has made probable the historic reality of Chedorlaomer, which some critics had previously divined; it has not proved the historical reality of the patriarch Abraham or the part played by him in the story, which some critics, whether rightly or wrongly, had questioned. The Dutch scholar Kosters called in question the return of the Jews in the days of Cyrus; his view, adopted by many, has hardly obtained, as yet at all events, the weight of critical judgment: here again, unfortunately, archaeology at present is silent.

(3) *Criticism of Religion.*—Here, perhaps, archaeology has contributed most new material, with the result that religious terms, ideas, institutions, once supposed to be peculiar to Israel, are now seen to be common to them and other nations; in some cases, moreover, priority clearly does not lie with the Hebrews, as, for example, in the case of the materials (as distinct from the spirit in which they are worked up) of the stories of Creation and the Flood. Of late, too, it has been much argued, and often somewhat confidently maintained, that Hebrew monotheism is derivative from Babylonian monotheism.

This and similar questions, leading up to the ultimate and supreme question—Wherein does lie the uniqueness of Israel's religion?—are among those which will require in the future renewed examination in the light of a critical study alike of the Old Testament and of all the relevant material furnished by archaeology. Archaeology has not yet found the key to every unopened door; but it has already done enough to justify the surmise that if criticism had not already disintegrated the traditional theories of the Old Testament, archaeology in the latter half of the 19th century would itself have initiated the process.

LITERATURE.—Much of the details and results of criticism and the special literature will be found in the articles in the present work on the several books of the Old Testament. To the works already mentioned we may add L. Diestel, *Geschichte des Alten Testaments in der Christlichen Kirche* (1869); C.A. Briggs, *General Introduction to the Study of Holy Scripture* (1889); G.A. Smith, *Modern Criticism and the Preaching of the Old Testament* (1901)—these for the history of Criticism (or more generally of Old Testament study); T.K. Cheyne, *Founders of Old Testament Criticism* (pp. 1-247, biographical sketches of critical scholars since the middle of the 18th century; pp. 248-372, criticism of Driver's *Introduction*). As already indicated, the exposition of Literary Criticism in English is Driver's *Introduction to the Literature of the Old Testament*. For the general principles of Historical Criticism see Ch. V. Langlois and Ch. Seignobos, *Introduction to the Study of History* (Eng. trans., 1898), with which it is interesting to compare De Wette's brief discussion referred to in the article.

(G. B. G.*)

5. *Old Testament Chronology.*

A sense of the importance of a fixed standard of chronology was only acquired gradually in the history of the world. Nations in a primitive state of civilization were not, and are not, conscious of the need. When the need began to be felt events were probably at first dated by the regnal years of kings; the reigns of successive kings were then arranged in order, and grouped, if necessary, in dynasties, and thus a fixed standard was gradually constructed. Particular states also not unfrequently introduced fixed eras, which obtained a more or less extensive currency, as the era of the first Olympiad (776 B.C.), of the foundation of Rome (753 B.C.), and of the Seleucidae at Antioch (312 B.C.), which is followed by the Jewish author of the first book of Maccabees. Some of the earliest documents which we possess are dated by the year in which some noticeable event took place, as in contract-tablets of the age of Sargon of Agade (Akkad) (3800 B.C., or, according to other authorities, 2800 B.C.), "In the year in which Sargon conquered the land of Amurru [the Amorites]"; or, "In the year in which Samsu-ditana [*c.* 1950 B.C.] made the statue of Marduk": Is. vi. 1 ("In the year of King Uzziah's death"), xiv. 28, xx. 1, are examples of this method of dating found even in the Old Testament. In process of time, however, the custom of dating by the regnal year of the king became general. The Babylonians and Assyrians were probably the first to construct and employ a fixed chronological standard; and the numerous contract-tablets, and list of kings and yearly officials, discovered within recent years, afford striking evidence of the precision with which they noted chronological details. Biblical chronology is, unfortunately, in many respects uncertain. Prior to the establishment of the monarchy the conditions for securing an exact and consecutive chronology did not exist; the dates in the earlier period of the history, though apparently in many cases precise, being in fact added long after the events described, and often (as will appear below) resting upon an artificial basis, so that the precision is in reality illusory. And after the establishment of the monarchy, though the conditions for an accurate chronology now existed, errors by some means or other found their way into the figures; so that the dates, as we now have them, are in many cases at fault by as much as two to three decades of years. The *exact* dates of events in Hebrew history can be determined only when the figures given in the Old Testament, can be checked and, if necessary, corrected by the contemporary monuments of Assyria and Babylonia, or (as in the post-exilic period) by the knowledge which we independently possess of the chronology of the Persian kings. In the following parts of this article the chronological character of each successive period of the Old Testament history will be considered and explained as far as the limits of space at the writer's disposal permit.

I. *From the Creation of Man to the Exodus.*—In the whole of this period the chronology, in so far as it consists of definite figures, depends upon that part of the Pentateuch which is called by critics the "Priestly Narrative." The figures are in most, if not in all cases artificial, though the means now fail us of determining upon what principles they were calculated. It is also to be noted that in the Samaritan text of the Pentateuch, and in the LXX., the figures, especially in the period from the Creation to the birth of Abraham, differ considerably from those given in the Hebrew, yielding in Sam. a lower, but in the LXX. a much higher total. The following tables will make the details clear:—

(1) *From the Creation of Man to the Flood* (Gen. v. and vii. 11).

	Age of each at birth of next.		
	Heb.	Sam.	LXX.
Adam (930)	130	130	230
Seth (912)	105	105	205
Enosh (905)	90	90	190
Kenan (910)	70	70	170
Mahalalel (895)	65	65	165
Jared (962)	162	62	162
Enoch (365)	65	65	165
Methuselah (969)	187	67	187[26]
Lamech (777)	182	53	188
Noah (950); age at Flood	600	600	600
Total from the Creation of Man to the Flood	1656	1307	2262

The figures in parentheses indicate the entire ages assigned to the several patriarchs; these are generally the same in the three texts. The Sam., however, it will be noticed, makes in three cases the father's age at the birth of his eldest son less than it is in the Heb. text, while the LXX. makes it in several cases as much as 100 years higher, the general result of these differences being that the total in the Sam. is 349 years less than in the Heb., while in the LXX. it is 606 years more. The names, it need hardly be remarked, belong to the prehistoric period, and equally with the figures are destitute of historical value.

(2) *From the Flood to the Call of Abraham* (Gen. xi.).

	Age of each at birth of next.		
	Heb.	Sam.	LXX.
Arphaxad (438)[27]	35[28]	135	135
Cainan (460) [cf. Luke iii. 27]	··	··	130
Shelah (433)	30	130	130
Eber (464)	34	134	134
Peleg (239)	30	130	130
Reu (239)	32	132	132
Serug (230)	30	130	130
Nahor (148)	29	79	79
Terah (205)	70	70	70
Abraham (175); age at Call (Gen. xii. 4)	75	75	75
Total from the Flood to the Call of Abraham.	365	1015	1145

The variations are analogous to those under (1), except that here the birth-years of the patriarchs in both Sam. and LXX. differ more consistently in one direction, being, viz., almost uniformly higher by 100 years. It has been much debated, in both cases, which of the three texts preserves the original figures. In (2) it is generally agreed that the Heb. does this, the figures in Sam. and LXX. having been arbitrarily increased for the purpose of lengthening the entire period. The majority of scholars hold the same view in regard also to (1); but Dillmann gives here the preference to the figures of the Sam. The figures, of course, in no case possess historical value: accepting even Ussher's date of the Exodus, 1491 B.C., which is earlier than is probable, we should obtain from them for the creation of man 4157 B.C., or (LXX.) 5328,[29] and for the confusion of tongues, which, according to Gen. xi. 1-9, immediately followed the Flood, 2501 B.C., or (LXX.) 3066 B.C. But the monuments of Egypt and Babylonia make it certain that man must have appeared upon the earth long before either 4157 B.C. or 5328 B.C.; and numerous inscriptions, written in three distinct languages—Egyptian, Sumerian and Babylonian—are preserved dating from an age considerably earlier than either 2501 B.C. or 3066 B.C.[30] The figures of Gen. v. and xi. thus merely indicate the manner in which the author of the Priestly Narrative—and probably to some extent tradition before him—pictured the course of these early ages of the world's history. The ages assigned to the several patriarchs (except Enoch) in Gen. v. are much greater than those assigned to the patriarchs mentioned in Gen. xi., and similarly the ages in Gen. xi. 10-18 are higher than those in Gen. xi. 19-26; it is thus a collateral aim of the author to exemplify the supposed gradual diminution in the normal years of human life.

The Babylonians, according to Berossus, supposed that there were ten antediluvian kings, who they declared had reigned for the portentous period of 432,000 years: 432,000 years, however, it has been ingeniously pointed out by Oppert (*Gott. Gel. Nachrichten*, 1877, p. 205 ff.) = 86,400 *lustra*, while 1656 years (the Heb. date of the Flood) = 86,400 *weeks* (1656 = 72 × 23; and 23 years being = 8395 days + 5 intercalary days = 8400 days = 1200 weeks); and hence the inference has been drawn that the two periods have in some way been developed from a common basis, the Hebrews taking as their unit a week, where the Babylonians took a *lustrum* of 5 years.

(3) *From the Call of Abraham to the Exodus.*

From the Call of Abraham to the birth of Isaac (Abraham being then aged 100, Gen. xxi. 5).	25	years
Age of Isaac at the birth of Esau and Jacob (Gen. xxv. 26)	60	”
Age of Jacob when he went down into Egypt (Gen. xlvii. 9)	130	”
	——	
The period of the Patriarchs' sojourn in Canaan was thus	215	”
But the period of the Israelites' sojourn in Egypt, according to Ex. xii. 40, 41, was	430	”
We thus get—		
From the Call of Abraham to the Exodus (Heb. text) 215 + 430 =	645	years
From the Flood to the Call of Abraham (Heb. text)	365	”
From the Creation of Man to the Flood (Heb. text)	1656	”
	——	
From the Creation of Man to the Exodus (Heb. text)	2666	”

On these figures the following remarks may be made:—(i.) In Genesis the chronology of the Priestly Narrative ("P") is not consistent with the chronology of the other parts of the book ("JE"). Three or four illustrations will suffice: (*a*) The author of Gen. xii. 10-20 evidently pictures Sarai as a comparatively young woman, yet according to P (xii. 4, xvii. 17) she was 65 years old. (*b*) In Gen. xxi. 15 it is clearly implied that Ishmael has been *carried* by his mother, yet according to xvi. 16, xxi. 5, 8, he must have been at least 15 years old. (*c*) In Gen. xxvii. Isaac is to all appearance on his death-bed (cf. ver. 2), yet according to P (xxv. 26, xxvi. 34, xxxv. 28) he survived for *eighty* years, dying at the age of 180. Ussher and others, arguing back from the dates in xlvii. 9, xlv. 6, xli. 46, xxxi. 41, infer that Jacob's flight to Haran took place in his 77th year. This reduces the 80 years to 43 years, though that is scarcely less incredible. It involves, moreover, the incongruity of supposing that *thirty-seven* years elapsed between Esau's marrying his Hittite wives (xxvi. 34) and Rebekah's expressing her apprehensions (xxvii. 46) lest Jacob, then aged seventy-seven, should follow his brother's example. (*d*) In Gen. xliv. 20 Benjamin is described as a "little one"; in P, almost immediately afterwards (xlvi. 21), he appears as the father of ten sons; for a similar anomaly in xlvi. 12, see the *Oxford Hexateuch*, i. p. 25n. (ii.) The ages to which the various patriarchs lived (Abraham, 175; Isaac, 180; Jacob, 147), though not so extravagant as those of the antediluvian patriarchs, or (with one exception) as those of the patriarchs between Noah and Abraham, are much greater than is at all probable in view of the structure and constitution of the human body. (iii.) The plain intention of Ex. xii 40, 41 is to describe the Israelites as having dwelt in Egypt for 430 years, which is also in substantial agreement with the earlier passage, Gen. xv. 13 ("shall sojourn in a land that is not theirs, ... and they shall afflict them 400 years"). It does not, however, accord with other passages, which assign only four generations from Jacob's children to Moses (Ex. vi. 16-20; Num. xxvi. 5-9; cf. Gen. xv. 16), or five to Joshua (Josh. vii. 1); and for this reason, no doubt, the Sam. and LXX. read in Ex. xii. 40, "The sojourning of the children of Israel in the land of Egypt, *and in the land of Canaan*, was 430 years," reducing the period of the sojourn in Egypt to half of that stated in the Hebrew text, viz. 215 years. This computation attained currency among the later Jews (Josephus and others; cf. the "400 years" of Gal. iii. 17). The forced and unnatural rendering of Ex. xii. 40 in the A.V. (contrast R.V.), which was followed by Ussher, is intended for the purpose of making it possible. From the facts that have been here briefly noted it must be evident how precarious and, in parts, how impossible the Biblical chronology of this period is. (iv.) It has been observed as remarkable that 2666, the number of years (in the Hebrew text) from the Creation

of Man to the Exodus, is, in round numbers, just two-thirds of 4000; and the fact has suggested the inference that the figure was reached by artificial computation.

The Date of the Exodus.—Is it possible to determine this, even approximately, upon the basis of external data? (i.) The correspondence between the Egyptian governors established in different parts of Palestine and the Egyptian kings Amen-hôtep (Amenophis) III. and IV. of the 18th dynasty, which was discovered in 1887 at Tel el-Amarna, makes it evident that Palestine could not yet have been in the occupation of the Israelites. It was still an Egyptian province, and the Babylonian language, in which the correspondence is written, shows that the country must have been for a considerable time past, before it came into the possession of Egypt, under Babylonian influence. Now one of the kings, who corresponds with Amen-hotep **IV**., is Burnaburiash (Burna-buryas), king of Babylon, and Egyptologists and Assyriologists are agreed that the date of these monarchs was *c.* 1400 B.C. The conquest of Canaan, consequently, could not have taken place till after 1400 B.C. (ii.) It is stated in Ex. i. 11 that the Israelites built in Egypt for the Pharaoh two store-cities, Pithom and Rameses. The excavations of M. Naville have, however, shown that Ramses II. of the 19th dynasty was the builder of Pithom; and though the other city has not at present been certainly identified, its name is sufficient to show that he was its builder likewise. Hence the Pharaoh of the Exodus is commonly supposed to have been Ramses (Rameses) II.'s successor, Merenptah (Mineptah). Egyptian chronology is unfortunately imperfect; but Professor Petrie, who has paid particular attention to the subject, and who assigns the reign of Amen-hotep IV. to 1383-1365 B.C., assigns Ramses II. to 1300-1234 B.C.[31] In Merenptah's fifth year the Delta was invaded by a formidable body of Libyans and other foes;[32] and it has been conjectured that the Israelites took the opportunity of escaping during the unsettlement that was thus occasioned.

> Alternative dates for Ramses II.: Maspero, *The Struggle of the Nations* (1897), p. 449, *c.* 1320-1255; Breasted (1906), 1292-1225; Meyer (1909), 1310-1244. Attempts have been made to identify the Khabiri, who are mentioned often in the Tel el-Amarna letters as foes, threatening to invade Palestine and bring the Egyptian supremacy over it to an end, with the Hebrews. The Exodus, it has been pointed out, might then be placed under Amen-hotep II. (1448-1420 B.C., Breasted; 1449-1423, Petrie), the successor of Thothmes, and more time would be allowed for the events between the Exodus and the time of David (*c.* 1000), which, if the date given above be correct, have been thought to be unduly compressed (see Orr in the *Expositor*, March 1897, p. 161 ff.); but there are difficulties attaching to this view, and it has not been adopted generally by scholars. There may be some ultimate connexion between the Khabiri and the Hebrews; but the Khabiri of the Tel el-Amarna letters cannot be the Hebrews who invaded Canaan under Joshua.

The mention of Israel on the stele of Merenptah, discovered by Petrie in 1896 ("Israel [Ysirael] is desolated; its seed [*or* fruit] is not"), is too vague and indefinite in its terms to throw any light on the question of the Exodus. The context speaks of places in or near Canaan; and it is possible that the reference is to Israelite clans who either had not gone down into Egypt at all, or had already found their way back to Palestine. See Hogarth's *Authority and Archaeology*, pp. 62-65.

2. *From the Exodus to the Foundation of the Temple* (*in the fourth year of Solomon*, 1 Kings vi. 1).—In the chronological note, 1 Kings vi. 1, this period is stated to have consisted of 480 (LXX. 440) years. Is this figure correct? If the years of the several periods of oppression and independence mentioned in the Book of Judges (Judges iii. 8, 11, 14, 30, iv. 3, v. 31, vi. 1, viii. 28, ix. 22, x. 2, 3, 8, xii. 7, 9, 11, 14, xiii. 1, xv. 20, xvi. 31) be added up, they will be found to amount to 410 years; to these must be added further, in order to gain the entire period from the Exodus to the foundation of the Temple, the 40 years in the wilderness, x years under Joshua and the elders (Judges ii. 7), the 40 (LXX. 20) years' judgeship of Eli (1 Sam. iv. 18), the 20 or more years of Samuel (1 Sam. vii. 2, 15), the y years of Saul (the two years of 1 Sam. xiii. 1 [R.V.] seem too few), the 40 years of David (1 Kings ii. 11), and the first four years of Solomon, *i.e.* 144 + x + y years, in all 554 years, + two unknown periods denoted by x and y—in any case considerably more than the 480 years of 1 Kings vi. 1. This period might no doubt be reduced to 480 years by the supposition, in itself not improbable, that some of the judges were local and contemporaneous; the suggestion has also been made that, as is usual in Oriental chronologies, the years of foreign domination were not counted, the beginning of each judge's rule being reckoned, not from the victory which brought him into power, but from the death of his predecessor; we should in this case obtain for the period from the Exodus to the foundation of the Temple 440 + x + y years,[33] which if 30 years be assigned conjecturally to Joshua and the elders, and 10 years to Saul, would amount exactly to 480 years. The terms used, however ("and the land *had rest* forty years," iii. 11, similarly, iii. 30, v. 31, viii. 28), seem hardly to admit of the latter supposition; and even if they did, it would still be scarcely possible to maintain the correctness of the 480 years: it is difficult to harmonize with what, as we have seen, appears to be the most probable date of the Exodus; it is, moreover, open itself to the suspicion of having been formed artificially, upon the assumption that the period in question consisted of twelve generations,[34] of 40 years each. In the years assigned to the different judges, also, the frequency of the number 40 (which certainly appears to have been regarded by the Hebrews as a round number) is suspicious. On the whole no certain chronology of this period is at present attainable.[35]

3. *From the Fourth Year of Solomon to the Captivity of Judah.*—During this period the dates are both more abundant, and also, approximately, far more nearly correct, than in any of the earlier periods; nevertheless in details there is still much uncertainty and difficulty. The Books of Kings are a compilation made at about the beginning of the Exile, and one object of the compiler was to give a consecutive and complete chronology of the period embraced in his work. With this purpose in view, he not only notes carefully the length of the reign of each king in both kingdoms, but also (as long as the northern kingdom existed) brings the history of the two kingdoms into relation with one another by equating the commencement of each reign in either kingdom with the year of the reign of the contemporary king in the other kingdom.

> The following are examples of the standing formulae used by the compiler for the purpose:—"In the twentieth year of Jeroboam king of Israel began Asa to reign over Judah. And forty and one years reigned he in Jerusalem" (1 Kings xv. 9, 10). "In the third year of Asa king of Judah began Baasha the son of Ahijah to reign over all Israel in Tirzah (and reigned) twenty and four years" (*ibid.* ver. 33).

In these chronological notices the lengths of the reigns were derived, there is every reason to suppose, either from tradition or from the state annals—the "book of the chronicles of Israel" (or "Judah"), so constantly referred to by the compiler as his authority (*e.g.* 1 Kings xv. 23, 31, xvi. 5); but the "synchronisms"—*i.e.* the corresponding dates in the contemporary reigns in the other kingdom were derived, it is practically certain, by computation from the lengths of the successive reigns. Now in some cases, perhaps, in the lengths of the reigns themselves, in other cases in the computations based upon them, errors have crept in, which have vitiated more or less the entire chronology of the period. The existence of these errors can be demonstrated in two ways: (1) The chronology of the two kingdoms is not consistent with itself; (2) the dates of various events in the history, which are mentioned also in the Assyrian inscriptions, are in serious disagreement with the dates as fixed by the contemporary Assyrian chronology.

(1) That the chronology of the two kingdoms is inconsistent with itself is readily shown. After the division of the kingdom the first year of Jeroboam in Israel coincides, of course, with the first year of Rehoboam in Judah; and after the death of Jehoram of Israel and Ahaziah of Judah in battle with Jehu (2 Kings ix. 24, 27), the first year of Jehu in Israel coincides similarly with the first year of Athaliah in Judah; there are thus in the history of the two kingdoms two fixed and certain synchronisms. Now, if the regnal years of the kings of Israel from Jeroboam to Jehoram be added together, they will be found to amount to 98, while if those of the kings of Judah for the same period (viz. from Rehoboam to Ahaziah) be added together, they amount only to 95. This discrepancy, if it stood alone, would not, however, be serious. But when we proceed to add up similarly the regnal years in the two kingdoms from the division after Solomon's death to the fall of Samaria in the sixth year of Hezekiah (2 Kings xviii. 10), we find in the southern kingdom 260 years, and in the northern kingdom only 241 years 7 months. This is a formidable discrepancy. Ussher, in order to remove it, has recourse to the doubtful expedient of artificially lengthening the northern series of years, by assuming (without any authority in the text) an "interregnum of 11 years" after the death of Jeroboam II., and an "anarchy for some years" between Pekah and Hoshea (see the margin of A.V. at 2 Kings xiv. 29; xv. 8, 29).

The dates printed in heavy type are certain, at least within a unit.

Chronology of Ussher.	Probable Real Dates.	Biblical Events.	Events in Contemporary History.		
			Babylonia.	Assyria.	Egypt.[38]
4004 [4157][36]	Indeterminable, but much before 7000 B.C.	Creation of Man			
			7-6000.[37] Temple of Bel at Nippur founded.		
					4777. Menes, the first king o First Egyptian Dynasty
			c. 4000.[37] lugal-zaggisi, king of Uruk (Erech, Gen. x. 10)		
					3998-3721. *Fourth Dynasty.* 3969-3908. Cheops. The Grea Pyramid The Great Pyramic
			3800.[39] Sargon of Agade, who carries his arms as far as the Mediterranean Sea.		
2348 [2501[40]]		The Deluge	*c.* 2800.[41] Ur-bau and Dungi, kings of Uru (Ur, Gen. xi. 28, 31)		
				c. 2300. Ushpia, priest of Ashur, builder of temple in the city of Ashur.	
1996-1821 [2211-2036[40]]	*c.* 2100 (if, as is probable, the Amraphel of Gen. xiv. 1 is Khammurabi.)	Abraham	*c.* B.C. 2130-2088.[42] Khammurabi unifies Babylonia and constructs in it many great works (see art. BABYLONIA.)	*c.* 2225. Ilu-shuma, first king of Assyria at present (1909) known.[43]	
					2098-1587. Rule of the Hyksc 1587-1328. *Eighteenth Dyna* 1503-1449. Thothmes (Tethm III. (leads victorious expedi into Asia.)
			c. 1400. Burnaburiash. Tel el-Amarna correspondence.		1414-1483. Amen-hōtep (Amenophis) III. 1383-1365. Amen-hōtep IV. 1328-1202. *Nineteenth Dyna*
				c. 1300. Shalmaneser I. (builder of Calah, Gen. x. 11.)	
					1300-1234. Ramses II. 1234-1214. Merenptab II.
1491	c. 1230	The Exodus.	. .	. .	
1099-1058	*c.* 1025-1010[44]	Saul (2)[45]			
1058-1017	*c.* 1010-970	David (40)			
1017-977	*c.* 970-933	Solomon (40)			
	Judah.	*Israel.*			952-749 (*al.* 945-745). *Twent second Dynasty*
977	933. Rehoboam (17)	933. Jeroboam I. (22)	. .	. .	952-930[46] (Breasted 945-924). Sheshonq (Shishak). Shishak invades Judah in the fifth year of Rehoboam (1 Ki. xiv. 25 f.)
959	916. Abijah (3)				
956	913. Asa (41)				
956	. .	912. Nadab (2)			
954	. .	911. Baasha (24)			
930	. .	888. Elah (2)		**885-860**. Asshur-nazir-abal	
929	. .	887. Zimri (7 days)		**860-825**. Shalmaneser II.	
929	. .	887. Omri (12)			
918	. .	876. Ahab (22)			869
914	873. Jehoshaphat (25)				
898	. .			**854**. *Ahab* mentioned at the battle of Karkar	
896	. .				
892	849. Jehoram (8)				
885	842. Ahaziah (1)				
884	842. Athalia (6)	842. Jehu (28)		**842**. *Jehu* pays tribute to Shalmaneser II.	
878	836. Jehoash (40)				
856	. .	814. Jehoahaz (17)	. .		
841	. .	798. Jehoash (16)		**825-812**. Shamshi-Adad (Hadad)	
839	797. Amaziah (29)	. .		**812-783**. Adad-Nirari IV.	
823	. .	783. Jeroboam II. (41)			
810	779. Uzziah(52) *c.* 750. Jotham (16) as regent. (2 Ki. xv. 5)	. .			
			747-733. Nabonassar	**745-727**. Tiglath-Pileser IV.	
773	. .	743. Zecharia (6 mo.)			
772	. .	743. Shallum (1 mo.)			
772	. .	743. Menahem (10)			
758	740. Jotham, sole ruler				
761	. .	738. Pekabiah(2)	. .	**738**. *Menahem* pays tribute to Tiglath-pileser IV. (cf. 2 Ki. xv. 19)	
759	. .	737. Pekah(20)			
742	736.[47] Ahaz (16)				
730		**733**. (or **732**) Hoshea (9)		**733** (or **732**). Assassination of *Pekah*, and succession of *Hoshea* mentioned by Tiglath-pileser III. **732**. Capture of Damascus by Tiglath-pileser IV. (2 Ki. xvi. 9; cf. Is. viii. 4, xvii. 1)	
726	728.[47] Hezeiah (29)		**729-724**. Tiglath-pileser, under the name of *Pulu* (cf. 2 Ki. xv. 19), king of Babylon.	**727-722**. Shalmaneser IV.	
			. .	**722-705**. Sargon.	
721		**722**. Fall of Samaria and end of northern kingdom.		**722**. Capture of Samaria in Sargon's accession-year.	
	Biblical Events.		**721-710**. The Chaldaean prince, Merodach-baladan, king of Babylon (cf. 2 Kings xx. 12 = Is. xxxix. 1)		

				715-663. *Twenty-fifth* (Ethiopian) *Dynasty.* 715.[48] Sabako (Shabaka)
			711. Siege and capture of Ashdod. (cf. Is. xx. 1) **705**-**681**. Sennacherib	
				707.[48] Shabataka
			701. Campaign against Phoenicia, Philistia and Judah (2 Kings xviii. 13-xix. 35)	
698	698. Manasseh (55)			
				693.[48] Taharqa (Tirhakah, Is. xxxvii. 9)
			681-**668**. Esarhaddon	
			670. Esarhaddon conquers Egypt	870 664-525. Twenty-sixth Dynas
			668-**626** Asshur-banipal (Assur-bani-pal)	664. Psammetichus I.
			663. Asshur-banipal invades Egypt, and sacks Thebes (Nah. iii. 8-10)	
643	641. Amon (2)			
641	639. Josiah (31)			
629	626. *Call of the prophet Jeremiah* in Josiah's 13th year. (Jer. i. 2, xxv. 3)			
		Chaldaean Dynasty		
		625. Nabopolassar		
624	621. *Discovery of the Book of the Law* (Deuteronomy) in Josiah's 18th year (2 Kings xxiii. 3 ff.)			
610	**608**. Jehoahaz (3 mo.)	. .	. .	**610**. Necho **608**. *Battle of Megiddo,* and death of Josiah. (2 Kings xxiii. 29)
610	**608**. Jehoiakim (11)			
			607. Destruction of Nineveh by the Medes, and end of the empire of Assyria.	
		605. Defeat of Egyptians by Nebuchadrezzar (as his father's general) at Carchemish (Jer. xlvi. 2)		
		604. Nebuchadrezzar		
599	**597**. Jehoiachin (3 mo.) *First* deportation of captives (including Jehoiachin) to Babylonia, in the 8th year of Nebuchadnezzar (2 Kings xxiv. 12-16)			
599	**597**. Zedekiah (11)			
				594. Psammetichus II. (Psam **589**. Apries (Hophra, Jer. xliv
588	**586**. Destruction of Jerusalem by the Chaldaeans in the 19th year of 19th year of Nebuchadnezzar (2 Kings xxv. 8). *Second* deportation of captives to Babylonia (2 Kings xxv. 4-21)			
		568. Nebuchadrezzar invades Egypt (cf. Jer. xliii. 8-13)		**570**. Amasis II. (jointly with Apries)
				564. Amasis alone
562	**561**. Jehoiachin released from prison by Evil-merodach in the 37th year of his captivity (2 Kings xxv. 27-30)	**561**. Amēl-marduk (Evil-merodach, 2 Ki. xxv. 27)		
		559. Nergal-sharuzur (Neriglissar)		
		555. (9 months) Labashi-marduk (Laboriso-archod)		
		555. Nabu-na'id (Nabon-nēdus, Nabonidus)		
		539. Capture of Babylon by Cyrus.		
	Judah a province of the Persian Empire	*Persian Kings*		
536	**538**. Edict of Cyrus, permitting the Jews to return to Palestine. Many return under the leadership of Zerubbabel (Ezra i.-ii.)	**538**. Cyrus		
		529. Cambyses		**526**. Psammetichus III. **525**. Conquest of Egypt by Cambyses
		522. (7 mo.) Gaumata (Pseudo-Smerdis)		
		522. Darius Hystaspis		
515	**516**. Completion of the second Temple in the 6th year of Darius (Ezra vi. 15)			
		490. *Battle of Marathon*		
		485. Xerxes		
		480. *Battles of Thermopylae and Salamis*		
		465. Artaxerxes		
457	**458**. Return of exiles with Ezra, in the 7th year of Artaxerxes (Ezra vii. 7)			
445	**445**. Nehemiah's first visit to Jerusalem (Neh. i. 1, ii. 1)			
434	**432**. Nehemiah's second visit to Jerusalem (Neh. xiii. 6)			871
		423. Darius II. (Nothus)		
		404. Artaxerxes II. (Mnemon)		
		359. Artaxerxes III. (Ochus)		
	c. 350. Many Jews carried away captive to Hyrcania and Babylonia, probably on account of a revolt against the Persians			
		338. Arses		
		336. Darius III. (Codomannus)		
		333. Persian Empire overthrown by Alexander the Great		

Palestine now becomes a province, first of the empire of Alexander, and afterwards of that of one or other of Alexander's successors.

332. The Jews submit to Alexander the Great.

323. Death of Alexander in Babylon.

322. Alexander's general, Ptolemy Lagi, becomes Satrap of Egypt.

320. Ptolemy Lagi gains possession of Palestine, which, with short interruptions, continues in the hands of the Ptolemies till 198.

312. Beginning of the era of the Seleucidae (reckoned from the time when Seleucus Nicator, Alexander's former heavy cavalry officer, finally established himself in the satrapy of Babylonia. He founded Antioch as his capital, 300 B.C.).

305. Ptolemy Lagi assumes the title of king.

198. Antiochus the Great, king of Syria (223-187), defeats Ptolemy Epiphanes at Panias (Baniyas, near the sources of the Jordan), and obtains possession of Palestine.

175-**164**. Antiochus Epiphanes, king of Syria (Dan. xi. 21-45).

168. Antiochus's attempt to suppress the religion of the Jews (1 Macc. i. 41-63; cf. Dan. vii. 8, 21, 24-26, viii. 9-14, xii. 10-12). Public worship suspended in the Temple for three years.

167. Rise of the Maccabees (1 Macc. ii.).

166-**165**. Victories of Judas Maccabaeus over the generals of Antiochus (1 Macc. iii.-iv.).

165. Re-dedication of the Temple on 25th Chisleu (December), 1 Macc. iv. 52-61.

160. Death of Judas Maccabaeus (1 Macc. ix. 1-22).

160-**142**. Jonathan, younger brother of Judas, leader of the loyal Jews (1 Macc. ix. 23-xii. 53).

142-**135**. Simon, elder brother of Judas (1 Macc, xiii.-xvi.).

135-**105**. John Hyrcanus, son of Simon.

105-**104**. Aristobulus I. (son of Hyrcanus), king.

104-**78**. Alexander Jannaeus (brother of Aristobulus), king.

78-**69**. Salome (Alexandra), widow of Alexander Jannaeus.

69. Aristobulus II. (son of Alexandra).

65. Capture of Jerusalem by Pompey. Palestine becomes a part of the Roman province of Syria.

(2) As we now know, the methods of chronological computation adopted by the Assyrians were particularly exact. Every year a special officer was appointed, who held office for that year, and gave his name to the year; and "canons," or lists, of these officers have been discovered, extending from 893 to 666 B.C.[49] The accuracy of these canons can in many cases be checked by the full annals which we now possess of the reigns of many of the kings—as of Asshur-nazir-abal or Assur-nasir-pal (885-860 B.C.), Shalmaneser II. (860-825), Tiglath-pileser IV. (745-727), Sargon (722-705), Sennacherib (704-781), Esarhaddon (681-668), and Asshurbanipal or Assur-bani-pal (668-626). Thus from 893 B.C. the Assyrian chronology is certain and precise. Reducing now both the Assyrian and Biblical dates to a common standard,[50] and adopting for the latter the computations of Ussher, we obtain the following singular series of discrepancies:—

	Dates according to Ussher's Chronology. B.C.	Dates according to Assyrian Inscription. B.C.
Reign of Ahab	918-897	
Ahab mentioned at the battle of Karkar	· ·	854
Reign of Jehu	884-856	
Jehu pays tribute to Shalmancser II.	· ·	842
Reign of Menahem	772-761	
Menahem mentioned by Tiglath-pileser IV.		738
Reign of Pekah	759-739	
Reign of Hoshea	730-721	
Assassination of Pekah and succession of Hoshea, mentioned by Tiglath-pileser IV.	· ·	733 (or 732)[51]
Capture of Samaria by Sargon in Hezekiah's sixth year (2 Kings xviii. 10)	721	722
Invasion of Judah by Sennacherib in Hezekiah's fourteenth year (*ibid.* ver. 13)	713	701

Manifestly all the Biblical dates earlier than 733-732 B.C. are too high, and must be considerably reduced: the two events, also, in Hezekiah's reign—the fall of Samaria and the invasion of Sennacherib—which the compiler of the book of Kings treats as separated by an interval of *eight* years, were separated in reality by an interval of *twenty-one* years.[52]

Much has been written on the chronology of the kings and many endeavours have been made to readjust the Biblical figures so as to bring them into consistency with themselves and at the same time into conformity with the Assyrian dates. But, though the fact of there being errors in the Biblical figures is patent, it is not equally clear at what points the error lies, or how the available years ought to be redistributed between the various reigns. It is in any case evident that the accession of Jehu and Athaliah must be brought down from 884 to 842 B.C.; and this will involve, naturally, a corresponding reduction of the dates of the previous kings of both kingdoms, and of course, at the same time, of those of Solomon, David and Saul. The difficulty is, however, greatest in the 8th century. Here, in Judah, from the accession of Athaliah to the accession of Ahaz, tradition gives 143 years, whereas, in fact, there were but 106 years (842-736); and in Israel, from the death of Menahem to the fall of Samaria, it gives 31 years, whereas from 738 (assuming that Menahem died in that year) to 722 there are actually only 16 years. The years assigned by tradition to the reigns in both kingdoms in the middle part of the 8th century B.C. have thus to be materially reduced. But in the following period, from the fall of Samaria in 722 to the capture of Jerusalem by the Chaldaeans in 586, the Biblical dates, so far as we can judge, are substantially correct. (See further the table above.)

4. *From the Destruction of Jerusalem in 586 to the close of the Old Testament History.*—Here, though it is true that there are events in the Biblical history which are not fully or unambiguously dated, there is otherwise no difficulty. The lengths of the reigns of Nebuchadrezzar and his successors on the throne of Babylon, and also, after the conquest of Babylon, of Cyrus and the following Persian kings, are known from the "Canon of Ptolemy," referred to above, the particulars in which, for the earlier part of this period, are also confirmed by the testimony of the monuments.

See, for further information on the subject, the article CHRONOLOGY, and the same heading in the *Encyclopedia Biblica*, cols. 773-799, with the literature referred to on col. 819 (especially the writings of Nöldeke, Wellhausen, and Kamphausen there

mentioned).

(S. R. D.)

(B) New Testament.

1. *Canon.*

The New Testament is the collection of the Sacred Books of Christians. It forms in the Bible the distinctive possession of Christians, just as the Old Testament is the collection of Sacred Books which Christians share with Jews. Every term in the definition is significant and has a history. There are, first, the Books; then, the Collection; then, the Sacred Volume, complete as such in idea, though not as yet complete in its actual contents; and, lastly, the Sacred Volume in its full dimensions, as it has come down to us.

There is a double development, of quality and of quantity; of quality, as to the estimate formed of the books, their increasing recognition as sacred; and of quantity, by which the books so recognized were gradually brought up to their present number. Our duty will be to describe this double process, and we shall do so under the four heads: (α) The Growth of a specifically Christian Literature; (β) The Collection of the Books into a single volume, made up of ordered groups; (γ) The investing of this volume with the character of a Sacred Book; and (δ) The gradual settlement by which the volume assumed its present dimensions, neither less nor more.

The model throughout was the Old Testament. The result was attained when there was a definite volume called the New Testament by the side of the earlier volume called the Old Testament, complete like it, and like it endowed with the attributes of a Sacred Book. This is the consummation towards which events had been steadily moving—not at first consciously, for it was some time before the tendencies at work were consciously realized—but ending at last in the complete equation of Old Testament and New, and in the bracketing together of both as the first and second volumes of a single Bible. This is the process that we shall have to describe. And because the process before us is the gradual assimilation of New Testament and Old Testament, we shall have to include at each step all that bears upon this. For instance, at starting, it will not be enough for us simply to tell the story how the Books of the New Testament came to be written, but we shall have to point out what there was about them which fitted them to be what they afterwards became, what inherent qualities they possessed which suggested the estimate ultimately put upon them; in others words, how they came to be not only a collection of Christian books, but a collection of Christian sacred books, or part of a Bible.

(α) *The Growth of a Christian Literature.* 1. *The Pauline Epistles.*—The Bible of Jesus and His disciples was the Old Testament. And both Jesus and His disciples were to all appearance content with this. It was probably two full decades after the death of Christ before there were any specifically Christian writings at all. The first generation of Christians was not given to writing. There was not only no obvious reason why it should write, but there was a positive reason why it should not write. This reason lay in the dominant attitude of Christians, which was what we call “eschatological.” The first generation of Christians lived in the daily expectation that Christ would return from heaven. The truth is, that not only were Christians expecting (as we say) the Second Coming of the Messiah, but what they expected was *the* Coming. The Messiah, as all Jews conceived of Him, was a superhuman being; and His First Coming as a man among men did not count as really Messianic. The whole first generation of Christians looked intently for His Coming in power and great glory, which they believed to be near at hand. In such a state of mind as this there was no motive for seeking permanence by writing. Men who imagined that they might at any moment be caught up to meet the Lord in the air were not likely to take steps for the instruction of the generations that might come after them.

Hence the first Christian writings were no deliberate product of theologians who supposed themselves to be laying the foundation of a sacred volume. They were not an outcome of the dominant tendencies of the time, but they arose rather in spite of them, in the simplest way, just from the practical needs of the moment.

It was thus that St Paul came to write his two epistles to the Thessalonians, the oldest Christian documents that we possess. By this time he was launched on his missionary labours; he had founded a number of churches, and he was going on to found others. And these earliest epistles are just the substitute for his personal presence, advice which he took occasion to send to his converts after he had left them. There are a few indications that he had sent similar communications to other churches before, but these have not been preserved. Indeed the wonder is—and it is a testimony to the strength of the impression which St Paul left upon all with whom he came into contact—that these missionary letters of his should have begun to be preserved so soon.

Both Epistles to the Thessalonians have for their object to calm somewhat the excited expectations of which we have spoken.

The first Epistle hits exactly the prominent features in the situation, when it reminds the Thessalonians how they had “turned unto God from idols, to serve a living and true God, and to wait for his Son from heaven,” who would deliver them from the wrath to come (1 Thess. i. 9, 10). The turning from idols was of course peculiar to the Gentile communities, but the waiting for the Messiah from heaven was common to all Christians, whatever their origin. In this we may take the epistle as typical of the state of the whole Church at the time. And there is another important passage which shows why, in spite of its natural and occasional character, the epistle exhibits the germs of that essential quality which caused all the books of the New Testament to be so highly estimated. The apostle again reminds his readers how they had received his preaching “not as the word of men, but as it is in truth, the word of God,” which showed its power by the way in which it took hold of those who believed in it (1 Thess. ii. 13). The reference is of course primarily to the spoken word, but the written word had the same qualities as the spoken. It was the deep impression made by these which prepared Christians generally to accept the apostolic writings as inspired, and therefore sacred. There is no greater mistake than to suppose that the estimate formed by the early Church of its Bible was a merely arbitrary verdict imposed by an external authority; it was the expression, and the natural expression (though following certain prescribed lines), of its real sense of the value and fundamentally divine origin of the writings which it treasured.

Nearest in character to the Thessalonian Epistles are the two to Corinth, which have perhaps an interval of a year and a half between them. When 1 Corinthians was written, the attitude of the Church was still strongly eschatological (1 Cor. i. 7, 8, iii. 13-15, vii. 26, 29-31, xv. 25, 26, 51-54, xvi. 23). The thoughts of men were still set upon the near approach of the end, the troublous times that would issue in the break-up of the existing order and the return of Christ to introduce a new era. There was no idea of constructing a systematic theology; Christ was still the Jewish Messiah, and His Coming was conceived of as the Jews conceived of the coming of the Messiah, as a great supernatural event transforming the face of things and inaugurating the reign of God. In view of this approaching revolution, both the Church and the world were regarded as living from hand to mouth. It was useless to attempt to found permanent institutions; everything was provisional and for the moment. And yet, even under these conditions, some practical arrangements had to be made. The epistle is taken up with matters of this kind; either the apostle is reproving disorders and abuses actually existing in the Church, and almost sure to exist in a young community that had just adopted a novel method of life and had as yet no settled understanding of the principles involved in it; or else he is replying to definite questions put to him by his converts. In all this the epistle is still a genuine letter, and not a treatise. It only rises from time to time above the level of a letter, through the extraordinary penetration, force, enthusiasm and elevation of feeling that the apostle throws into his treatment of more or less ordinary topics. He can never rest until he has carried up the question of the moment to some higher ground of faith or conduct. It is in this incidental and digressive way that we get the description of the Gospel in i. 18-ii. 16; of the Christian ministry in chs. iii., iv.; of the principle of consideration for others in ch. ix.; of the Sacrament of the Lord’s Supper in chs. x., xi.; of Christian love in ch. xiii.; of the Resurrection and its consequences in ch. xv.

2 Corinthians is even more a product of the situation: it is even more taken up with personal relations. No epistle sheds more

light on St Paul's character as a man—so mobile, so tactful, so tender and affectionate, and yet so statesmanlike and so commanding. If doctrinal utterances occur from time to time, they are in every case incidental and unpremeditated.

The development of doctrine in St Paul's epistles is due in part to the gradual subsiding of the eschatological temper, but even more to the growth of controversy. A crisis had arisen in Galatia owing to the invasion of the churches, which St Paul had founded there, by reactionary Jews. This called forth a letter[53] from St Paul, who felt himself compelled to grapple at close quarters with teaching which he saw cut at the very root of his own. He was thus led both to clear up for himself and to state for the sake of others his whole conception of soteriology—his answer to the question how was man to be set right before God. That was a large part, and at the moment the most crucial part, of the whole problem of religion.

Two or three years later (*c.* A.D. 55-56) St Paul was bent on paying a visit to Rome. He was not going there straight, but to Jerusalem first. He knew that he could only do this at the imminent peril of his life. It seemed very doubtful whether he would accomplish his desire. And therefore he took the opportunity to send to the Romans what is really a summing up, not of the whole of Christianity, but of that side of Christianity which the preceding controversy had brought into special relief. He states his case as part of a larger question still—a question that inevitably became pressing at that particular time—as to the entire religious relation of Jew and Gentile.

These years of shock and conflict could not fail to have marked effect upon the shaping of definite Christian doctrine. They drew attention away from the future to the present, and to the past as leading up to the present. They compelled a man like St Paul to theorize: thought was driven inward; it was made to search for foundations, to organize itself and knit together part with part. And the impulse thus given continued. It showed itself strongly in the epistles of the next group, especially Ephesians and Colossians. These epistles took their form at once from a natural progression of thought and from a new phase of controversy, a sort of Gnosticizing theory, or theories, which perverted Christian practice and impaired the supremacy of Christ by placing other beings or entities by His side. The apostle meets this by renewed emphasis on the central position of Christ; and he at the same time carries a step farther his conception of the unity of the Church, as embracing both Jew and Gentile. The predominance of this somewhat recondite teaching gave to these epistles even more the character of treatises, which in the case of Ephesians is further enhanced by the fact that it is probably a circular letter addressed not to a single church but to a group of churches. Philemon is of course a pure letter, and Philippians mainly so, the Pastorals, as their name implies, contain advice and instructions to the apostle's lieutenants, Timothy and Titus, in the temporary charge committed to them of churches that the apostle could not visit himself.

The Epistle to the Hebrews is an epistolary treatise of uncertain date, on the Pauline model, and by a disciple of St Paul or at least a writer strongly influenced by him, though influenced also in no small degree by the Jewish school of Alexandria represented by Philo. Of the many theories as to the address, the most plausible are perhaps those which would apply to a single congregation of Hebrew Christians in Rome, or to a local church or group of local churches in Palestine, perhaps like that of which the centre would be at Caesarea. It is not probable that the epistle was addressed to the mother church at Jerusalem.

> The above sketch of the growth and general character of the Pauline Epistles is based upon the hypothesis that all thirteen are genuine. But some discrimination should be made in detail. The scepticism which challenges the whole collection may be set aside as radically perverse and unreasonable. Apart from this, the keen criticism of modern times has fastened especially upon two groups:—2 Thessalonians; Colossians with Philemon, Ephesians and the Pastorals. The present writer would accept without any real hesitation the first of these classes; and the second he would also himself accept, though in regard to this class he would think it right to speak with rather more reserve. This may be said to be the position generally taken up by the leading English scholars; it differs slightly in a conservative direction, but not widely, from that of Harnack, a little more from that of Jülicher, and again a little more from that of von Soden.
>
> 2 Thessalonians is still questioned by scholars of some note; but when Jülicher can say that no question could be raised if it were not for the existence of 1 Thessalonians (assumed to be genuine), this is practically giving up the whole case, because the objections drawn from 1 Thessalonians are, at least to the present writer, only an example of faulty criticism. Still less is there any valid argument against Philemon. It is a mark of the improved methods now current in Germany that, whereas in 1886 this epistle was rejected by a scholar as able and sober as Weizsäcker, Jülicher now pronounces it "among the most assured possessions of the apostle" (*Einl.* 5th ed., p. 112).
>
> But there is an arguable case of some real weight against Colossians, Ephesians, Pastorals—least against Colossians and perhaps most against the Pastorals. Colossians is strongly vouched for by its connexion with Philemon. And the objections to Ephesians are considerably reduced when it is taken as a circular letter. But it should be admitted that, especially in regard to Ephesians and Pastorals, there is a perceptible difference, (*a*) in style, and (*b*) in characteristic subject matter, from the standard epistles. If these later epistles are really the work of St Paul, the difference must be accounted for (*a*) by a somewhat unusual range of variation in style and thought on his part, and (*b*) by different environment and different purpose. The question is whether these explanations are adequate. The writer of this is inclined to think that they are. St Paul was in any case an unusual writer, by no means facile or with ready command of expression; still, he could by an effort express what he wanted, and new situations called up new words and new minor ideas. He was also a writer in whom the physical wear and tear must have been enormous. It might well be believed that the change in the so-called Epistles of the Imprisonment from the earlier epistles was due in part to the physical effects of prolonged confinement, as compared with the free, varied and open life and exciting controversies of earlier years. There is also the uncertain element that may possibly be due to the use of different amanuenses. An argument in favour of the genuineness of the epistles may be derived from the fact that each of the doubtful epistles is connected with others that are not doubtful by subtle links both of style and thought. If the reasons suggested above are not adequate, then we must set down the questioned epistles to some disciple of St Paul, who has carried the ideas and principles of his master a step farther or has applied them to a different set of problems and conditions.

2. *The Gospels and Acts.*—The Gospels and Acts arose in a way very similar to the Pauline Epistles. Here too there was no deliberate intention of writing a series of books that should be at once accepted as sacred and authoritative. Here too the expectation of the near return of Christ doubtless delayed for a number of years the desire and need for written compositions. Here too the first steps were taken as the exigencies of the moment dictated. We are again driven to fill up the gaps in our knowledge by conjectures; but some such outline as the following has much to commend it.

When the enterprise of Christian missionaries had gone on for some little time, especially in the regions outside Palestine where there was little or no previous knowledge of Christ and of Christian ideals, the wandering prophets and apostles by whom the missions were mainly conducted must have soon begun to feel the need for some sort of written manual to supplement their own personal teaching. It was one of the characteristics of the early Christian teachers that they rarely stayed for any length of time in a place; they moved on, and the little congregation was left to wait for another visitor, who might be some time in coming. How was this interval to be filled? There would be every degree of preparation, or want of preparation, for the reception of Christian teaching. Some Jews, like those who are described in the Gospel as "waiting for the kingdom of God," would be pious men and women carefully trained in the Old Testament, who would be almost fit for the kingdom even before they had heard of Christ. Other Gentile converts would require instruction in the very rudiments of ethical and monotheistic religion. Between these extremes there would be many shades and degrees of ignorance and knowledge. How could these various cases be met at once most simply and most effectually? We remember that the Christian preachers were preaching before all things a Person, but a Person whose interest for these new converts lay chiefly in the fact that He was about to come and establish a supernatural kingdom for which they had to fit themselves. The best way therefore of helping them to do this was to provide them with an outline of the characteristic teaching of Christ, which should be at the same time a clear statement of His moral demands. It is probable that these requirements suggested the form of the first Christian Gospel, which the writer believes to be rightly identified with the so-called *Logia* of St Matthew, now often designated by the symbol Q. It did not aim at being a history, and still less a complete history, but it was mainly a collection of sayings or discourses suited to supply a rule of life.

It would be somewhat later than this, and not until the eschatological outlook became weaker, and men began to turn their regard to the past rather than to the future, that there would gradually arise a more strictly historical interest. There is reason to think that in the Christian Church this interest did not begin to be active much before the decade A.D. 60-70. Its first conspicuous product was our present Gospel of St Mark, which was probably composed at Rome within the years 64-70. We say advisedly "our present Gospel of St Mark," because there does not seem to us to be any sufficient reason for presupposing an *Ur-Marcus*, or older form of this Gospel.

These two works, the *Logia* (or, as some prefer to call it, the Non-Marcan document common to Matthew and Luke) and the Mark-Gospel, were the prime factors in all the subsequent composition of Gospels. Our Matthew and our Luke are just combinations, differently constructed, of these two documents, with a certain amount of additional matter which the editors had collected for themselves. And it is probable that other Gospels of which only fragments have come down to us, like the Gospel according to the Hebrews and the Gospel of Peter, have been built up out of the same materials.

St Luke was the first to write, as we may see from his preface, definitely in the spirit of a historian. He addresses his work to Theophilus, apparently an official person, who had already been taught the main outlines of Christianity. He had planned his work on a large scale; and in Acts we have its second volume. It is an event of no small importance for criticism that so eminent a scholar as Prof. Harnack should have come round to the view, almost universally prevalent in England, that St Luke himself was the final editor and author of both the Third Gospel and the Acts. It is a very secondary question what is their exact date.

The reasons which converge upon the conclusion just expressed as to the origin and nature of the fundamental documents worked up in our present Synoptic Gospels are as follows:—(i.) The literary analysis of the Synoptic Gospels brings out a number of sections common to Matthew and Luke which probably at one time existed as an independent document. (ii.) This document consisted, in the main though not entirely, of a collection of Sayings of the Lord, which set in strong relief at once His character and the moral and religious ideal that He desired to commend. (iii.) We have an express statement, which must have been originally made before the end of the first century, that the apostle Matthew composed in Hebrew a work described as *Logia*. This word need not mean, but may quite well and pointedly mean, a collection specially of Sayings, and would still more aptly denote a collection of divine or authoritative sayings (λόγια = prop. "oracles"). (iv.) We know further that the conditions of early Christian missionary teaching were such as have been described. We learn this especially from the *Didache*; and the first part of that work, the so-called "Two-Ways," is commonly thought to have been in the first instance a Jewish manual put into the hands of proselytes. On our hypothesis the *Logia* would have been a sort of Christian manual used with a similar object. (v.) We are confirmed in this opinion by the fact that the epistles of St Paul furnish many indications that Christians in general, including those who had not been much in contact with the original Twelve, were well acquainted with the leading features in the character of Christ and in the Christian ideal, although there is little corresponding evidence for their knowledge of details in the life of Christ.

There is a similar statement to the one mentioned above, that like it must have been originally made before the end of the first century, as to a Gospel composed by St Mark on the basis mainly of the preaching of St Peter, though this need not exclude personal experience (as, *e.g.*, perhaps in Mark xiv. 51-52) or information derived from other sources. Only raw materials came from St Peter, and those probably not checked or revised by him; the arrangement is due to Mark himself, and is more successful than might have been expected in the circumstances—indeed so successful as to suggest advice from some good quarter. According to Irenaeus (*c.* A.D. 185), who is more precise than Clement of Alexandria, the Gospel was not published until after the death of Peter, which would place its composition between the limits A.D. 65 and 70. The phenomena which are sometimes supposed to require the hypothesis of an *Ur-Marcus* are more simply and satisfactorily explained as incidents in the transmission of the Marcan text.

The matter peculiar to Matthew and Luke raises a number of interesting questions which are still too much *sub judice* to be answered decidedly or dogmatically, though approximate and provisional answers may before long be forthcoming. All parts of the problem have been greatly forwarded by the recent publication of important works by Wellhausen and Harnack (see below). The date of the completed Luke depends (*a*) on whether or not we believe Luke himself or a later disciple to be the author, and (*b*) whether or not we believe that the author of Acts had seen Josephus' *Antiquities*, published in A.D. 93 or 94. Professor Burkitt takes an original line in maintaining that Luke was the author of both works, and yet that he had seen *Antiq*. The present writer is inclined to think the latter hypothesis not proven. The date of Matthew cannot be fixed more nearly than 70-100.

3. *The Catholic Epistles.*—The Catholic Epistles were so called in the first instance from their wider and more indefinite address; they were intended for Christians generally, or over some wide area, rather than for a particular church or individual. 2 and 3 John are exceptions, but probably came in under the wing of the larger epistle, which is strictly "catholic." As applied to a class of epistles, the title dates from Eusebius, early in the 4th century; the epithet is given to single epistles by Origen, and is found as far back as the end of the 2nd century. In later Latin usage "catholic" came to mean much the same as "canonical," another name that was also given.

This group of epistles practically continues and supplements the work of the epistles of St Paul, 1 Peter, if genuine, must date from the end of the apostle's career (for the early composition claimed for it by B. Weiss is a paradox that may be disregarded). It was written to instruct and encourage the Christians of Asia Minor at a time of persecution, which on the hypothesis of genuineness, would be the Neronian, *i.e.* a secondary outbreak perhaps loosely connected with the onslaught in Rome. The Epistle of James (also, if genuine) must be placed late in the lifetime of the brother of the Lord. In that case it was probably not written with any direct polemic against writings of St Paul, but against hearsay versions of his teaching that had reached Jerusalem. Controversy of this kind is not always conducted with complete understanding of that which is being opposed. The Epistle of Jude cannot be either dated or localized with any certainty. It seems on the whole most probable that 2 Peter is not a genuine work, but that it came from the same factory of pseudonymous Petrine writings as the Apocalypse which bears the same name, though the one has, and the other has not, obtained a place within the Canon. This epistle was questioned from the first, and only gained its place with much hesitation, and rather through slackness of opposition than any conclusiveness of proof. The three Johannine epistles may be more conveniently treated under the next head.

Even in the case of the two more important epistles, 1 Peter and James, we have to add the qualification "if genuine," but rather perhaps because of the persistence with which they are challenged than because of inherent defect of attestation. The evidence for 1 Peter is both early in date and wide in range, and the book was one of those that passed as "acknowledged" in antiquity. The evidence for James is not so widely diffused but is found in early writings. Perhaps the position of these two epistles might be described as not unlike that of Colossians and Ephesians. Instead of casting doubt upon them, we should prefer to say that they are both probably genuine, but that there are features about them that are not as yet fully explained. The chief of these features is their relation to the writings of St Paul. There is indeed so much that is Pauline in 1 Peter as to give distinct attractiveness to the hypothesis, which is most elaborately maintained by Zahn, that a larger share than usual in the composition of the letter was left to Silvanus (1 Peter v. 12). Nor does it appear to us that the objections to this theory brought by Dr Chase in his excellent article on the epistle in Hastings' *Dictionary* are really so fatal as he supposes. The epistle is more the work of a companion of St Paul of long standing than of one who, with quite different and independent antecedents, had only been influenced by the perusal of one or two of St Paul's letters. In the Epistle of James we have a really distinct type; and it seems to us that the degree to which the epistle misses its mark as a polemic may be easily and naturally accounted for in more ways than one.

4. *The Johannine Writings.*—The Gospel and Epistles that bear the name of John, and the Apocalypse, form a group of writings that stand very much by themselves and are still the subject of active discussion. The points in regard to them that would unite the greatest number of suffrages would seem to be these:—(i.) That, except 2 Peter, they are probably the latest of the New Testament writings, and that they form a group closely connected among themselves, though it is not clear how many hands

have been at work in them, (ii.) That they arose not far from each other towards the end of the 1st century. The Apocalypse is plausibly dated by Reinach and Harnack near to the precise year 93, and the other writings may be referred to the reign of Domitian (81-96), though many critics would extend the limit to some two decades later, (iii.) The writings are to be connected, either more or less closely, with John of Ephesus, who was a prominent figure towards the end of the 1st century. On the other hand, the greatest differences would be:—(i.) As to the personal identity of this John—is he himself "the beloved disciple"? Is he the apostle, the son of Zebedee or another? Can the writer of the Apocalypse be the same as the writer of the Gospel and Epistles? (ii.) What is the exact relation of John of Ephesus to the Gospel? Is he its author or only the authority behind it? (iii.) How far is the Gospel intended to be, and how far is it, in the strict sense historical? This last question is beginning to overshadow all the rest.

Whatever may be the ultimate decision on these intricate questions, the Fourth Gospel in any case played a very important part in the history of the Church and of Christian theology. It drew together and gathered up into itself the forces at work in the apostolic age; and, by reaching out a hand as it were (through the preface) towards Greek philosophy, it succeeded in so formulating the leading doctrines of Christianity as to make it more acceptable than it had as yet been to the Gentile world, and in securing for the Gospel a place in the main stream of European thought. It is probably true to say that no other primitive Christian writing has had so marked an effect on all later attempts to systematize the Christian creed.

> The situation as to the Fourth Gospel has been altered in recent years by the statement attributed to Papias that the two sons of Zebedee (and not only one) were slain by the Jews—a statement which becomes more difficult to put aside as the evidence for it increases (full details in Burkitt, *Gosp. Hist.* pp. 252-255; E. Schwartz, *Über d. Tod d. Söhne Zebedaci*, Berlin, 1904). But this statement does not affect the historical character of John of Ephesus, who is also expressly described by Papias as "a disciple of the Lord" (Eus. *H.E.* iii. 39. 4). On the other hand, the theory that the Gospel is a thorough-going allegory must be hard to maintain in view of the frequent appeals to "witness" which is several times denned as eye-witness (John i. 15, 32, iii. 11, xix. 35, xxi. 24; 1 John i. 1-3; cf. John v. 36, x. 25). This is borne out by Ignatius with his strong emphasis on the reality of the Gospel history (*Eph.* xx. 2; *Trall*, x.; *Smyrn.* i. 1, 2, ii., iii. 1-3, v. 2). If the writer of the Gospel were simply inventing his facts, they would be no proof of his thesis (John xx. 31). It is a paradox that he should be invoked "to prove the reality of Jesus Christ" (as against Docetism), and yet that it should be contended at the same time that for him "ideas, and not events, were the true realities."

5. *Other Literature not included in the New Testament.*—It must not be thought that the primitive Christian literature came abruptly to an end with the writings that are included in our present New Testament. On the contrary, all round these there was a broad fringe of writings more or less approximating to them in character. Most nearly on the lines of the New Testament are the so-called Apostolic (really Sub-Apostolic) Fathers (Clement of Rome to the Corinthians, *Didachē*, Barnabas, the letters of Ignatius and the single letter of Polycarp, the *Shepherd* of Hermas, the homily commonly known as the Second Epistle of Clement). These are in most cases the writings of leading persons in the Church who took up and continued the tradition of the apostles. Barnabas and 2 Clement are more eccentric, but the writers must have been persons of some note. Outside this group 876
would come what are called the Apocryphal Gospels and Acts (Gospel according to Hebrews, according to Egyptians, of Peter, of Truth, of the Twelve [or Ebionite Gospel], the recently recovered so-called *Logia*; the Gospel of Nicodemus, the Protevangelium of James, the Gospel of Thomas, the Acts of Pilate, Acts of Paul, Peter, John, Andrew, Thomas; the Preaching of Peter, the Apocalypse of Peter). As the 2nd century wears on, we come to controversial or philosophical works by Agrippa, Castor, Quadratus, Aristides. With the middle of the century we reach a considerable writer in Justin Martyr. With him the twilight period which succeeds to the apostolic age is over, and we enter upon the main course of ecclesiastical history. At this point, therefore, our survey may end.

(β) *The Process of Discrimination and Collection*, 1. *Discrimination.*—Throughout the apostolic age Christians were conscious of being carried forward in a great movement, the origin and motive-power of which they regarded as supernatural. It began on the Day of Pentecost, but continued in full tide almost to the end of the 1st century, and, even when it began to subside, it did so quite gradually. The moment of transition is clearly marked in the *Didachē*, where the *charismatic* ministry of "apostles and prophets" is beginning to give place to permanent local officials of the Church, bishops, presbyters and deacons. The literature that we now call the New Testament held its place because it was regarded as a product of the palmy days of that great movement. It was considered to be the work of inspired men, of men whom the Holy Spirit, at that time specially active in the Church, had chosen as its organs. We have seen how St Paul, for instance, fully believed that his own preaching had a force behind it which vindicated for it the claim to be "the word of God" (1 Thess. ii. 13); and it was inevitable that the other preachers and teachers should have had in different degrees something of the same consciousness. This consciousness receives perhaps its strongest expression in the Apocalypse.

There is really no contradiction between this sense of a high calling and mission, with a special endowment corresponding to it, and the other fact that the writings from this age that have come down to us are all (except perhaps the Apocalypse, and even the Apocalypse, in some degree, as we see by the letters to the Seven Churches) strictly occasional and natural in their origin. The lives and actions of apostles and prophets were in their general tenor like those of other men; it was only that, for the particular purpose of their mission, they found themselves carried beyond and above themselves. St Paul himself knew when he was speaking by the Spirit, and when he was not; and we too can recognize to some extent when the *afflatus* comes upon him. It is fortunate that this should be so clearly marked in his epistles, because it enables us to argue by analogy to the other writers. When we come to historical books like the third Gospel and the Acts, we find the writer just pursuing the ordinary methods of history, and not claiming to do anything more (Luke i. 1-4). With the methods of history, these writers were naturally exposed to the risks and chances of error attendant upon those methods. There was hot at first among the writers any idea that they were composing an infallible narrative. The freedom with which they used each other's work, and with which the early texts were transmitted, excludes this. But there was the idea that the whole movement of the Church to which they gave expression was in a special sense divine. And this belief was the fundamental principle that determined the marking off of the writings of the first, or apostolic, age from the rest.

At the same time it must not be supposed that a hard and fast line can be drawn beyond which the spiritual stimulus of this first age ceased. The writings of Clement of Rome (A.D. 97) and of Ignatius (*c.* A.D. 110) mark the transition. Ignatius, for instance, clearly distinguishes between his own position and that of the apostles: "I do not enjoin you. as Peter and Paul did. They were Apostles, I am a convict; they were free, but I am a slave to this very hour" (Rom. iv. 3). And yet, none the less, Ignatius is conscious of acting and speaking at times from a kind of inspiration. "Even though certain persons desired to deceive me after the flesh, yet the spirit is not deceived, being from God; for it knoweth whence it cometh and where it goeth, and it searcheth out the hidden things. I cried out, when I was among you; I spake with a loud voice, with God's own voice, give ye heed to the bishops, and the presbyters and deacons" (*Philadelph.* vii. 1). In like manner Clement, in two places (lix. 1, lxiii. 2), writes as though God were speaking through him.

2. *Collection.*—Concurrently with the tendency to discriminate between the higher authority of certain writings and the lower authority of others, there was also a tendency to collect and group together writings of the first class. The earliest example of this tendency is in the case of the Pauline Epistles. Marcion, we know (*c.* A.D. 140), had a collection of ten out of thirteen, in the order, Gal., 1 and 2 Cor., Rom., 1 and 2 Thess., Laodic. (= Eph.), Col., Phil., Philem. We observe that the Pastorals are omitted. But it is highly probable that the collection went back a full generation before Marcion. The short Epistle of Polycarp contains references or allusions to no less than nine out of the thirteen epistles, including 2 Thess., Eph., 1 and 2 Tim. Ignatius, writing just before, gives clear indications of six, including 1 Tim. and Titus. The inference lies near at hand that both writers had access to the full collection of thirteen, not omitting the Pastorals. Polycarp (*ad Phil.* xiii. 2) shows how strong was the interest in collecting the writings of eminent men.

It of course did not follow that, because the letters of St Paul were collected, they were therefore regarded as sacred. The feeling towards them at first would be simply an instinct of respect and deference; but we have seen above that the essential

conditions of the higher estimate were present all along, and were only waiting to be recognized as soon as reflective thought was turned upon them. This process appears to have been going on throughout the middle years of the 2nd century.

The famous passage of Irenaeus (*Adv. Haer*. iii. 15. 8) assumes the possession by the Church of four authoritative Gospels and no more. This is the general view of the Church of his time, except the little clique known as the Alogi who rejected the Fourth Gospel, and Marcion, who only recognized St Luke. But here again, we may go back some way farther. Irenaeus writes (*c*. A.D. 185) as though the Four Gospels had held the field as far back as he can remember. About A.D. 170 Tatian, the disciple of Justin, composed out of these Gospels his *Diatessaron*. If Justin used any other Gospel, his use of it was very subordinate. Practically we may say that the estimate of the Four to which Tatian and Irenaeus testify must have been well established by the middle of the century, though sporadic instances may be found of the use of other Gospels that did not become canonical. The sifting out of these was proceeding steadily and gradually, and by the end of the century it may be regarded as complete.

We must make allowance for the existence of this margin, and for the blurring of the boundary-line that goes along with it. We cannot claim for the Church absolute sureness of judgment as to what falls on one side of the line and what on the other. It is possible, *e.g.*, that a mistake has been made in the case of 2 Peter, which, however, is edifying enough. It is not less possible that writings like 1 Clem, and Epp. Ignat. are not inferior in real religious value to the Epistle of Jude. But, broadly speaking, the judgment of the early Church has been endorsed by that of after ages.

Harnack raises an interesting question (*Reden u. Aufsätze*. ii. 239 ff.), how it came about that Four Gospels were recognized, and not only one. There are many indications early in the 2nd century of a tendency towards the recognition of a single Gospel; for instance, there are the local Gospels according to Hebrews, according to Egyptians; Marcion had but one Gospel, St Luke, the Valentinians preferred St John and so on; Tatian reduced the Four Gospels to one by means of a Harmony, and it is possible that something of the kind may have existed before he did this. There is probably some truth in the view that the Church clung to its Four Gospels as a weapon against Gnosticism; it could not afford to reduce the number of its documents. But, over and above this, there was probably something in the circumstances in which the canonical Gospels were composed, and in their early history, which gave them a special prestige in the eyes of the faithful. The story which Eusebius quotes from Clement of Alexandria (*H.E*. vi. 14) seems to point to something of the kind.

3. *Influences at work*.—The whole process of the formation of the New Testament was steady and gradual. The critical period, during which the conception grew up of the New Covenant with its sacred book by the side of the Old Covenant, which in its written embodiment we call the Old Testament, extends roughly over the 2nd century. By the last decades of that century a preliminary list of these new Sacred Books had been formed and placed by the side of the Old with substantially the same attributes. We must briefly sketch the process by which this came about, tracing the causes which led to the result and indicating the manner in which they operated.

We have seen that the ultimate cause was the consciousness on the part of the Church that the first age of its own history was characterized by spiritual workings more intense than other times. This feeling had been instinctive, and it found expression in several ways, each one of them partial, when taken alone, but obtaining their full effect in combination. It should be understood that the goal towards which events were moving all the time was the equalizing of the New Testament with the Old Testament.

(*a*) *Public Reading*.—From the first the way in which the Epistles of Paul were brought to the knowledge of the churches to which they were addressed was by reading in the public assemblies for worship. This was done by the direction of the apostle himself (1 Thess. v. 27; Col. iv. 16). At first any writing that was felt to be useful for edification was read in this way, especially if it had local associations (cf. Dionysius of Corinth, *ap*. Eus. *H.E*. iv. 23. 11). But, as worship became more thoroughly organized, it was invested with increasing solemnity; the freedom of choice was gradually restricted; and inasmuch as lections were regularly taken from the Old Testament, it was only natural that other lections read alongside of them should gradually be placed upon the same footing.

(*b*) *Authority of Christ and the Apostles*.—As the words of prophets and lawgivers had from the first carried their own authority with them under the Old Covenant, so from the first the words of Christ needed no commendation from without under the New. And what applied to words of Christ soon came also to apply in their degree to words of the apostles. The only difference was that an authority at first instinctively assumed came to be consciously recognized and formally defined. There was also a natural tendency towards levelling up the different parts of books and groups of books. In other words, the somewhat vague sense of spiritual power and impressiveness hardened into the conception of sacred books united in a sacred volume.

(*c*) *Controversy*.—The process was accelerated by the demand for a standard or rule of faith and practice. At an early date in the 2nd century this demand was met by the composition of the oldest form of what we call the Apostles' Creed. But the Creed was but the condensed essence of the New Testament scriptures, and behind it there lay an appeal to these scriptures, which was especially necessary where (as in the case of the Valentinian Gnostics) the dissident bodies professed to accept the common belief of Christians. In its conflict with Gnostics, Marcionites and Montanists the Church was led to insist more and more upon its Bible, its own Bible, just as in its older controversy with the Jews it had to insist on the Bible which it inherited from them. This was a yet further cause of the equating of the two parts of the sacred volume, which went on with an imperceptible *crescendo* through the first three quarters of the 2nd century, and by the last quarter was fairly complete.

(γ) *Provisional Canon of New Testament* (end of 2nd century).—By the last quarter of the 2nd century the conception of a Christian Bible in two parts, Old Testament and New Testament, may be said to be definitely established. Already at the beginning of this period Melito had drawn up a list of the twenty-two Books of the Old Covenant, *i.e*. of the documents to which the Old Covenant made its appeal. It was a very short step to the compiling of a similar list for the New Covenant, which by another very short step becomes the New Testament, by the side of the Old Testament. It is therefore not surprising, though a piece of great good fortune, that there should be still extant a list of the New Testament books that may be roughly dated from the end of the century. This list published by Muratori in 1740, and called after him "the Muratorian Fragment on the Canon," is commonly believed to be of Roman origin and to be a translation from the Greek, though there are a few dissentients on both heads. The list recognized four Gospels, Acts, thirteen epistles of Paul, two epistles of John, Jude, Apocalypse of John and (as the text stands) of Peter; there is no mention of Hebrews or (apparently) of 3 John or Epistles of Peter, where it is possible—we cannot say more—that the silence as to 1 Peter is accidental; the *Shepherd* of Hermas on account of its date is admitted to private, but not public, reading; various writings associated with Marcion, Valentinus, Basilides and Montanus are condemned.

There are many interesting points about this list, which still shows considerable freshness of judgment, (i.) There are traces of earlier discussions about the Gospels, both in disparagement of the Synoptics as compared with St John, and in criticism of the latter as differing from the former, (ii.) There is a healthy tendency to lay stress on the historical value of narratives which proceed from eye-witnesses, (iii.) An over-ruling and uniting influence is ascribed to the Holy Spirit, (iv.) The writer is concerned to point out that letters addressed to a single church and even to an individual may yet have a wider use for the Church as a whole, (v.) The sense is not yet lost that the appeal of the Old Testament is as coming from men of prophetic gifts, and that of the New Testament as coming from apostles, (vi.) It is in accordance with this that a time limit is placed upon the books included in the New Testament, (vii.) Christians are to be on their guard against writings put forth in the interest of heretical sects.

When the data of Fragm. Murat. are compared with those supplied by the writers of the last quarter of the 2nd and first of the 3rd centuries (Tatian, Theoph. Ant., Iren., Clem. Alex., Tert., Hippol.), it is seen that there is a fixed nucleus of writings that is acknowledged, with one exception, over all parts of the Christian world. The exception is the Syriac-speaking Church of Edessa and Mesopotamia. This Church at first acknowledged only the Gospel (in the form of Tatian's *Diatessaron*), Acts and the Epistles of Paul. These seem to have been the only books translated immediately upon the foundation of the Edessan Church, though an edition of the separate Gospels must have followed either before or very soon afterwards. In all other churches the four Gospels, Acts and Epistles of Paul are fixed, with the addition in nearly all of 1 Peter, 1 John. The Apocalypse was generally accepted in the West. Hebrews and James were largely accepted in the East.

In the 3rd century the conspicuous figure is Origen (*ob*. 253), whose principal service was, through the vast range of his knowledge, his travels and his respect for tradition wherever he found it, to keep open the wider limits of the Canon. There is not one of our present books that he does not show himself inclined to accept, though he notes the doubts in regard to 2 Peter and 2 and 3 John. Later in the century Dionysius of Alexandria applies some acute criticism to justify the Alexandrian dislike of the Apocalypse.

(6) *The Final Canon* (4th century).—Early in the 4th century Eusebius, as a historian reviews the situation (*H.E*. iii. 25. 1). He makes three classes; the first, including the Gospels, Acts, Epistles of Paul, 1 Peter, 1 John, is acknowledged; to these, if one likes, one may add the Apocalypse. The second class is questioned, but accepted by the majority; viz. James, Jude, 2 Peter, 2 and 3 John. The third class, of works to be decidedly rejected, contains the Acts of Paul, Hermas, Apocalypse of Peter, Barnabas, *Didachē*; to these some would add Apoc. of John, and others *Ev. sec. Hebr*. About the same time another line of tradition is represented by Lucian and the school of Antioch. The vernacular Church of Syria represented yet a third. In Egypt the uncertainty and laxity of usage was still greater. This state of things the great Athanasius set himself to correct, and he did so by laying down a list identical with our New Testament as we have it now. It was very largely the influence of Athanasius that finally turned the scale. He was peculiarly qualified for exercising this influence, as his long exile in the West made him familiar with Western usage, while he was also able to bring to the West the usage that he was trying to establish in the East. His efforts would be helped by Westerns, like Hilary and Lucifer, who were exiled to the East. The triumph of the Athanasian Canon, indeed, went along with the triumph of Nicene Christianity. And while the movement received its impulse from 878
Athanasius, the power by which it was carried through and established was largely that of his powerful ally, the Church of Rome.

The final victory was no doubt a little delayed. Asia Minor and Syria were for most of the 4th century divided between the following of Eusebius (Cyril of Jerusalem in A.D. 348, Gregory of Nazianzus, the list of *Apost. Can*. 85, that attached to Can. 59 of the Council of Laodicea, *c*. A.D. 363) and the school of Antioch. The leading members of that school adopted 3 Epp. Cath. (James, 1 Peter, 1 John), Theod. Mops. omitting this group altogether, and the whole school omitting Apoc. Amphilochius of Iconium (*c*. 380) gives the two lists, Eusebian and Antiochene, as alternatives. The Eusebian list only wanted the complete admission of the Apocalypse to be identical with the Athanasian; and Athanasius had one stalwart supporter in Epiphanius (*ob*. 403).

The original Syriac list, as we have seen, had neither Epp. Cath. nor Apoc. The Peshito version, in regard to which Professor Burkitt's view is now pretty generally accepted, that it was the work of Rabbula, bishop of Edessa, 411-433, added the 3 Epp. Cath. The remaining 4 Epp. Cath. and Apoc. were supplied in the Philoxenian version of 508, and retained in the Harklean revision of 616. But both these were Monophysite and of limited use, and the Nestorians still went on using the Peshito.

Meantime, in the West, an important Synod was held by Damasus at Rome in 382 which, under the dominant influence of Jerome and the Athanasian tradition, drew up a list corresponding to the present Canon. This was ratified by Pope Gelasius (492-496), and independently confirmed for the province of Africa by a series of Synods held at Hippo Regius in 393, and at Carthage in 397 and 419, under the lead of Augustine. The formal completion of the whole process in East and West was reserved for the Quinisextine Council (Council in Trullo) of 692. But even after that date irregularities occur from time to time, especially in the East.

In the fixing of the Canon, as in the fixing of doctrine, the decisive influence proceeded from the bishops and the theologians of the period 325-450. But behind these was the practice of the greater churches; and behind that again was not only the lead of a few distinguished individuals, but the instinctive judgment of the main body of the faithful. It was really this instinct that told in the end more than any process of quasi-scientific criticism. And it was well that it should be so, because the methods of criticism are apt to be, and certainly would have been when the Canon was formed, both faulty and inadequate, whereas instinct brings into play the religious sense as a whole; with spirit speaking to spirit rests the last word. Even this is not infallible; and it cannot be claimed that the Canon of the Christian Sacred Books is infallible. But experience has shown that the mistakes, so far as there have been mistakes, are unimportant; and in practice even these are rectified by the natural gravitation of the mind of man to that which it finds most nourishing and most elevating.

BIBLIOGRAPHY.—The separate articles on the various books of the New Testament may be consulted for detailed bibliographies. The object of the above sketch has been to embrace in constructive outline the ground usually covered analytically and on a far larger scale by Introductions to the New Testament, and by Histories of the New Testament Canon. In English there is a standard work of the latter class in Westcott's *General Survey of the History of the Canon of the New Testament* (first published in 1855, important revision and additions in 4th ed. 1874, 7th ed. 1896), with valuable appendix of documents at the end. There was also a useful collection of texts by Prof. Charteris of Edinburgh, *Canonicity* (1880), based on Kirchhofer, *Quellensammlung* (1844), but with improvements. The leading documents are to be had in the handy and reliable *Kleine Texte* (ed. Lietzmann, from 1902). On Introduction the ablest older English work was Salmon, *Historical Introduction to the Study of N.T.* (1st ed. 1885, 5th ed. 1891); but, although still possessing value as argument, this has been more distinctly left behind by the progress of recent years. England has made many weighty contributions both to Introduction and Canon, especially Lightfoot, *Essays on Supernatural Religion* (collected in 1889); editions of Books of the New Testament and Apostolic Fathers; Westcott, editions; Hort, especially *Romans and Ephesians* (posthumous, 1895); Swete, editions; Knowling and others. The Oxford Society of Historical Theology put out a useful *New Testament in the Apostolic Fathers* in 1905, and Prof. Stanton of Cambridge, *The Gospels as Historical Documents* (part i. in 1903). Prof. Burkitt's *Gospel History and its Transmission* appeared in 1906. For introductory matter the student will do well to consult the *Dictionary of the Bible* (ed. Hastings, 5 vols., 1898-1904) and *Encyclopaedia Biblica* (ed. Cheyne and Black, 4 vols., 1899-1903). Dr Hastings and his contributors belong more to the right wing of criticism, and Dr Cheyne and his to the left. The systematic Introduction is a characteristic production of Germany and has done excellent service in its day, though there are signs that the analytic method hitherto mainly practised is beginning to give place to something more synthetic or constructive. The pioneer work in this latter direction is Weizsäcker's skilful and artistic *Apostolisches Zeitalter* (1st ed. 1886, 3rd ed. 1901; Eng. trans. 1894-1895); somewhat similar on a smaller scale is von Soden, *History of Early Christian Literature* (trans., 1906). Special mention should be made of Wellhausen on the Synoptic Gospels (1903-1905), and Harnack, *Beiträge z. Einleitung in d. N.T.* (part i. 1906, part ii. 1907). The most important recent works on Introduction and Canon have been those of H.J. Holtzmann (1st ed. 1885, 3rd ed. 1902), B. Weiss (1st ed. 1886, 3rd ed. 1897); a series of works by Th. Zahn, almost colossal in scale and exhaustive in detail, embracing *Gesch. d. neut. Kanöns* (2 vols., 1888-1892, third to follow), *Forschungen z. Gesch. d. neut. Kan.* (7 parts, 1881-1907), *Einleitung* (2 vols., 1897-1899), *Grundriss d. Gesch. d. neut. Kan*. (1st ed. 1901, 2nd ed. 1904); A. Jülicher, *Einleitung* (1st and 2nd ed. 1894, 5th and 6th ed. 1906; Eng. trans. by Miss Janet Ward, 1904). Zahn and Jülicher may be said to supplement and correct each other, as they write from very different points of view, and on Jülicher's side there is no lack of criticism of his great opponent. Zahn's series is monumental in its way, and his *Grundriss* is very handy and full of closely packed and (in statements of facts) trustworthy matter. Jülicher's work is also highly practical, very complete and well proportioned in scale, and up to a certain point its matter is also excellent. The *History of the Canon*, by the Egyptologist Joh. Leipoldt (Leipzig, 1907), may also be warmly recommended; it is clear and methodical, and does not make the common mistake of assigning too much to secondary causes; the author does not forget that he is dealing with a sacred book, and that he has to show why it was held sacred.

(W. SA.)

2. *Texts and Versions*.

The *apparatus criticus* of the New Testament consists, from one point of view, entirely of MSS.; but these MSS. may be divided into three groups: (A) Greek MSS., which in practice are known "The MSS," (B) MSS. of versions in other languages representing translations from the Greek, (C) MSS. of other writings whether in Greek or other languages which contain quotations from the New Testament.

(A) *Greek MSS.*—These may be divided into classes according to style of writing, material, or contents. The first method

distinguishes between uncial or majuscule, and cursive or minuscule; the second between papyrus, vellum or parchment, and paper (for further details see Manuscript and Palaeography); and the third distinguishes mainly between Gospels, Acts and Epistles (with or without the Apocalypse), New Testaments (the word in this connexion being somewhat broadly interpreted), lectionaries and commentaries.

Quite accurate statistics on this subject are scarcely attainable. Von Soden's analysis of numbers, contents and date may be tabulated as follows, but it must be remembered that it reckons many small fragments as separate MSS., especially in the earlier centuries. It is also necessary to add that there is one small scrap of papyrus of the 3rd century containing a few verses of the 4th Gospel.

Century	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	XIV.	XV.	XVIf.	Total.
New Testaments	2	2	1	..	1	2	2	16	24	44	47	19	7	167
Gospels	3	10	26	10	19	26	82	188	282	260	218	107	46	1277
Act and Epistles	1	1	..	1	1	4	19	55	49	52	56	31	8	278
Acts and Catholic Epp.	..	..	1	4	..	..	..	..	2	..	3	2	5	25
Pauline Epp.	..	4	7	1	..	5	4	..	1	..	4	3	3	32
Apocalypse	..	..	..	..	..	..	1	2	3	5	5	21	6	43

Plate I.

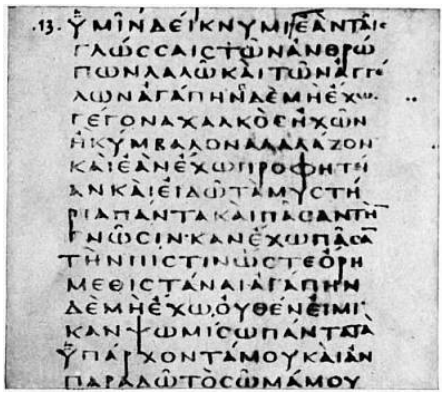

Fig. 1.—*Codex Vaticanus* (*From facsimile ed. by J. Cozza-Luzi,* 1889-1890.)

Fig. 2.—*Codex Sinaiticus* (*From facsimile published by Palaeographical Soc.* 1873.)

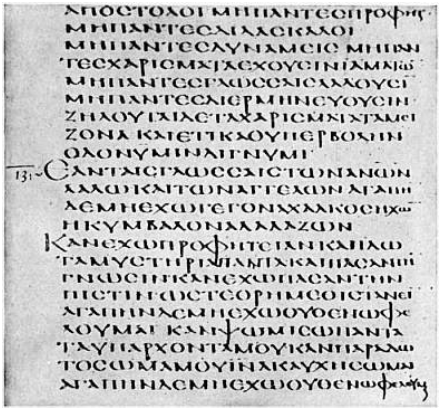

Fig. 3.—*Codex Alexandrinus.* (*British Museum.*)

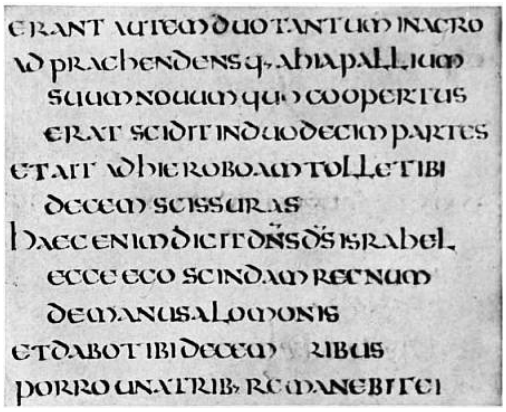

Fig. 4.—From a probable Northumbrian Copy of the *Codex Amiatinus.* (*British Museum.*)

Fig. 5.—*Pentateuch* in Hebrew, 9th Century. (*British Museum.*)

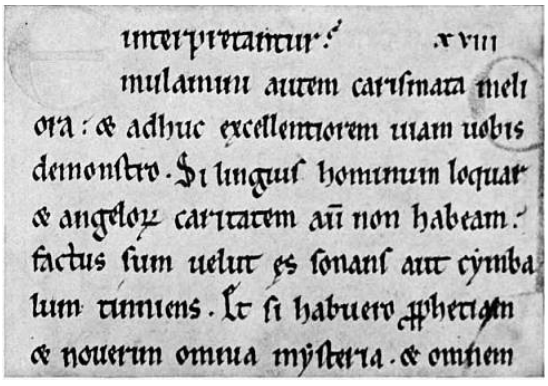

Fig. 6.—Vulgate. (*From MS written for the monastery of Ste Marie de Parco, Louvain,* A.D. 1148. *British Museum.*)

Plate II.

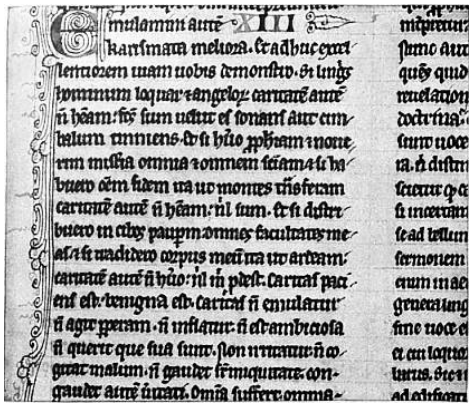

FIG. 7.—13th Century Latin Bible. (*From copy belonging to Robert de Bello, abbot of St Augustine's, Canterbury. British Museum.*)

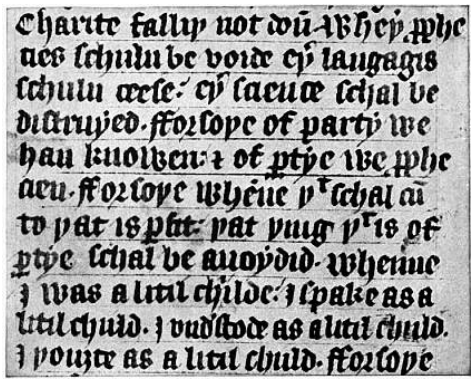

FIG. 8.—Early Wycliffite Version. (*From copy belonging to Thomas of Woodstock, duke of Gloucester, written towards the end of 14th century. British Museum.*)

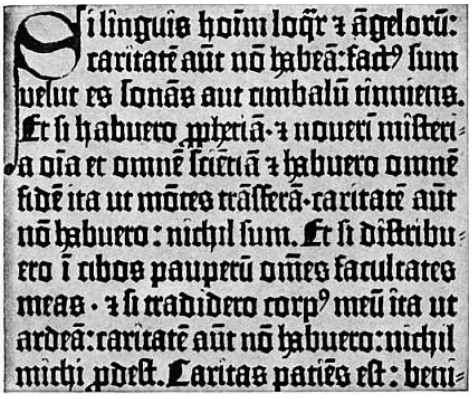

FIG. 9.—The 42-Line Bible. (*Printed at Mainz, 1452-6. British Museum.*)

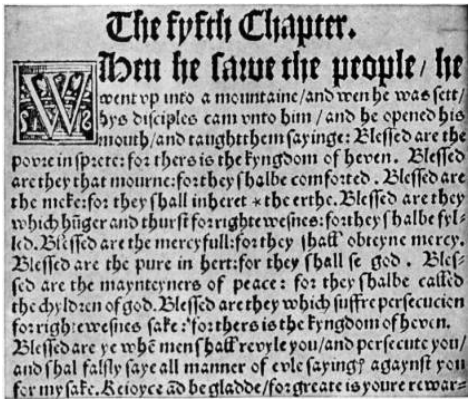

FIG. 10.—Tyndale's Quarto Edition of New Testament. (*Printed by P. Quentel, Cologne, 1525, from the only remaining fragment, in British Museum.*)

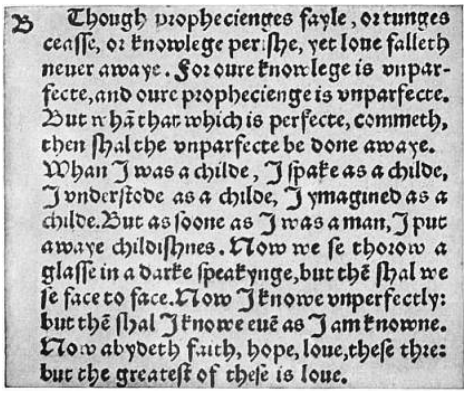

FIG. 11.—First printed English Bible, 1535. (*British Museum.*)

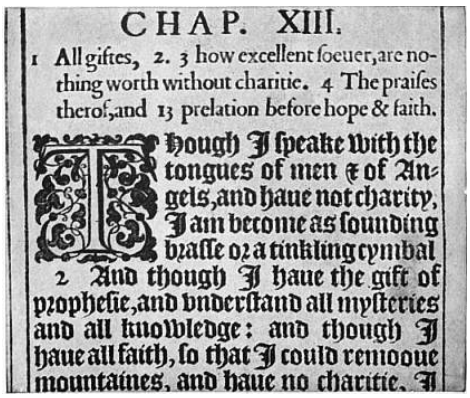

FIG. 12.—First Edition of the Authorized Version, 1611. (*British Museum.*)

This table says nothing about style of writing or material, but it may be taken as a general rule that MSS. earlier than the 13th century are on vellum and later than the 14th century are on paper, and that MSS. earlier than the 9th century are uncial and later than the 10th are minuscule. There are said to be 129 uncial MSS. of the New Testament (Kenyon, *Textual Criticism of the New Testament*, p. 45), but it is not easy to be quite accurate on the point.

Besides the MSS. mentioned in the table above, there are 281 MSS. containing commentaries on the Gospels, 169 on Acts and Epistles, 66 on the Apocalypse, 1072 lectionaries of the Gospels and 287 of Acts and Epistles, making a grand total of 3698 MSS. It must be remembered that the dating of the MSS., especially of minuscules, is by no means certain: Greek Palaeography is a difficult subject, and not all the MSS. have been investigated by competent palaeographers.

The notation of this mass of MSS. is very complicated. There are at present two main systems: (1) Since the time of Wetstein it has been customary to employ capital letters, at first of the Latin and latterly also of the Greek and Hebrew alphabets, to designate the uncials, and Arabic figures to designate the minuscules. Of this system there are two chief representatives, Gregory and Scrivener. These agree in the main, but differ for the more recently discovered minuscules. Gregory's notation is more generally used, and Scrivener's, though still followed by a few English scholars, is likely to become obsolete. This method of notation has various disadvantages. There are not enough letters to cover the uncials, the same letter has to serve for various fragments which are quite unconnected except by the accident of simultaneous discovery, and no information is given about the MS. referred to. (2) To remedy these drawbacks an entirely new system was introduced in 1902 by von Soden in his *Die Schriften des neuen Testaments*, Bd. 1, Abt. 1, pp. 33-40. He abandons the practice of making a distinction between uncial and minuscule, on the ground that for textual criticism the style of writing is less important than the date and contents of a MS. To indicate these he divided MSS. into three classes, (1) New Testaments (the Apocalypse being not regarded as a necessary part), (2) Gospels, and (3) Acts, Epistles and Apocalypse (the latter again being loosely regarded). These three classes he distinguished as δ (= διαθήκη), ε (= εὐαγγέλιον) and α (= ἀπόστολος). To these letters he attaches numbers arranged on a principle showing the century to which the MS. belongs and defining its contents more precisely. The number is determined thus:—MSS. of the δ and α classes from the earliest period to the 9th century inclusive are numbered 1 to 49; those of the 10th century 50 to 99; for the later centuries numbers of three figures are used, and the choice is made so that the figure in the hundreds' place indicates the century, 1 meaning 11th century, 2 meaning 12th century, and so on; to all these numbers the appropriate letter, if it be δ or α, must be always prefixed, but if it be ε, only when there is any chance of ambiguity. In δ MSS. a distinction is made for those of the 11th and subsequent centuries by reserving 1 to 49 in each hundred for MSS. containing the

Apocalypse, 50 to 99 for those which omit it. Similarly, in α MSS. a distinction is made according to their contents; the three-figure numbers are reserved for MSS. which contain Acts, Catholic Epistles and Pauline Epistles with or without the Apocalypse, the presence or absence of which is indicated as in the δ MSS.; but when a MS. consists of only one part a "1" is prefixed, thus making a four-figure number, and the precise part is indicated by the two last of the four figures; 00-19 means Acts and Catholic Epistles, 20-69 means Pauline Epistles and 70-99 means Apocalypse. In the case of ε MSS. 1-99 is used for the earliest MSS. up to the 9th century, and as this is insufficient, the available numbers are increased by prefixing a 0, and reckoning a second hundred from 01 to 099; 1000 to 1099 are MSS. of the 10th century; 100 to 199 are MSS. of the 11th century, 200-299 of the 12th century, and so on; as this is insufficient, the range of numbers is increased by prefixing a 1, and so obtaining another hundred, *e.g.* 1100 to 1199, and in the 12th and subsequent centuries, where even this is not enough, by passing on to the thousands and using 2000-2999 for the 12th century, 3000-3999 for the 13th and so on. In each case ε is prefixed whenever there is any chance of ambiguity. It is claimed that this system gives the maximum of information about a MS., and that it leaves room for the addition of any number of MSS. which are likely to be discovered. At present it has not seriously threatened the hold of Gregory's notation on the critical world, but it will probably have to be adopted, at least to a large extent, when von Soden's text is published.

[The full details of this subject can be found in E. Miller's edition of Scrivener's *Introduction to the Criticism of the New Testament* (George Bell, 1894); C.R. Gregory's *Prolegomena* to Tischendorf's *Novum Testamentum Graece, Ed. VIII. critica major* (Leipzig, 1894); C.R. Gregory's *Textkritik* (Leipzig, 1900); H. von Soden's *Die Schriften des neuen Testaments* (Berlin, Band i., 1902-1907); F.G. Kenyon's *Handbook to the Textual Criticism of the New Testament* (London, 1901), especially valuable for a clear account of the Papyri fragments.]

It is neither possible nor desirable to give any description of most of these MSS., but the following are, critically, the most important.

Codex Vaticanus.

Uncials.—*Codex Vaticanus* (Vat. Gr, 1209), Greg. B, v. Soden δ1; an uncial MS. of the 4th century. It is written in three columns and has forty-two lines to the column. It originally contained the whole Bible, but in the New Testament Heb. ix. 14, xiii. 25, 1 and 2 Tim., Tit., Philemon, Apoc., are now missing. It was written by three scribes of whom the writer of the New Testament was identified by Tischendorf as the scribe D of א (*cod. Sinaiticus*). The text has been corrected by two scribes, one (the διορθώτης) contemporary with the original writer, the other belonging to the 10th or 11th century. The latter probably also re-inked the whole of the MS. and introduced a few changes in the text, though some critics think that this was done by a monk of the 15th century who supplied the text of the lacuna in Heb. and of the Apocalypse from a MS. belonging to Bessarion. The text is the best example of the so-called Neutral Text, except in the Pauline epistles, where it has a strong "Western" element. How this MS. came to be in the Vatican is not known. It first appears in the catalogue of 1481 (Bibl. Vat. MS. Lat. 3952 f. 50), and is not in the catalogue of 1475, as is often erroneously stated on the authority of Vercellone. It was, therefore, probably acquired between the years 1475 and 1481. The problem of its earlier history is so entangled with the similar questions raised by χ that the two cannot well be discussed separately. [Phototypic editions have been issued in Rome in 1889-1890 and in 1905.]

Sinaiticus.

Codex Sinaiticus (St Petersburg, Imperial library), Greg. א, von Soden δ2; an uncial MS. of the 4th century. It was found in 1844 by C. Tischendorf (*q.v.*) in the monastery of St Catherine on Mt. Sinai, and finally acquired by the tsar in 1869. It is written on thin vellum in four columns of forty-eight lines each to a page. It contained originally the whole Bible, and the New Testament is still complete. At the end it also contains the Ep. of Barnabas and the *Shepherd* of Ilermas, unfortunately incomplete, and there was probably originally some other document between these two. The text was written, according to Tischendorf, by four scribes, of whom he identified one as also the scribe of *cod. Vaticanus*. It was corrected many times, especially in the 6th century, by a scribe known as א^{a} and in the 7th by א^{c}. It has, in the main, a Neutral text, less mixed in the Epistles than that of B, but not so pure in the Gospels. The corrections of א^{c} are important, as they are based (according to a note by that scribe, at the end of Esther) on an early copy which had been corrected by Pamphilus, the disciple of Origen, friend of Eusebius and founder of a library at Caesarea.

[The text of א was published in Tischendorf's *Bibliorum codex Sinaiticus Petropolitanus* (vol. iv.,1862), and separately in his *Novum Testamentum Sinaiticum* (1863); in 1909 it was published in collotype by the Clarendon Press, Oxford. The relations of χ^{o} to Pamphilus are studied by Bousset in "Textkritische Studien zum N.T." (in *Texte u. Untersuchungen*, xi. 4).]

If Tischendorf was right in identifying the scribe of B with that of part of א, it is obvious that these MSS. probably come from the same place. He was probably wrong, but there are some indications of relationship to justify the same view. The two most probable places seem to be Caesarea and Alexandria. The case for Caesarea is that the colophon written by א^{c} at the end of Esther, and also of Ezra, shows that א was then in the library of Caesarea, and that a chapter division in Acts found both in א and B can also be traced to the same library. This is a fairly strong case, but it falls short of demonstration because it cannot be shown that the MS. corrected by Pamphilus was still at Caesarea when it was used by א, and because it is not certain either that the chapter divisions in Acts were added by the original scribes, or that א and B were at that time in their original home, or that the chapter divisions were necessarily only to be found at Caesarea. The case for Alexandria depends partly on the orthography of B, which resembles Graeco-Coptic papyri, partly on the order of the Pauline epistles. At present, both in א and B, Hebrews is placed after 2 Thess., but in **B** there is also a continuous numeration of sections throughout the epistles, according to which 1 to 58 cover Romans to Galatians, but Ephesians, the next epistle, begins with 70 instead of 59, and the omitted section numbers are found in Hebrews. Obviously, the archetype placed Hebrews between Galatians and Ephesians, but the scribe altered the order and put it between 2 Thess. and 1 Tim., though without changing the section numbers. This older order of the epistles is only found elsewhere in the Sahidic version of the New Testament, and it was probably therefore the old Egyptian or Alexandrian order. Moreover, we know from the Festal letter of A.D. 367 (according to the Greek and Syriac texts, but not the Sahidic), that Athanasius then introduced the order of the epistles which is now given in א B. This is strong evidence for the view that the archetype of B came from Alexandria or the neighbourhood, and was older than the time of Athanasius, but it scarcely proves that B itself is Alexandrian, for the order of epistles which it gives is also that adopted by the council of Laodicea in A.D. 363, and may have been introduced elsewhere, perhaps in Caesarea. A further argument, sometimes based upon and sometimes in turn used to support the foregoing, is that the text of א B represents that of Hesychius; but this is extremely doubtful (see the section *Textual Criticism* below).

[The question of the provenance of א and B may best be studied in J. Rendel Harris, *Stichometry* (Cambridge, 1893), pp. 71-89; J. Armitage Robinson, "Euthaliana," *Texts and Studies*, iii. 3 (Cambridge, 1895), esp. pp. 34-43 (these more especially for the connexion with Caesarea); A. Rahfls, "Alter und Heimat der vatikanischer Bibelhandschrift," in the *Nachrichten der Gesell. der Wiss. zu Göttingen* (1899), vol. i. pp. 72-79; and O. von Gebhardt in a review of the last named in the *Theologische Literaturzeitung* (1899), col. 556.]

Bezae.

Codex Bezae (Cambridge Univ. Nu. 2, 41), Greg. D, von Soden δ 5; an uncial Graeco-Latin MS. not later than the 6th century and probably considerably earlier. The text is written in one column to a page, the Greek on the left hand page and the Latin on the right. It was given to the university of Cambridge in 1581, but its early history is doubtful. Beza stated that it came from Lyons and had been always preserved in the monastery of St Irenaeus there. There is no reason to question Beza's *bona fides*, or that the MS. was obtained by him after the sack of Lyons in 1562 by des Adrets, but there is room for doubt as to the accuracy of his belief that it had been for a long time in the same monastery. His information on this point would necessarily be derived from Protestant sources, which would not be of the highest value, and there are two pieces of evidence which show that just previously the MS. was in Italy. In the first place it is certainly identical with the MS. called η which is quoted in the margin of the 1550 edition of Robert Stephanus' Greek Testament; this MS. according to Stephanus' preface was collated for him by friends in Italy. In the second place it was probably used at the council of Trent in 1546 by Gul. a Prato, bishop of Clermont in Auvergne, and in the last edition of the *Annotationes* Beza quotes his MS. as *Claromontanus*, and not as *Lugdunensis*. These points suggest that the MS. had only been a short time at Lyons when Beza obtained it. The still earlier history of the MS. is equally doubtful. H. Quentin has produced some interesting but not convincing evidence to show that the MS. was used in Lyons in the 12th century, and Rendel Harris at one time thought that there were traces of Gallicism in the Latin, but the latter's more recent researches go to show that the corrections and

annotations varying in date between the 7th and 12th centuries point to a district which was at first predominantly Greek and afterwards became Latin. This would suit South Italy, but not Lyons. The text of this MS. is important as the oldest and best witness in a Greek MS. to the so-called "Western" text. (See the section *Textual Criticism* below.)

[The following books and articles are important for the history, as apart from the text of the MS. *Codex Bezae ... phototypice repraesentatus* (Cambridge, 1899); Scrivener, *Codex Bezae* (Cambridge, 1864); J. Rendel Harris, "A Study of *Cod. Bezae*," *Texts and Studies*, i. 1 (Cambridge, 1891); J. Rendel Harris, *The Annotators of Cod. Bezae* (London, 1901); F.E. Brightman and K. Lake, "The Italian Origin of Codex Bezae," in *Journal of Theol. Studies*, April 1900, pp. 441 ff.; F.C. Burkitt, "The Date of *Codex Bezae*," in the *Journal of Theol. Studies*, July 1902, pp. 501 ff.; D.H. Quentin, "Le Codex Bezae à Lyon, &c.," *Revue Bénédictine*, xxxiii. 1, 1906.]

Alexandrinus.

Codex Alexandrinus (G. M. reg. ID v.-viii.), Greg. A. von Soden 84; an uncial MS. of the 5th century. It was given by Cyril Lucar, patriarch of Constantinople, to Charles I. in 1621. It appears probable that Cyril Lucar had brought it with him from Alexandria, of which he had formerly been patriarch. A note by Cyril Lucar states that it was written by Thecla, a noble lady of Egypt, but this is probably merely his interpretation of an Arabic note of the 14th century which states that the MS. was written by Thecla, the martyr, an obviously absurd legend; another Arabic note by Athanasius (probably Athanasius III., patriarch *c.* 1308) states that it was given to the patriarchate of Alexandria, and a Latin note of a later period dates the presentation in 1098. So far back as it can be traced it is, therefore, an Alexandrian MS., and palaeographical arguments point in the same direction. Originally, the MS. contained the whole of the Old and New Testaments, including the Psalms of Solomon in the former and 1 and 2 Clement in the latter. It has, however, suffered mutilation in a few places. Its text in the Old Testament is thought by some scholars to show signs of representing the Hesychian recension, but this view seems latterly to have lost favour with students of the Septuagint. If it be true, it falls in with the palaeographic indications and suggests an Alexandrian provenance. In the New Testament it has in the gospels a late text of Westcott and Hort's "Syrian" type, but in the epistles there is a strongly marked "Alexandrian" element. [Cod. A was published in photographic facsimile in 1879-1880.]

Ephraemi Syri.

Codex Ephraemi Syri Rescriptus (Paris Nat. Gr. 9), Greg. C, von Soden δ 3; an uncial palimpsest (the top writing being that of Ephraem) of the 5th century. It was formerly the property of Catherine de' Medici, and was probably brought from the east to Italy in the 16th century. Hort (*Introduction*, p. 268) has shown from a consideration of displacements in the text of the Apocalypse that it was copied from a very small MS., but this, of course, only holds good of the Apocalypse. It is usually said that this MS., like A, came originally from Egypt, but this is merely a palaeographical guess, for which there is no real evidence. Originally, it contained the whole Bible, but only sixty-four leaves of the Old Testament remain, and 145 (giving about two-thirds of the whole) of the New Testament. The character of the text is mixed with a strong "Alexandrian" element. [Published in facsimile by Tischendorf (1843). Discussed by Lagarde in his *Ges. Abhandlungen*, p. 94.]

Claromontanus.

Codex Claromontanus (Paris Nat. Gr. 107), Greg. D^{paul}, von Soden α 1026; an uncial Graeco-Latin MS. of the 6th century. This MS. also belonged to Beza, who "acquired" it from the monastery of Clermont, near Beauvais. After his death it passed through various private hands and was finally bought for the French royal library before 1656. It contains the whole of the Pauline epistles with a few *lacunae*, and has a famous stichometric list of books prefixed in another hand to Hebrews. It is probably the best extant witness to the type of Greek text which was in use in Italy at an early time. It is closely connected with *cod. Sangermanensis* (a direct copy) at St Petersburg, Greg. E^{paul}, von Soden α 1027; *cod. Augiensis* (Cambridge, Trin. Coll. B xvii. i), Greg. F^{paul}, von Soden α 1029; and *cod. Boernerianus* (Dresden K Bibl.), Greg. G^{paul}, von Soden α 1028. [The text is published in Tischendorf's *Codex Claromontanus* (1852). Its relations to EFG are best discussed in Westcott and Hort's *Introduction*, §§ 335-337.]

There are no other uncials equal in importance to the above. The next most valuable are probably *cod. Regius* of the 8th century at Paris, Greg. L, von Soden ε 56, containing the Gospels; *cod. Laudianus* of the 7th century at Oxford, Greg. E, von Soden α 1001, a Latino-Greek MS. containing the Acts; *cod. Coislinianus* of the 6th century in Paris, Turin, Kiev, Moscow and Mt. Atohs, Greg. H^{paul}, von Soden α 1022, containing fragments of þhe Pauline epistles; and *cod. Augiensis* of the 9th century in Trinity College, Cambridge, Greg. F^{paul}, von Soden α 1029, a Graeco-Latin MS. closely related to *cod. Claromontanus*. [Further details as to these MSS. with bibliographies can be found in Gregory's *Prolegomena* to Tischendorf's *N.T.* ed. maj. viii.]

MINUSCULES.—Very few of these are of real importance. The most valuable are the following:—

1. *The Ferrar Group*; a group of eight MSS. known in Gregory's notation as 13, 69, 124, 346, 543, 788, 826, 828, or in von Soden's as ε 368, δ 505, ε 1211, ε 226, ε 257, ε 1033, ε 218, ε 219, all which, except 69, in spite of the dating implied by von Soden's notation were probably written in the 12th century in Calabria. They have a most peculiar text of a mainly "Western" type, with some special affinities to the Old Syriac and perhaps to the Diatessaron. They are known as the Ferrar group in memory of the scholar who first published their text, and are sometimes quoted as Φ (which, however, properly is the symbol for *Codex Beratinus* of the Gospels), and sometimes as *fam.*^{13}.

2. *Cod. 1 and its Allies*; a group of four MSS. known in Gregory's notation as 1, 118, 131, 209, and in von Soden's as δ 50, ε 346, δ 467 and δ 457. The dating implied by the latter notation is wrong, as 1 certainly belongs to the 12th, not to the 10th century, and 118 is probably later than 209. It is sometimes quoted as *fam.*^{1}. *Fam.*^{1} and *fam.*^{13} probably have a common archetype in Mark which is also represented by codd. 28 (ε 168), 565 (ε 93, quoted by Tischendorf and others as 2^{pe}) and 700 (ε 133, quoted by Scrivener and others as 604). It seems to have had many points of agreement with the Old Syriac, but it is impossible to identify the locality to which it belonged. Other minuscules of importance are cod. 33 (δ 48) at Paris, which often agrees with ℵ BL and is the best minuscule representative of the "Neutral" and "Alexandrian" types of text in the gospels; cod. 137 (α 364) at Milan, a valuable "Western" text of the Acts; α 78 (not in Gregory) in the Laura on Mt. Athos, a MS. of the Acts and epistles, with an early (mixed) type of text and textual comments and notes from Origen.

[The text of the Ferrar group was published after Ferrar's death by T.K. Abbott, *A Collation of Four Important MSS. of the Gospels* (Dublin, 1877). It is best discussed by Rendel Harris's books, *The Origin of the Leicester Codex* (1887), *The Origin of the Ferrar Group* (1893), and *The Ferrar Group* (1900), all published at Cambridge; the text of *fam.*^{1} with a discussion of its textual relations is given in K. Lake's "Codex 1 and its Allies" (*Texts and Studies*, vii. 3, 1902); 565 was edited by J. Belsheim in *Das Evang. des Marcus nach d. griech. Cod. Theodorae*, &c. (Christiania, 1885), many corrections to which are published in the appendix to H.S. Cronin's "Codex Purpureus," *Texts and Studies*, v. 4; 700 was published by H.C. Hoskier in his collation of cod. Evan. 604, London, 1890; α 78 is edited by E. von der Goltz in *Texte und Untersuchungen*, N.F. ii. 4.]

(B) *The Versions.*—These are generally divided into (α) *primary* and (β) *secondary*; the former being those which represent translation made at an early period directly from Greek originals, and the latter being those which were made either from other versions or from late and unimportant Greek texts.

(α) The *primary* versions are three—Latin, Syriac and Egyptian.

Old Latin.

Latin Versions.—1. The Old Latin. According to Jerome's letter to Pope Damasus in A.D. 384, there was in the 4th century a great variety of text in the Latin version, "*Tot enim exemplaria pene quot codices.*" This verdict is confirmed by examination of the MSS. which have pre-Hieronymian texts. It is customary to quote these by small letters of the Latin alphabet, but there is a regrettable absence of unanimity in the details of the notation. We can distinguish two main types, African and European. The African version is best represented in the gospels by *cod. Bobiensis* (k) of the 5th (some say 6th) century at Turin, and *cod. Palatinus* (e) of the 5th century at Vienna, both of which are imperfect, especially k, which, however, is far the superior in quality; in the Acts and Catholic epistles by *cod. Floriacensis* (f, h. or reg.) of the 6th century, a palimpsest which once belonged to the monks of Fleury, and by the so-called *speculum* (m) or collection of quotations formerly attributed to Augustine but probably connected with Spain. This scanty evidence is dated and localized as African by the quotations of Cyprian, of Augustine (not from the gospels), and of Primasius, bishop of Hadrumetum (d. *c.* 560), from the Apocalypse. It is still a disputed point whether Tertullian's quotations may be regarded as evidence for a Latin version or as independent translations from the Greek, nor is it certain that this version is African in an exclusive sense; it was

undoubtedly used in Africa and there is no evidence that it was known elsewhere originally, but on the other hand there is no proof that it was not. The European version is best represented in the gospels by *cod. Vercellensis* (a) of the 5th century and *cod. Veronensis* (b) of the same date (the latter being the better), and by others of less importance. It is possible that a later variety of it is found in *cod. Monacensis* (q) of the 7th century, and *cod. Brixianus* (f) of the 6th century, and this used to be called the Italic version, owing (as F.C. Burkitt has shown) to a misunderstanding of a remark of Augustine about the "Itala" which really refers to the Vulgate. In the Acts the European text is found in *cod. Gigas* (g or gig) of the 13th century at Stockholm, in a Perpignan MS. of the 12th century (p), published by S. Berger, and probably in *cod. Laudianus* (e) of the 7th century at Oxford. In the Catholic epistles it is found in *cod. Corbeiensis* (f or ff) of the 10th century at St Petersburg. In the Pauline epistles it is doubtful whether it is extant at all, though some have found it in the *cod. Claromontanus* (d) and its allies. In the Apocalypse it is found in *cod. Gigas*.

The main problem in connexion with the history of the African and European versions is whether they were originally one or two. As they stand at present they are undoubtedly two, and can be distinguished both by the readings which they imply in the underlying Greek, and by the renderings which they have adopted. But there is also a greater degree of similarity between them than can be explained by accidental coincidence, and there is thus an *a priori* case for the theory that one of the two is a revision of the other, or that there was an older version, now lost, which was the original of both. If one of the two is the original it is probably the African, for which there is older evidence, and of which the style both in reading and rendering seems purer. The chief argument against this is that it seems paradoxical to think of Africa rather than Rome as the home of the first Latin version; but it must be remembered that Roman Christianity was originally Greek, and that the beginnings of a Latin church in Rome seem to be surprisingly late.

[Editions of Old Latin MSS. are to be found in *Old Latin Biblical Texts*, i.-iv. (Oxford); in Migne's *Patrologia Latina*, tom. xii.; and their history is treated especially in F.C. Burkitt's "Old Latin and the Itala" (*Texts and Studies*, iv. 3), as well as in all books dealing with Textual Criticism generally; other important books are Rönsch's *Itala und Vulgata* (1875); Corssen's *Der cyprianische Text der Acta Apostolorum* (Berlin, 1892); Wordsworth and Sanday on the "Corbey S. James" in *Studia Biblica*, i. (1885); the article on the "Old Latin Version," in Hastings' *Dictionary of the Bible*. For the textual character and importance of these versions see the section *Textual Criticism* below.]

Vulgate.

2. The Vulgate or Hieronymian version. To remedy the confusion produced by the variations of the Latin text Pope Damasus asked Jerome to undertake a revision, and the latter published a new text of the New Testament in A.D. 384 and the rest of the Bible probably within two years. This version gradually became accepted as the standard text, and after a time was called the "Vulgata," the first to use this name as a title being, it is said, Roger Bacon. In the Old Testament Jerome made a new translation directly from the Hebrew, as the Old Latin was based on the LXX., but in the New Testament he revised the existing version. He did this fully and carefully in the gospels, but somewhat superficially in the epistles. He seems to have taken as the basis of his work the European version as it existed in his time, perhaps best represented by *cod. Monacensis* (q) of the 7th century, and by the quotations in *Ambrosiaster*, to which *cod. Brixianus* (f) of the 6th century would be added if it were not probable that it is merely a Vulgate MS. with intrusive elements. This type of text he revised with the help of Greek MSS. of a type which does not seem to correspond exactly to any now extant, but to resemble B more closely than any others.

Of Jerome's revision we possess at least 8000 MSS., of which the earliest may be divided (in the gospels at all events) into groups connected with various countries; the most important are the Northumbrian, Irish, Anglo-Irish and Spanish, but the first named might also be called the Italian, as it represents the text of good MSS. brought from Italy in the 7th century and copied in the great schools of Wearmouth and Jarrow. One of the most important, *cod. Amiatinus*, was copied in this way in the time of Ceolfrid, Benedict Biscop's successor, as a present for Pope Gregory in 716. From these MSS. the original Hieronymian text may be reconstructed with considerable certainty. The later history of the version is complicated, but fairly well known. The text soon began to deteriorate by admixture with the Old Latin, as well from the process of transcription, and several attempts at a revision were made before the invention of printing. Of these the earliest of note were undertaken in France in the 9th century by Alcuin in 801, and almost at the same time by Theodulf, bishop of Orleans (787-821). In the 11th century a similar task was undertaken by Lanfranc, archbishop of Canterbury (1069-1089); in the 12th century by Stephen Harding (1109), third abbot of Citeaux, and by Cardinal Nicolaus Maniacoria (1150), whose corrected Bible is preserved in the public library at Dijon. But these were not successful, and in the 13th century, instead of revisions, attempts were made to fix the text by providing *correctoria*, or lists of correct readings, which were the equivalent of critical editions; of these the chief are the Parisian, the Dominican (prepared under Hugo de S. Caro about 1240), and the Vatican. In the 15th century the history of the printed Vulgates begins. The earliest is the Mentz edition of 1452-1456 (the *Mazarin* or "42-line" Bible), but the earliest of a critical nature were those of Robert Étienne in 1528 and 1538-1540. In 1546 the council of Trent decided that the Vulgate should be held as *authentica*, and in 1590 Pope Sixtus V. published a new and authoritative edition, which was, probably at the instigation of the Jesuits, recalled by Pope Clement VIII. in 1592. In the same year, however, the same pope published another edition under the name of Sixtus. This is, according to the Bull of 1592, the authoritative edition, and has since then been accepted as such in the Latin Church. The critical edition by J. Wordsworth (bishop of Salisbury) and H.J. White probably restores the text almost to the state in which Jerome left it.

[The text of the Vulgate may be studied in Wordsworth and White, *Novum Testamentum Latine*; Corssen, *Epistula ad Galatas*. Its history is best given in S. Berger's *Histoire de la Vulgate* (Paris, 1893), in which a good bibliography is given on pp. xxxii.-xxxiv. The section in Kenyon's handbook to the *Textual Criticism of the New Testament* is particularly clear and full.]

Old Syriac.

Syriac Versions.—1. The Old Syriac. This is only known to us at present through two MSS. of the gospels, containing the *Evangelion da-Mepharreshe*, or separated gospel, probably so called in distinction to Tatian's *Diatessaron*. These MSS. are known as the Curetonian and Sinaitic. The Curetonian is a MS. of the 5th century. The fragments of it which we possess are MS. Brit. Mus. addit. 14.451, which was brought in 1842 from the monastery of St. Mary in the Nitrian desert, and was edited by Cureton in 1858; and three leaves in Berlin (MS. Orient. Quart. 528) which were bought in Egypt by H. Brugsch and published by A. Roediger in 1872. It was given to the monastery of St. Mary in the 10th century, but its earlier history is unknown. It contained originally the four gospels in the order Mt., Mk., Jo., Lc. It is generally quoted as Syr^{cur} or Syr C. The Sinaitic was discovered in 1892 by Mrs Lewis and Mrs Gibson in the library of St. Catherine's monastery on Mt. Sinai, where it still remains, and was published in 1894 by R.L. Bensly, J. Rendel Harris and F.C. Burkitt, with an introduction by Mrs Lewis. It is a palimpsest MS., and the upper writing (lives of saints), dated A.D. 778, is the work of "John, the anchorite of Beth Mari Qanon, a monastery of Ma'arrath Mesren city in the district of Antioch." This town is between Antioch and Aleppo; though the monastery is otherwise unknown, it seems probable that it was the source of many of the MSS. now at Sinai. The under writing seems to be a little earlier than that of the Curetonian; it contains the gospels in the order Mt., Mc., Lc., Jo. with a few *lacunae*. There is no evidence that this version was ever used in the Church services: the Diatessaron was always the normal Syriac text of the gospels until the introduction of the Peshito. But the quotations and references in Aphraates, Ephraem and the Acts of Judas Thomas show that it was known, even if not often used. It seems certain that the Old Syriac version also contained the Acts and Pauline epistles, as Aphraates and Ephraem agree in quoting a text which differs from the Peshito, but no MSS. containing this text are at present known to exist.

[The text of this version is best given, with a literal English translation, in F.C. Burkitt's *Evangelion da Mepharreshe* (Cambridge, 1904).]

Peshito.

2. The Peshito (Simple) Version. This is represented by many MSS. dating from the 5th century. It has been proved almost to demonstration by F.C. Burkitt that the portion containing the gospels was made by Rabbula, bishop of Edessa (411), to take the place of the Diatessaron, and was based on the Greek text which was at that time in current use at Antioch. The Old Testament Peshito is a much older and quite separate version. The exact limits of Rabbula's work are difficult to define. It seems probable that the Old Syriac version did not contain the Catholic epistles, and as these are found in the Peshito they were presumably added by Rabbula. But he never added 2 Peter, Jude, 2 and 3 John, or the Apocalypse, and the text of these books, which is sometimes bound up with the Peshito, really is that of the Philoxenian or of the Harklean version. A comparison of the Peshito with quotations in Aphraates and Ephraem shows that Rabbula revised the text of the Acts and Pauline epistles, but in the absence of MSS. of the Old Syriac for these books, it is difficult to define the extent

or character of his work. The Peshito is quoted as Syr P, Pesh., and Syrsch (because Tischendorf followed the edition of Schaaf).

[The best text of the Peshito is by G.H. Gwilliam, *Tetraevangelium Sanctum* (Oxford, 1901); its relations to Rabbula's revision are shown by F.C. Burkitt, "S. Ephraim's quotations from the Gospel" (*Texts and Studies*, vii. 2, Cambridge, 1901), which renders out of date F.H. Woods's article on the same subject in *Studia Biblica*, iii. pp. 105-138.]

Philoxenian.

3. The Philoxenian Version. This is known, from a note extant in MSS. of the Harklean version, to have been made in A.D. 508 for Philoxenus, bishop of Hierapolis, by Polycarpus, a chorepiscopus. No MSS. of it have survived except in 2 Peter, Jude, 2 and 3 John and the Apocalypse. The four former are found in some MSS. of the Peshito, as the Philoxenian was used to supply these epistles which were not in the older version, and the Apocalypse was published in 1892 by Dr Gwynn from a MS. belonging to Lord Crawford.

[This version may be studied in Isaac H. Hall's *Williams MS.* (Baltimore, 1886); in the European editions of the Syriac Bible so far as the minor Catholic epistles are concerned; in *Hermathena*, vol. vii. (1890), pp. 281-314 (article by Gwynn); in *Zeitschrift für Assyriologie*, xii. and xiii. (series of articles by Merx); in Gwynn's *The Apocalypse of St John in a Syriac Version* (Dublin, 1897).]

Harklean.

4. The Harklean Version. This is a revision of the Philoxenian made in 616 by Thomas of Harkel (Heraclea), bishop of Hierapolis. It was apparently an attempt to replace the literary freedom of the Philoxenian by an extreme literalness. It represents in the main the text of the later Greek MSS., but it has important textual notes, and has adopted a system of asterisks and obeli from the Hexaplar LXX. The source of these notes seems to have been old MSS. from the library of the Enaton near Alexandria. The marginal readings are therefore valuable evidence for the Old Alexandrian text. This version is quoted as Syr H (and when necessary Syr Hc* or Syr H^{mg}) and by Tischendorf as Syr^{p} (= Syra posterior). It should be noted that when Tischendorf speaks of Syr^{utr} he means the Peshito and the Harklean.

[There is no satisfactory critical edition of this version, nor have the Philoxenian and the Harklean been disentangled from each other. The printed text is that published in 1778-1803 by J. White at Oxford under the title *Versio Philoxenia*; for the marginal notes see esp. Westcott and Hort, *Introduction*, and for Acts, Pott's *Abendländische Text der Apostelgesch.* (Leipzig, 1900).]

Palestinian.

5. The Palestinian or Jerusalem Version. This is a lectionary which was once thought to have come from the neighbourhood of Jerusalem, but has been shown by Burkitt to come from that of Antioch. It was probably made in the 6th century in connexion with the attempts of Justinian to abolish Judaism. Usually quoted as SyrPa and by Tischendorf as Syr^{hier}.

[The text may be found in Lewis and Gibson's *The Palestinian Syriac Lectionary* (London, 1899), (Gospels), and in *Studia Sinaitica*, part vi. (Acts and Epistles); its origin is discussed best by F.C. Burkitt in the *Journal of Theological Studies*, vol. ii. (1901), pp. 174-183.]

6. The Karkaphensian. This is not a version, but a Syriac "Massorah" of the New Testament, *i.e.* a collection of notes on the texts. Probably emanates from the monastery of the Skull. Little is known of it and it is unimportant.

[See Gwilliam's "Materials for the Criticism of the Peshito N.T." in *Studia Biblica*, in. esp. pp. 60-63.]

Tatian's "Diatessaron."

7. Tatian's *Diatessaron.* This is something more than a version. It was originally a harmony of the four goepels made by Tatian, the pupil of Justin Martyr, towards the end of the 2nd century. In its original form it is no longer extant, but it exists in Arabic (published by Ciasca) and Latin (*cod. Fuldensis*) translations, in both of which the text has unfortunately been almost entirely conformed to the ordinary type. These authorities are, therefore, only available for the reconstruction of the order of the selections from the gospels, not for textual criticism properly so called. For the latter purpose, however, we can use an Armenian translation of a commentary on the Diatessaron by Ephraem, and the quotations in Aphraates. The Diatessaron appears to have been the usual form in which the gospels were read until the beginning of the 5th century, when the Peshito was put in its place, and a systematic destruction of copies of the Diatessaron was undertaken.

[The Diatessaron may be studied in Zahn, "Evangelien-harmonie," article in the *Protestantische Realencyklopädie* (1898); J.H. Hill, *The Earliest Life of Christ* (Edinburgh, 1893); J. Rendel Harris, *Fragments of the Commentary of Ephraim the Syrian* (London, 1895); F.C. Burkitt, *Evangelion da Mepharreshe* (Cambridge, 1904, vol. ii.).]

Inter-relation of Syriac Versions.—The relations which subsist between the various Syriac versions remain to be discussed. There is little room for doubt that the Harklean was based on the Philoxenian, and the Philoxenian was based on the Peshito, the revision being made in each case by the help of the Greek MSS. of the day, but the relations which subsist between the Old Syriac, the Diatessaron and the Peshito are a more difficult question. There are now but few, if any, scholars who think that the Peshito is an entirely separate version, and the majority have been convinced by Burkitt and recognize (1) that the Peshito is based on a knowledge of the Old Syriac and the Diatessaron; (2) that it was made by Rabbula with the help of the contemporary Greek text of the Antiochene Church. But there is not yet the same degree of consensus as to the relations between the Old Syriac and the Diatessaron. Here it is necessary to distinguish between the original text of the Old Syriac and the existing MSS. of it—Cur. and Sin. There is no question that many passages in these show signs of Diatessaron influence, but this is only to be expected if we consider that from the end of the 2nd to the beginning of the 5th century the Diatessaron was the popular form of the gospels. A large discount has therefore to be made from the agreements between Diatessaron and Syr. S and C. Still, it is improbable that this will explain everything, and it is generally conceded that the original Diatessaron and the original Old Syriac were in some way connected. The connexion is variously explained, and efforts have been made to show on which side the dependence is to be found. The most probable theory is that of Burkitt. He thinks that the first Syriac translation was that of Tatian (*c.* A.D. 175), who brought the Diatessaron from Rome and translated it into Syriac. There, in the last days of the 2nd century, when Serapion was bishop of Antioch (A.D. 190-203), a new start was made, and a translation of the "separated Gospels" (*Evangelion da Mepharreshe*) was made from the MSS. which was in use at Antioch. Probably the maker of this version was partly guided, especially in his choice of renderings, by his knowledge of the Diatessaron. Nevertheless, the Diatessaron remained the more popular and was only driven out by Theodoret and Rabbula in the 5th century, when it was replaced by the Peshito. If this theory be correct the Syriac versions represent three distinct Greek texts:—(1) the 2nd-century Greek text from Rome, used by Tatian; (2) the 2nd-century Greek text from Antioch, used for the Old Syriac; (3) the 2nd-century Greek text from Antioch, used by Rabbula for the Peshito.

[The best discussion of this point is in vol. ii. of Burkitt's *Evangelion da Mepharreshe*.]

Coptic.

Egyptian Versions.—Much less is known at present about the history of the Egyptian versions. They are found in various dialects of Coptic, the mutual relations of which are not yet certain, but the only ones which are preserved with any completeness are the Bohairic, or Lower Egyptian, and Sahidic, or Upper Egyptian, though it is certain that fragments of intermediate dialects such as Middle Egyptian, Fayumic, Akhmimic and Memphitic also exist. The Bohairic has been edited by G. Horner. It is well represented, as it became the official version of the Coptic Church; its history is unknown, but from internal evidence it seems to have been made from good Greek MSS. of the type of ℵBL, but the date to which this points depends largely on the general view taken of the history of the text of the New Testament. It need not, but may be earlier than the 4th century. The Sahidic is not so well preserved. G. Horner's researches tend to show that the Greek text on which it was based was different from that represented by the Bohairic, and probably was akin to the "Western" text, perhaps of the type used by Clement of Alexandria. Unfortunately none of the MSS. seems to be good, and at present it is impossible to make very definite use of the version. It is possible that this is the oldest Coptic version, and this view is supported by the general probabilities of the spread of Christianity in Egypt. which suggest that the native church and native literature had their strength at first chiefly in the southern parts of the country. It must be noted that Westcott and Hort called the Bohairic Memphitic, and the Sahidic Thebaic, and Tischendorf called the Bohairic Coptic.

[See G. Horner's *The Coptic Version of the New Testament in the Northern Dialect* (Oxford); Scrivener's *Introduction* (ed. Miller), vol. ii. pp. 91-144; and especially an article on "Egyptian Versions" in Hastings' *Dictionary of the Bible*, vol. i. by Forbes

Robinson.]

(β) Among the *secondary* versions the only one of real importance is the Armenian.

Armenian.

The Armenian Version.—The early history of this version is obscure, but it seems probable that there were two translations made in the 4th century: (1) by Mesrop with the help of Hrofanos (Rufinus?) based on a Greek text; (2) by Sahak, based on Syriac. After the council of Ephesus (A.D. 430) Mesrop and Sahak compared and revised their work with the help of MSS. from Constantinople. The general character of the version is late, but there are many places in which the Old Syriac basis can be recognized, and in the Acts and Epistles, where the Old Syriac is no longer extant, this is sometimes very valuable evidence.

[See Scrivener (ed. Miller) vol. ii. pp. 148-154; Hastings' *Dictionary of the Bible*, article on "The Armenian Versions of the New Testament," by F.C. Conybeare; J.A. Robinson, "Euthaliana" (*Texts and Studies*, iii. 3), cap. 5; on the supposed connexion of Mark xvi. 8 ff. with Aristion mentioned in this version, see esp. Swete's *The Gospel according to St Mark* (London, 1902), p. cxi.]

Other secondary versions which are sometimes quoted are the Gothic, Ethiopic, Georgian, Arabic, Anglo-Saxon, Frankish and Persic. None has any real critical importance; details are given in Gregory's *Prolegomena* and in Scrivener's *Introduction*.

(C) *Quotations in Patristic Writings.*—The value of this source of evidence lies in the power which it gives us to date and localize texts. Its limitations are found in the inaccuracy of quotation of the writers, and often in the corrupt condition of their text. This latter point especially affects quotations which later scribes frequently forced into accord with the text they preferred.

All writers earlier than the 5th century are valuable, but particularly important are the following groups:—(1) Greek writers in the West, especially Justin Martyr, Tatian, Marcion, Irenaeus and Hippolytus; (2) Latin writers in Italy, especially Novatian, the author of the *de Rebaptismate* and Ambrosiaster; (3) Latin writers in Africa, especially Tertullian and Cyprian; (4) Greek writers in Alexandria, especially Clement of Alexandria, Origen, Athanasius and Cyril; (5) Greek writers in the East, especially Methodius of Lycia and Eusebius of Caesarea; (6) Syriac writers, especially Aphraates and Ephraem; it is doubtful whether the Diatessaron of Tatian ought to be reckoned in this group or in (1). None of these groups bears witness to quite the same text, nor can all of them be identified with the texts found in existing MSS. or versions, but it may be said with some truth that group 2 used the European Latin version, group 3 the African Latin, and group 6 the Diatessaron in the gospels and the Old Syriac elsewhere, while group I has much in common with *cod. Bezae*, though the difference is here somewhat greater. In group 4 the situation is more complex; Clement used a text which has most in common with *cod. Bezae*, but is clearly far from identical; Origen in the main has the text of ℵ B; Athanasius a somewhat later variety of the same type, while Cyril has the so-called Alexandrian text found especially in L. Group 4 has a peculiar text which cannot be identified with any definite group of MSS. For further treatment of the importance of this evidence see the section *Textual Criticism* below.

[There is as yet but little satisfactory literature on this subject. Outstanding work is P.M. Barnard's "Clement of Alexandria's Biblical Text" (*Texts and Studies*, v. 5), 1899; Harnack's "Eine Schrift Novatians," in *Texte und Untersuchungen*, xiii. 4; Souter's "Ambrosiaster" in *Texts and Studies*, vii. 4; the Society of Historical Theology's *New Testament in the Apostolic Fathers*; an article by Kostschau, "Bibelcitate bei Origenes," in the *Zeitschrift f. wissenschaftliche Theologie* (1900), pp. 321-378; and on the general subject especially Nestle's *Einführung in das griechische Neue Testament* (Göttingen, 1909), pp. 159-167.]

(K. L.)

3. *Textual Criticism.*

The problem which faces the textual critic of the New Testament is to reconstruct the original text from the materials supplied by the MSS., versions, and quotations in early writers, which have been described in the preceding section on the *apparatus criticus*. His object, therefore, is to discover and remove the various corruptions which have crept into the text, by the usual methods of the textual critic—the collection of material, the grouping of MSS. and other authorities, the reconstruction of archetypes, and the consideration of transcriptional and intrinsic probability. No book, however, presents such a complicated problem or such a wealth of material for the textual critic.

In a certain wide sense the textual criticism of the New Testament began as soon as men consciously made recensions and versions, and in this sense Origen, Jerome, Augustine and many other ecclesiastical writers might be regarded as textual critics. But in practice it is general, and certainly convenient, to regard their work rather as material for criticism, and to begin the history of textual criticism with the earliest printed editions which sought to establish a standard Greek Text. It is, of course, impossible here to give an account of all these, but the following may fairly be regarded as the epoch-making books from the beginning to the present time.

The *Complutensian.*—The first printed text of the Greek Testament is known as the Complutensian, because it was made under the direction of Cardinal Ximenes of Alcalá (Lat. *Complutum*). It was printed in 1514, and is thus the first printed text, but is not the first published, as it was not issued until 1522. It is not known what MSS. Ximenes used, but it is plain from the character of the text that they were not of great value. His text was reprinted in 1569 by Chr. Plantin at Antwerp.

Erasmus.—The first *published* text was that of Erasmus. It was undertaken at the request of Joannes Froben (Frobenius), the printer of Basel, who had heard of Cardinal Ximenes' project and wished to forestall it. In this he was successful, as it was issued in 1516. It was based chiefly on MSS. at Basel, of which the only really good one (*cod. Evan. 1*) was seldom followed. Erasmus issued new editions in 1519, 1522, 1527 and 1535, and the Aldine Greek Testament, printed at Venice in 1518, is a reproduction of the first edition.

Stephanus.—Perhaps the most important of all early editions were those of Robert Étienne, or Stephanus, of Paris and afterwards of Geneva. His two first editions (1546, 1549) were based on Erasmus, the Complutensian, and collations of fifteen Greek MSS. These are 16mo volumes, but the third and most important edition (1550) was a folio with a revised text. It is this edition which is usually referred to as *the* text of Stephanus. A fourth edition (in 16mo) published at Geneva in 1551 is remarkable for giving the division of the text into verses which has since been generally adopted.

Beza.—Stephanus' work was continued by Theodore Beza, who published ten editions between 1565 and 1611. They did not greatly differ from the 1550 edition of Stephanus, but historically are important for the great part they played in spreading a knowledge of the Greek text, and as supplying the text which the Elzevirs made the standard on the continent.

Elzevir.—The two brothers, Bonaventura and Abraham Elzevir, published two editions at Leiden in 1624 and 1633, based chiefly on Beza's text. In the preface to the second edition the first is referred to as "textum... nunc ab omnibus receptum," and this is the origin of the name "Textus Receptus" (or T.R.) often given to the ordinary Greek Text. The Elzevir text has formed the basis of all non-critical editions on the continent, but in England the 1550 edition of Stephanus has been more generally followed. The importance of both the Stephanus and Elzevir editions is that they formed a definite text for the purposes of comparison, and so prepared the way for the next stage, in which scholars busied themselves with the investigation and collation of other MSS.

Walton's Polyglot.—The first to begin this work was Brian Walton, bishop of Chester, who published in 1657 in the 5th and 6th volumes of his "polyglot" Bible the text of Stephanus (1550) with the readings of fifteen new MSS. besides those employed by Stephanus himself. The collations were made for him by Archbishop Ussher.

John Fell.—In 1675 John Fell, dean of Christ Church, published the Elzevir text with an enlarged apparatus, but even more important was the help and advice which he gave to the next important editor—Mill.

John Mill, of Queen's College, Oxford, influenced by the advice, and supported by the purse of John Fell until the latter's death, published in 1707 a critical edition of the New Testament which has still a considerable value for the scholar. It gives the

text of Stephanus (1550) with collations of 78 MSS., besides those of Stephanus, the readings of the Old Latin, so far as was then known, the Vulgate and Peshito, together with full and valuable prolegomena.

Bentley.—A little later Richard Bentley conceived the idea that it would be possible to reconstruct the original text of the New Testament by a comparison of the earliest Greek and Latin sources; he began to collect material for this purpose, and issued a scheme entitled "Proposals for Printing" in 1720, but though he amassed many notes nothing was ever printed.

W. Mace.—Fairness forbids us to omit the name of William (or Daniel?) Mace, a Presbyterian minister who published *The New Testament in Greek and English*, in 2 vols. in 1729, and really anticipated many of the verdicts of later critics. He was, however, not in a position to obtain recognition, and his work has been generally overlooked.

J.J. Wetstein, one of Bentley's assistants, when living in Basel in 1730, published "Prolegomena" to the Text, and in 1751-1752 (at Amsterdam) the text of Stephanus with enlarged Prolegomena and apparatus criticus. His textual views were peculiar; he preferred to follow late MSS. on the ground that all the earlier copies had been contaminated by the Latin—almost reversing the teaching of Bentley. His edition is historically very important as it introduced the system of notation which, in the amplified form given to it by Gregory, is still in general use.

J.A. Bengel, abbot of Alpirspach (a Lutheran community), published in 1734, at Tübingen, an edition of the New Testament which marks the beginning of a new era. For the first time an attempt was made to group the MSS., which were divided into African and Asiatic. The former group contained the few old MSS., the latter the many late MSS., and preference was given to the African. This innovation has been followed by almost all critics since Bengel's time, and it was developed by Griesbach.

J.J. Griesbach, a pupil at Halle of J.S. Semler (who in 1764 reprinted Wetstein's Prolegomena, and in comments of his own took over and expounded Bengel's views), collated many MSS., and distinguished three main groups:—the Alexandrian or Origenian (which roughly corresponded to Bengel's African), found in ABCL, the Egyptian version and Origen; the Western, found in D and Latin authorities; and the Constantinopolitan (Bengel's Asiatic), found in the later MSS. and in Byzantine writers. His view was that the last group was the least valuable; but, except when internal evidence forbade (and he thought that it frequently did so), he followed the text found in any two groups against the third. His first edition was published in 1774-1775, his second and improved edition in 1796 (vol. i.) and 1806. For the second edition he had the advantage not merely of his own collection of material (published chiefly in his *Symbolae Criticae*, 1785-1793), but also of many collations by Birch, Matthaei and Adler, and an edition with new collations by F.K. Alter.

J.L. Hug, Roman Catholic professor of theology at Freiburg, published (Stuttgart and Tübingen) his *Einleitung in die Schriften des N. T.* (1808); he is chiefly remarkable for the curious way in which he introduced many critical ideas which were not appreciated at the time but have since been revived. He accepted Griesbach's views as a whole, but starting from the known recensions of the LXX. he identified Griesbach's Alexandrian text with the work of Hesychius, and the Constantinopolitan with that of Lucian, while he described Griesbach's Western text as the κοινὴ ἔκδοσις.

J.M.A. Scholz, a pupil of Hug, inspected and partially collated nearly a thousand MSS. and assigned numbers to them which have since been generally adopted. His work is for this reason important, but is unfortunately inaccurate.

K. Lachmann, the famous classical scholar, opened a new era in textual criticism in 1842-1850, in his *N.T. Graece et Latine*. In this great book a break was made for the first time with the traditional text and the evidence of the late MSS., and an attempt was made to reconstruct the text according to the oldest authorities. This was a great step forward, but unfortunately it was accompanied by a retrogression to the pre-Griesbachian (or rather pre-Bengelian) days; for Lachmann rejected the idea of grouping MSS., and having selected a small number of the oldest authorities undertook always to follow the reading of the majority.

C. Tischendorf, the most famous follower of Lachmann, besides editions of many MSS. and the collation of many more, published between 1841 and 1869-1872 eight editions of the New Testament with full critical notes. The eighth edition, which for the first time contained the readings of א, has not yet been equalled, and together with the Prolegomena, supplied by C.R. Gregory after Tischendorf's death, is the standard critical edition which is used by scholars all over the world. At the same time it must be admitted that it gradually became antiquated. Fresh collations of MSS., and especially fresh discoveries and investigations into the text of the versions and Fathers, have given much new information which entirely changed the character of the evidence for many readings, and rendered a new edition necessary (see Soden, H. Von). As a collector and publisher of evidence Tischendorf was marvellous, but as an editor of the text he added little to the principles of Lachmann, and like Lachmann does not seem to have appreciated the value of the Griesbachian system of grouping MSS.

S.P. Tregelles, an English scholar, like Tischendorf, spent almost his whole life in the collection of material, and published a critical edition, based on the earliest authorities, at intervals between 1857 and 1872. His work was eclipsed by Tischendorf's, and his critical principles were almost the same as the German scholar's, so that his work has obtained less recognition than would otherwise have been the case. Tischendorf and Tregelles finished the work which Lachmann began. They finally exploded the pretensions of the *Textus Receptus* to be the original text; but neither of them gave any explanation of the relations of the later text to the earlier, nor developed Griesbach's system of dealing with groups of MSS. rather than with single copies.

B.F. Westcott and F.J.A. Hort (commonly quoted as WH), the Cambridge scholars, supplied the deficiencies of Lachmann, and without giving up the advantages of his system, and its development by Tischendorf, brought back the study of the text of the New Testament to the methods of Griesbach. Their great work was published in 1881 under the title of *The New Testament in the Original Greek*. Their view of the history of the text is that a comparison of the evidence shows that, while we can distinguish more than one type of text, the most clearly discernible of all the varieties is first recognizable in the quotations of Chrysostom, and is preserved in almost all the later MSS. Though found in so great a number of witnesses, this type of text is shown not to be the earliest or best by the evidence of all the oldest MS. versions and Fathers, as well as by internal evidence. Moreover, a comparison with the earlier sources of evidence shows that it was built up out of previously existing texts. This is proved by the "conflations" which are found in it. For instance in Mark ix. 38 the later MSS. read ὃς οὐκ ἀκολουθεῖ ἡμῖν, καὶ ἐκωλύσαμεν αὐτὸν ὅτι οὐκ ἀκολουθεῖ ἡμῖν, a clumsy sentence which is clearly made up out of two earlier readings, καὶ ἐκωλύομεν αὐτὸν ὅτι οὐκ ἠκολούθει ἡμῖν, found in א BCL boh., and ὃς οὐκ ἀκολουθεῖ μεθ᾽ ἡμῶν, καὶ ἐκωλύομεν αὐτόν, found in DX *fam.*[1], *fam.*[13] 28 latt. It is impossible, in face of the fact that the evidence of the oldest witnesses of all sorts is constantly opposed to the longer readings, to doubt that WH were right in arguing that these phenomena prove that the later text was made up by a process of revision and conflation of the earlier forms. Influenced by the use of the later text by Chrysostom, WH called it the Syrian or Antiochene text, and refer to the revision which produced it as the Syrian revision. They suggested that it might perhaps be attributed to Lucian, who is known to have made a revision of the text of the LXX. The earlier texts which were used for the Syrian revision may, according to WH, be divided into three:—(1) the Western text, used especially by Latin writers, and found also in *cod. Bezae* and in Syr C; (2) the Alexandrine text used by Cyril of Alexandria and found especially in CL Ξ 33; and (3) a text which differs from both the above mentioned and is therefore called by WH the Neutral text, found especially in א B and the quotations of Origen. Of these three types WH thought that the Neutral was decidedly the best. The Alexandrian was clearly a literary recension of it, and WH strove to show that the Western was merely due to the non-literary efforts of scribes in other parts to improve the narrative. The only exception which they allowed to this general rule was in the case of certain passages, especially in the last chapters of Luke, where the "Western" authorities omit words which are found in the Neutral and Alexandrian texts. Their reason was that omission seems to be contrary to the genius of the Western text, and that it is therefore probable that these passages represent interpolations made in the text on the Neutral side after the division between it and the Western. They might be called Neutral interpolations, but WH preferred the rather clumsy expression "Western non-interpolations." Having thus decided that the Neutral text was almost always right, it only remained for WH to choose between the various authorities which preserved this type. They decided that the two best authorities were א and B, and that when these differed the reading of B, except when obviously an accidental blunder, was probably right. The great importance of this work of WH lies in the facts that it not merely condemns but explains the late Antiochene text, and that it attempts to consider in an objective manner all the existing evidence and to explain it historically and genealogically. Opinions differ as to the correctness of the results reached by WH, but there is scarcely room for doubt that as an example of method their work is quite unrivalled at present and is the necessary starting-point for all modern investigations.

Since Westcott and Hort no work of the same importance appeared up till 1909. Various useful texts have been issued, among which those of Nestle (*Novum Testamentum Graece*, Stuttgart, 1904), based on a comparison of the texts of Tischendorf, WH and Weiss, and of Baljon (*Novum Testamentum Graece*, Groningen, 1898), are the best. The only serious attempt as yet published to print a complete text independently of other editors is that of B. Weiss (*Das Neue Testament*, Leipzig, 1894-1900), but the method followed in this is so subjective and pays so little attention to the evidence of the versions that it is not likely to be permanently important. The text reached is not widely different from that of WH. The new work in course of preparation by von Soden at Berlin, which promises to take the place of Tischendorf's edition, must certainly do this so far as Greek MSS. are concerned, for the whole field has been reinvestigated by a band of assistants who have grouped and collated specimens of all known MSS.

Besides these works the chief efforts of textual critics since WH have been directed towards the elucidation of minor problems, and the promulgation of certain hypotheses to explain the characteristics either of individual MSS. or of groups of MSS. Among these the works of Sanday, Corssen, Wordsworth, White, Burkitt and Harris on the history of the Old Latin and Vulgate, and especially the work of Burkitt on the Old Syriac, have given most light on the subject. These lines of research have been described in the preceding section on the *apparatus criticus*. Other noteworthy and interesting, though in the end probably less important, work has been done by Blass, Bousset, Schmidtke, Rendel Harris and Chase. The outline of the chief works is as follows:—

F. Blass.—In his various books on the Acts and third gospel Blass has propounded a new theory as to the "Western" text. He was struck by the fact that neither the Western can be shown to be derived from the Neutral, nor the Neutral from the Western. He therefore conceived the idea that perhaps both texts were Lucan, and represented two recensions by the original writer, and he reconstructed the history as follows. Luke wrote the first edition of the Gospel for Theophilus from Caesarea; this is the Neutral text of the Gospel. Afterwards he went to Rome and there revised the text of the Gospel and reissued it for the Church in that city; this is the Western (or, as Blass calls it, Roman) text of the Gospel. At the same time he continued his narrative for the benefit of the Roman Church, and published the Western text of the Acts. Finally he revised the Acts and sent a copy to Theophilus; this is the Neutral text of the Acts. This ingenious theory met with considerable approval when it was first advanced, but it has gradually been seen that "Western" text does not possess the unity which Blass's theory requires it to have. Still, Blass's textual notes are very important, and there is a mass of material in his books.

Bousset and Schmidtke.—These two scholars have done much work in trying to identify smaller groups of MSS. with local texts. Bousset has argued that the readings in the Pauline epistles found in $\aleph^{c}$ H and a few minuscules represent the text used by Pamphilus, and on the whole this view seems to be highly probable. Another group which Bousset has tried to identify is that headed by B, which he connects with the recension of Hesychius, but this theory, though widely accepted in Germany, does not seem to rest on a very solid basis. To some extent influenced by and using Bousset's results, Schmidtke has tried to show that certain small lines in the margin of B point to a connexion between that MS. and a Gospel harmony, which, by assuming that the text of B is Hesychian, he identifies with that of Ammonius. If true, this is exceedingly important. Nestle, however, and other scholars think that the lines in B are merely indications of a division of the text into sense-paragraphs and have nothing to do with any harmony.

Rendel Harris and *Chase.*—Two investigations, which attracted much notice when they were published, tried to explain the phenomena of the Western text as due to retranslation from early versions into Greek. Rendel Harris argued for the influence of Latin, and Chase for that of Syriac. While both threw valuable light on obscure points, it seems probable that they exaggerated the extent to which retranslation can be traced; that they ranked *Codex Bezae* somewhat too highly as the best witness to the "Western" text; and that some of their work was rendered defective by their failure to recognize quite clearly that the "Western" text is not a unity. At the same time, however little of Rendel Harris's results may ultimately be accepted by the textual critics of the future, his work will always remain historically of the first importance as having done more than anything else to stimulate thought and open new lines of research in textual criticism in the last decade of the 19th century.

The time has not yet come when any final attempt can be made to bring all these separate studies together and estimate exactly how far they necessitate serious modification of the views of Westcott and Hort; but a tentative and provisional judgment would probably have to be on somewhat the following lines. The work of WH may be summed up into two theorems:—(1) The text preserved in the later MSS. is not primitive, but built up out of earlier texts;. (2) these earlier texts may be classified as Western, Alexandrian and Neutral, of which the Neutral is the primitive form. The former of these theorems has been generally accepted and may be taken as proved, but the second has been closely criticized and probably must be modified. It has been approached from two sides, according as critics have considered the Western or the Neutral and Alexandrian texts.

The Western Text.—This was regarded by WH as a definite text, found in D, the Old Latin and the Old Syriac; and it is an essential part of their theory that in the main these three witnesses represent one text. On the evidence which they had WH were undoubtedly justified, but discoveries and investigation have gone far to make it impossible to hold this view any longer. We now know more about the Old Latin, and, thanks to Mrs Lewis' discovery, much more about the Old Syriac. The result is that the authorities on which WH relied for their Western text are seen to bear witness to two texts, not to one. The Old Latin, if we take the African form as the oldest, as compared with the Neutral text has a series of interpolations and a series of omissions. The Old Syriac, if we take the Sinaitic MS. as the purest form, compared in the same way, has a similar double series of interpolations and omissions, but neither the omissions nor the interpolations are the same in the Old Latin as in the Old Syriac. Such a line of research suggests that instead of being able, as WH thought, to set the Western against the Neutral text (the Alexandrian being merely a development of the latter), we must consider the problem as the comparison of at least three texts, a Western (geographically), an Eastern and the Neutral. This makes the matter much more difficult; and an answer is demanded to the problem afforded by the agreement of two of these texts against the third. The obvious solution would be to say that where two agree their reading is probably correct, but the followers of WH maintain that the agreement of the Western and Eastern is often an agreement in error. It is difficult to see how texts, geographically so wide apart as the Old Latin and Old Syriac would seem to be, are likely to agree in error, but it is certainly true that some readings found in both texts seem to have little probability. Sanday, followed by Chase and a few other English scholars, has suggested that the Old Latin may have been made originally in Antioch, but this paradoxical view has met with little support. A more probable suggestion is Burkitt's, who thinks that many readings in our present Old Syriac MSS. are due to the Diatessaron, which was a geographically Western text. It may be that this suggestion will solve the difficulty, but at present it is impossible to say.

The Neutral and Alexandrian Texts.—WH made it plain that the Alexandrian text was a literary development of the Neutral, but they always maintained that the latter text was not confined to, though chiefly used in Alexandria. More recent investigations have confirmed their view as to the relation of the Alexandrian to the Neutral text, but have thrown doubt on the age and wide-spread use of the latter. Whatever view be taken of the provenance of *Codex Vaticanus* it is plain that its archetype had the Pauline epistles in a peculiar order which is only found in Egypt, and so far no one has been able to discover any non-Alexandrian writer who used the Neutral text. Moreover, Barnard's researches into the Biblical text of Clement of Alexandria show that there is reason to doubt whether even in Alexandria the Neutral text was used in the earliest times. We have no evidence earlier than Clement, and the text of the New Testament which he quotes has more in common with the Old Latin or "geographically Western" text than with the Neutral, though it definitely agrees with no known type preserved in MSS. or versions. This discovery has put the Neutral text in a different light. It would seem as though we could roughly divide the history of the text in Alexandria into three periods. The earliest is that which is represented by the quotations in Clement, and must have been in use in Alexandria at the end of the 2nd and beginning of the 3rd century. It is unfortunately not found in any extant MS. The second stage is that found in the quotations of Origen which is fairly well represented in ℵ B, though Origen seems at times to have used MSS. of the earlier type. The third stage is WH's Alexandrian, found in the quotations of Cyril of Alexandria and a few MSS. (esp. CL Ξ Δ Ψ). It is clearly a revision of the second stage, as WH saw, but we can now add that it was not merely a literary revision but was influenced by the tendency to revive readings which are found in the first stage but rejected in the second.

It thus seems probable that WH's theory must be modified, both as regards the "Western" text, which is seen not to be a single text at all, and as regards the "Neutral" text, which seems to be nothing more than the second stage of the development of the text in Alexandria. But the importance of these modifications is something more than the doubt which they have thrown

on WH's theories: they have really shifted the centre of gravity of the textual problem.

Formerly the Greek uncials, which go back to the 4th century, were regarded as the most important source of evidence, and were supposed to have the decisive vote; but now it is becoming plain that still more important, though unfortunately much less complete, is the evidence of the versions and of quotations by early writers. Both of these point to the existence in the 3rd and even 2nd century of types of text which differ in very many points from anything preserved in Greek MSS. Yet there is no doubt that both of them ultimately represent Greek MSS. which are no longer extant. The question, therefore, is whether we ought not to base our text on the versions and ecclesiastical quotations rather than on the extant Greek MSS. Two positions are possible: (1) We may defend a text based on the best existing Greek MSS. by the argument that these represent the text which was approved by competent judges in the 4th century, and would be found to exist in earlier MSS. if we possessed them. The weak point of this argument is the lack of evidence in support of the second part. The only possible sources of evidence, apart from the discovery of fresh MSS., are the versions, and they do not point to existence in the 2nd or 3rd century of texts agreeing with the great uncials. It is also possible to argue, as WH did, on the same side, that the purest form of text was preserved in Alexandria, from which the oldest uncials are directly or indirectly derived, but this argument has been weakened if not finally disposed of by the evidence of Clement of Alexandria. It is, of course, conceivable that Clement merely used bad MSS., and that there were other MSS. which he might have used, agreeing with the great uncials, but there is no evidence for this view. (2) If we reject this position we must accept the evidence as giving the great uncials much the same secondary importance as Westcott and Hort gave to the later MSS., and make an attempt to reconstruct a text on the basis of versions and Fathers. The adoption of this view sets textual critics a peculiarly difficult task. The first stage in their work must be the establishment of the earliest form of each version, and the collection and examination of the quotations in all the early writers. This has not yet been done, but enough has been accomplished to point to the probability that the result will be the establishment of at least three main types of texts, represented by the Old Syriac, the Old Latin and Clement's quotations, while it is doubtful how far Tatian's Diatessaron, the quotations in Justin and a few other sources may be used to reconstruct the type of Greek text used in Rome in the 2nd century when Rome was still primarily a Greek church. The second stage must be the comparison of these results and the attempt to reconstruct from them a Greek text from which they all arose.

Bibliography.—The literature of textual criticism of the New Testament is so great that only a few of the more important modern books can be mentioned here: H. von Soden, *Die Schriften des Neuen Testaments* (i. 1902-1907); E. Nestle, *Einführung in das griechische Neue Testament* (Göttingen, 1909); F.G. Kenyon, *Handbook to the Textual Criticism of the New Testament* (London, 1901); C.R. Gregory, *Textkritik des Neuen Testament* (Leipzig, 1900-1902), and *Die griech. Handschr. des N.T.* (Leipzig, 1908); Westcott and Hort, *Introduction* (vol. ii. of their *New Testament in Greek*, Cambridge, 1882). The history of criticism is dealt with in all the above-mentioned books, and also in F.H. Scrivener, *Introduction to the Criticism of the New Testament* (London, 1894). For other points especially important (besides books mentioned in the preceding section) see F. Blass, *Acta Apostolorum* (Göttingen, 1895; and an editio minor, with a valuable preface, Leipzig, 1896); Rendel Harris, *Four Lectures on the Western Text* (Cambridge, 1894); F. Chase, *The Syro-Latin Text* (London, 1895); W. Bousset, *Textkritische Studien* (Leipzig, 1894); B. Weiss, *Der Codex D in der Apostelgeschichte* (Leipzig, 1897); A. Pott, *Der abendländische Text d. Apostelgeschichte* (Leipzig, 1900); G. Salmon, *Some Thoughts on Textual Criticism of the New Testament* (London, 1897); Schmidtke, *Die Evangelien eines alien Unzialcodex* (Leipzig, 1903).

(K. L.)

4. Higher Criticism.

The New Testament is a series of early Christian writings which the Church came to regard as canonical, *i.e.* they were placed in the same category as the Old Testament, the writings which the Christian had inherited from the Jewish Church. Just as the ancient Scriptures were considered to be the Word of God, so that what they contained was necessarily the true and inspired doctrine, so also the New Testament was available for proving the Church's dogma. The assured canonicity of the whole New Testament resulted in its use by the medieval theologians, the Schoolmen, as a storehouse of proof-texts. Thus the New Testament seemed to exist in order to prove the Church's conclusions, not to tell its own tale.

Erasmus.

The *Novum Instrumentum* published by Erasmus in 1516 (see above, *Textual Criticism*) contained more than the mere Editio Princeps of the Greek text: Erasmus accompanied it with a Latin rendering of his own, in which he aimed at giving the meaning of the Greek without blindly following the conventional phraseology of the Latin Vulgate, which was the only form in which the New Testament had been current in western Europe for centuries. This rendering of Erasmus, together with his annotations and prefaces to the several books, make his editions the first great monument of modern Biblical study. Medieval Bibles contain short prefaces by St Jerome and others. The stereotyped information supplied in these prefaces was drawn from various sources: Erasmus distinguishes, *e.g.*, between the direct statements in the Acts and the inferences which may be drawn from incidental allusions in the Pauline Epistles, or from the statements of ancient non-canonical writers.[54] This discrimination of sources is the starting-point of scientific criticism.

The Reformers.

The early champions of Church reform in the beginning of the 16th century found in the Bible their most trustworthy weapon. The picture of Apostolical Christianity found in the New Testament offered indeed a glaring contrast to the papal system of the later middle ages. Moreover, some of the "authorities" used by the Schoolmen had been discovered by the New Learning of the Renaissance to be no authorities at all, such as the writings falsely attributed to Dionysius the Areopagite. When, therefore, the breach came, and the struggle between reformers and conservatives within the undivided Church was transformed into a struggle between Protestants and Romanists, it was inevitable that the authority which in the previous centuries had been ascribed to the Church should be transferred by the Reformed Churches to the Bible. "The Bible, the Bible alone, is the religion of Protestants"[55] did really express the watchword of the anti-Romanist parties, especially towards the close of the acuter struggle. At the beginning of the movement the New Testament itself had been freely criticized. Luther, like his countrymen of to-day, judged the contents of the New Testament by the light of his leading convictions; and in his German translation, which occupies the same place in Germany as the Authorized Version of 1611 does in English-speaking lands, he even placed four of the books (Hebrews, James, Jude, Apocalypse) in an appendix at the end, with prefaces explanatory of this drastic act of criticism. But though we may trace a real affiliation between the principles of Luther and modern German critical study—notably in the doctrines of the Gospel within the Gospel and of the residual Essence of Christianity—Luther's discriminations were in the 17th century ignored in practice.

Influence of textual criticism.

From cover to cover the whole New Testament was regarded at the beginning of the 18th century by almost all Protestants as the infallible revelation of the true religion. The doctrines of Christianity, and in many communities the customs of the Church, were held to be inferences from the inspired text of the Scriptures. The first serious blow to this view came from the study of textual criticism. The editions of Mill (1707) and of Wetstein (1751) proved once for all that variations in the text, many of them serious, had existed from the earliest times. It was evident, therefore, that the true authority of the New Testament could not be that of a legal code which is definite in all its parts. More important still was the growing perception of the general uniformity of nature, which had forced itself with increasing insistence upon men's minds as the study of the natural sciences progressed in the 17th and 18th centuries. The miracles of the New Testament, which had formerly been received as bulwarks of Christianity, now appeared as difficulties needing explanation. Furthermore, the prevailing philosophies of the 18th century tended to demand that a real divine revelation should be one which expressed itself in a form convincing to the reason of the average plain man, whatever his predispositions might be; it was obvious that the New Testament did not wholly conform to this standard.

Rationalists.

But if the New Testament be not itself the direct divine revelation in the sense of the 18th century, the question still remains, how we are to picture the true history of the rise of Christianity, and what its true meaning is. This is the question which has occupied the theologians of the 19th and 20th centuries. Perhaps the most significant event from which to date the modern period is the publication by Lessing in 1774-1777 of the "Wolfenbüttel Fragments," *i.e.* H.S. Reimarus' posthumous attack on Christianity, a work which showed that the mere study of the New

Testament is not enough to compel belief in an unwilling reader. Lessing's publication also helped to demonstrate the weakness of the older rationalist position, a position which really belongs to the 18th century, though its best-remembered exponent, Dr H.E.G. Paulus, only died in 1851. The characteristic of the rationalists was the attempt to explain away the New Testament miracles as coincidences or naturally occurring events, while at the same time they held as tenaciously as possible to the accuracy of the letter of the New Testament narratives. The opposite swing of the pendulum appears in D.F. Strauss: in his *Leben Jesu* (1833) he abandons the shifts and expedients by which the rationalists eliminated the miraculous from the Gospel stories, but he abandons also their historical character. According to Strauss the fulfilments of prophecy in the New Testament arise from the Christians' belief that the Christian Messiah must have fulfilled the predictions of the prophets, and the miracles of Jesus in the New Testament either originate in the same way or are purely mythical embodiments of Christian doctrines.

Strauss.

The main objection to this presentation, as also to that of the rationalists, is that it is very largely based not upon the historical data, but upon a pre-determined theory. Granted the philosophical basis, the criticism practised upon the New Testament by Paulus and Strauss follows almost automatically. Herein lies the permanent importance of the work of Ferdinand Christian Baur, professor of theology at Tübingen from 1826 to 1860. The corner-stone of his reconstruction of early Christian history is derived not so much from philosophical principles as from a fresh study of the documents. Starting from Galatians and I Corinthians, which are obviously the genuine letters of a Christian leader called Paul to his converts, Baur accepted 2 Corinthians and Romans as the work of the same hand. From the study of these contemporary and genuine documents, he elaborated the theory that the earliest Christianity, the Christianity of Jesus and the original apostles, was wholly Judaistic in tone and practice. Paul, converted to belief in Jesus as Messiah after the Crucifixion, was the first to perceive that for Christians Judaism had ceased to be binding. Between him and the older apostles arose a long and fierce controversy, which was healed only when at last his disciples and the Judaizing disciples of the apostles coalesced into the Catholic Church. This only occurred, according to Baur, early in the 2nd century, when the strife was finally allayed and forgotten. The various documents which make up the New Testament were to be dated mainly by their relation to the great dispute. The Apocalypse was a genuine work of John the son of Zebedee, one of the leaders of the Judaistic party, but most of the books were late, at least in their present form. The Acts, Baur thought, were written about A.D. 140, after the memory of the great controversy had almost passed away. All four Gospels also were to be placed in the 2nd century, though that according to Matthew retained many features unaltered from the Judaistic original upon which it was based.

Tübingen school.

The Tübingen school founded by Baur dominated the theological criticism of the New Testament during a great part of the 19th century and it still finds some support. The main position was not so much erroneous as one-sided. The quarrel between St Paul and his opponents did not last so long as Baur supposed, and the great catastrophe of the fall of Jerusalem effectually reduced thorough-going Judaistic Christianity into insignificance from A.D. 70 onwards. Moreover, St Paul's converts do not seem to have adopted consistent "Paulinism" as a religious philosophy. St Paul was an emancipated Jew, but his converts were mostly Greeks, and the permanent significance of St Paul's theories of law and faith only began to be perceived after his letters had been collected together and had been received into the Church's canon. All these considerations tend to make the late dates proposed by Baur for the greater part of the New Testament books unnecessary; the latest investigators, notably Professor A. Harnack of Berlin, accept dates that are not far removed from the ancient Christian literary tradition.

Later views.

Literary criticism of the Gospels points to a similar conclusion. A hundred years' study of the synoptic problem, *i.e.* the causes which make the Gospels according to Matthew, Mark and Luke at once so much alike and so different, has resulted in the demonstration of the priority of Mark, which "was known to Matthew and Luke in the same state and with the same contents as we have it now."[56] This Gospel may be dated a very few years after A.D. 70. Luke and Matthew appear to have been published between 80 and 100.[57] Besides the Gospel of Mark these Evangelists made use of another document, now lost, which contained many sayings of Jesus and some narratives not found in Mark. This document is by many scholars identified with the "Logia," mentioned by Papias (Eusebius, *Ch. Hist.* in. 39) as being the work of Matthew the Apostle, but the identification is not certain.

The Johannine writings, *i.e.* the Fourth Gospel and the three Epistles of John, represent the view of Christ and Christianity taken by a Christian teacher, who seems to have lived and written in Asia Minor at the close of the 1st century A.D. The value of the Fourth Gospel as a narrative of events is a matter of dispute, but the view of the personality of Jesus Christ set forth in it is unquestionably that which the Church has accepted.

The discoveries of papyri in Upper Egypt during recent years, containing original letters written by persons of various classes and in some cases contemporary with the Epistles of the New Testament, have immensely increased our knowledge of the Greek of the period, and have cleared up not a few difficulties of language and expression. More important still is the application of Semitic study to elucidate the Gospels. It is idle indeed to rewrite the Gospel narratives in the Aramaic dialect spoken by Christ and the apostles, but the main watchwords of the Gospel theology—phrases like "the Kingdom of God," "the World to come," the "Father in Heaven," "the Son of Man,"—can be more or less surely reconstructed from Jewish writings, and their meaning gauged apart from the special significance which they received in Christian hands. This line of investigation has been specially followed by Professor G. Dalman in his *Worte Jesu*. The study of the Semitic elements in early Christianity is less advanced than the study of the Greek elements, so that it is doubtless from the Semitic side that further progress in the criticism of the New Testament may be expected.

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(F. C. B.)

5. *New Testament Chronology.*

The subject of the chronology of the New Testament falls naturally into two distinct sections—the chronology of the Gospels, that is, of the life of Christ; and the chronology of the Acts, that is, of the apostolic age.

The Chronology of the Gospels.

The data group themselves round three definite points and the intervals between them: the definite points are the Nativity, the Baptism and the Crucifixion; the age of Christ at the time of the Baptism connects the first two points, and the duration of

his public ministry connects the second and third. The results obtained under the different heads serve mutually to test, and thereby to correct or confirm, one another.

1. The date of the Nativity as fixed according to our common computation of Anni Domini (first put forward by Dionysius Exiguus at Rome early in the 6th century) has long been recognized to be too late. The fathers of the primitive church had been nearer the truth with the years 3 or 2 B.C. (see Irenaeus, *Haer*. 111. xxi. 3 [xxiv. 2]; Clement of Alexandria, *Strom*. i. 21, p. 147; Hippolytus, *in Danielem*, iv. ed. Bonwetsch, p. 242; [Tertullian], *adv. Judaeos*, 8). What may be called the received chronology during the last two centuries has pushed the date farther back to 4 B.C. But the considerations now to be adduced make it probable that the true date is earlier still. 888

(*a*) *Evidence of St Matthew's Gospel* (i. 18-ii. 22).—The birth of Christ took place before the death of Herod, and the evidence of Josephus fixes the death of Herod, with some approach to certainty, in the early spring of 4 B.C. Josephus, indeed, while he tells us that Herod died not long before Passover, nowhere names the exact year; but he gives four calculations which serve to connect Herod's death with more or less known points, namely, the length of Herod's own reign, both from his *de jure* and from his *de facto* accession, and the length of the reigns of two of his successors, Archelaus and Herod Philip, to the date of their deposition and death respectively. The various calculations are not quite easy to harmonize, but the extent of choice for the year of Herod's death is limited to the years 4 and 3 B.C., with a very great preponderance of probability in favour of the former. How long before this the Nativity should be placed the Gospel does not enable us to say precisely, but as Herod's decree of extermination included all infants up to two years of age, and as a sojourn of the Holy Family in Egypt of unknown length intervened between the massacre and Herod's death, it is clear that it is at least possible, so far as the evidence of this Gospel goes, that the birth of Christ preceded Herod's death by as much as two or three years. What is thus shown to be possible would, of course, be necessary if we went on, with the astronomer Kepler, to identify the star of the Magi with the conjunction of the planets Jupiter and Saturn which occurred, in the constellation Pisces, in May, October and December of 7 B.C.[58]

(*b*) *Evidence of St Luke's Gospel* (ii. 1-8).-The birth of Christ took place at the time of a general census of the empire ordered by Augustus: "it was the first census, and was made at the time when Quirinius was governor of Syria." Against this account it has been urged that we know that the governorship of Syria from 10 or 9 B.C. down to and after Herod's death was held successively by M. Titius, C. Sentius Saturninus, and P. Quintilius Varus; and further, that when Judaea became a Roman province on the deposition of Archelaus in A.D. 6, Quirinius was governor of Syria, and did carry out an elaborate census. The notice in the Gospel, it is suggested, grew out of a confused recollection of the later (and only historical) census, and is devoid of any value whatever. At the other extreme Sir W. M. Ramsay (*Was Christ Born at Bethlehem?*, 1898, pp. 149 ff.) defends the exact accuracy of St Luke's "first census" as witnessing to the (otherwise of course unknown) introduction into Syria of the periodic fourteen years' census which the evidence of papyri has lately established for Egypt, at least from A.D. 20 onwards. Reckoning back from A.D. 20, the periodic census should fall in 9 B.C., but Ramsay alleges various causes for delay, which would have postponed the actual execution of the census till 7 B.C., and supposes that Quirinius was an imperial commissioner specially appointed to carry it out. The truth seems to rest midway between these extremes. St Luke's statement of a general census is in all probability erroneous, and the introduction of the name Quirinius appears to be due to confusion with the census of A.D. 6. But the confusion in question would only be possible, or at any rate likely, if there really was a census at the time of the Nativity; and it is no more improbable that Herod should have held, or permitted to be held, a local census than that Archelaus of Cappadocia in the reign of Tiberius (Tacitus, *Ann*. vi. 41) should have taken a census of his own native state "after the Roman manner." But St Luke's account, when the name of Quirinius is subtracted from it, ceases to contain any chronological evidence.

(*c*) *Evidence of Tertullian.*—Strangely enough, however, the missing name of the governor under whom the census of the Nativity was carried out appears to be supplied by an author who wrote more than a century after St Luke, and has by no means a good reputation for historical trustworthiness. Tertullian, in fact (*adv. Marcionem*, iv. 19), employs against Marcion's denial of the true humanity of Christ the argument that it was well known that Sentius Saturninus carried out a census under Augustus in Judaea, by consulting which the family and relationships of Christ could have been discovered. This Saturninus was the middle one of the three governors of Syria named above, and as his successor Varus must have arrived by the middle of 6 B.C. at latest (for coins of Varus are extant of the twenty-fifth year of the era of Actium), his own tenure must have fallen about 8 and 7 B.C., and his census cannot be placed later than 7 or 7-6 B.C. The independence of Tertullian's information about this census is guaranteed by the mere fact of his knowledge of the governor's name; and if there was a census about that date, it would be unreasonable not to identify it with St Luke's census of the Nativity.

The traditional Western day for the Christmas festival, 25th December, goes back as far as Hippolytus, *loc. cit.*; the traditional Eastern day, 6th January, as far as the Basilidian Gnostics (but in their case only as a celebration of the Baptism), mentioned by Clement of Alexandria, *loc. cit*.

2. The interval between the Nativity and the Baptism.

Evidence of St Luke's Gospel (iii. 23).—At the time of his baptism Jesus was ἀρχόμενος ὡσεὶ ἐτῶν τριάκοντα, of which words two opposite misinterpretations must be avoided: (i.) ἀρχόμενος does not mean (as Valentinian interpreters thought, Iren. 11. xxii. 5 [xxxiii. 3]; so also Epiphanius, *Haer*. li. 16) "beginning to be thirty years" in the sense of "not yet quite thirty," but "at the beginning of His ministry," as in Luke xxiii. 5; Acts i. 22, x. 37; (ii.) ὡσεὶ ἐτῶν τριάκοντα does not mean "on attaining the full age of thirty, before which he could not have publicly taught," for if there was by Jewish custom or tradition any minimum age for a teacher, it was not thirty, but forty (*Bab. Talm*. ed. 1715, fol. 19 *b*; Iren. *loc cit*.). St Luke's phrase is a general one, "about thirty years old," and cannot be so pressed as to exclude some latitude in either direction.

3. The date of the Baptism.

(*a*) *Evidence of St Luke's Gospel* (iii. 1).—A *terminus a quo* for the Baptism is the synchronism of the commencement of the Baptist's public ministry with the fifteenth year of the rule (ἡγεμονία) of Tiberius. Augustus died on 19th August A.D. 14, and, reckoned from that point, Tiberius's fifteenth year might be, according to different methods of calculation, either A.D. 28, or 28-29, or 29. But any such result would be difficult to reconcile with the results yielded by other lines of investigation in this article; among alternative views the choice seems to lie between the following:—(i.) The years of Tiberius are here reckoned from some earlier starting-point than the death of his predecessor—probably from the grant to him of co-ordinate authority with Augustus over the provinces made in A.D. 11 (see, for the parallel with the case of Vespasian and Titus, Ramsay, *St Paul the Roman Traveller*, p. 387), so that the fifteenth year would be roughly A.D. 25; or (ii.) St Luke has made here a second error in chronology, caused perhaps in this case by reckoning back from the Crucifixion, and only allowing one year to the ministry of Christ.

(*b*) *Evidence of St John's Gospel* (ii. 13, 20).—A *terminus ad quem* for the Baptism is the synchronism of the first Passover mentioned after it with the forty-sixth year of the building of Herod's Temple. Herod began the Temple in the eighteenth year of his reign, probably 20-19 B.C., and the Passover of the forty-sixth year is probably that of A.D. 27. While too much stress must not be laid on a chain of reasoning open to some uncertainty at several points, it is difficult to suppose with Loisy, *Quatrième Évangile*, 1903, p. 293, that the number was intended by the evangelist as purely figurative, and is therefore destitute of all historical meaning. 889

On the whole, the Baptism of Christ should probably be placed in A.D. 26-27; and as the Nativity was placed in 7-6 B.C. (at latest), this would make the age of Christ at his Baptism to be about thirty-two, which tallies well enough with St Luke's general estimate.

4. The interval between the Baptism and the Crucifixion, or, in other words, the duration of the public ministry of Christ.

(*a*) *Evidence of the Synoptic Tradition and of St Mark's Gospel* (ii. 23, vi. 39, xiv. 1).—The order of events in the primitive

synoptic tradition appears to be faithfully reproduced in St Mark; and if this order is chronological, Christ's ministry lasted at least two years, since the plucking of the ears of corn (April-June) marks a first spring; the feeding of the five thousand when the grass was fresh green (χλωρός: about March), a second; and the Passover of the Crucifixion a third: and these three points are so far removed from one another in the narrative that the conclusion would hold, even if the general arrangement in St Mark were only roughly, and not minutely, chronological. On the other hand, it may be true that an impression of a briefer period of ministry naturally results, and in early generations did actually result, from the synoptic account considered as a whole.

(*b*) *Evidence of St Luke's Gospel* (ix. 51-xix. 28 compared with iv. 14-ix. 50; iv. 19).—Still stronger is the impression of brevity suggested by St Luke. The second and larger half of the narrative of the ministry is introduced at ix. 51 with the words, "It came to pass as the days of His assumption were coming to the full, He set His face firmly to go to Jerusalem," under which phrase the evangelist cannot have meant to include more than a few months, perhaps not more than a few weeks; so that even if the earlier and shorter half of the account, which describes a purely Galilean ministry ("Judaea" in iv. 44, if it is the true reading, means Judaea in the sense of Palestine), is to be spread over a longer period of time, the combined narrative can hardly have been planned on the scale of more than a single year. St Luke himself may have understood literally, like so many of his readers in ancient times, the reference which he records to the "acceptable year of the Lord" (iv. 19 = Isaiah lxi. 2): see, too, above, 3 (*a*) *ad fin*.

(*c*) *Evidence of St John's Gospel* (ii. 13, "the Passover of the Jews was near," and 23, "He was in Jerusalem at the Passover at the feast"; v. 1, "after these things was a feast [or 'the feast'] of the Jews"; vi. 4, "and the Passover, the feast of the Jews, was near"; vii. 2, "and the feast of the Jews, the Tabernacles, was near"; x. 22, "at that time the feast of dedication took place at Jerusalem"; xi. 55, "and the Passover of the Jews was near": besides iv. 35, "say ye not that there is yet a period of four months and harvest cometh? behold, I tell you, lift up your eyes and see the fields that they are white to harvest"). This catena of time-references is of course unique in the Gospels as a basis for a chronology of the ministry; and it is not reasonable to doubt (with Loisy, *loc. cit.*, who suggests that the aim was to produce an artificial correspondence of a three and a half years' ministry with the half-week of Daniel; but many and diverse as are the early interpretations of Daniel's seventy weeks, no one before Eusebius thought of connecting the half-week with the ministry), that the evangelist intended these notices as definite historical *data*, possibly for the correction of the looser synoptic narratives and of the erroneous impressions to which they had given rise. Unfortunately, difficulties, either (i.) of reading, or (ii.) of interpretation, or (iii.) of arrangement, have been raised with regard to nearly all of them; and these difficulties must be briefly noticed here.

(i.) *Readings* (α) v. 1. ἑορτή A B D, Origen, Epiphanius, Chrysostom, *Paschal Chronicle*; ἡ ἑορτή ℵCLΔ 1-118, 33, the Egyptian versions, Eusebius, Cyril-Alex. (Irenaeus?). The balance of internal evidence—copyists being more likely to accentuate than to diminish the precision of a note of time—inclines, like the balance of external evidence, against the article, (β) vi. 4, τὸ πάσχα is read by all known MSS. and versions; but it has been argued by Hort (in Westcott's and Hort's *New Testament in Greek*, appendix, pp. 77-81) that four ancient authorities omitted the words, and that their omission simplifies the whole chronology, since "the feast" which was "near" in vi. 4 would then be identical with the feast of Tabernacles mentioned in vii. 2, and all the time-notices of the Gospel could be arranged to fall within the space of a single year, between the Passover of ii. 13 and the Passover of xi. 55. But of the four authorities alleged, Irenaeus (11. xxii. 3 [xxxiii. i]) and the Alogi (*ap*. Epiphanius, *Haer*. li. 22) were giving catalogues of Passovers "observed" by Christ (at Jerusalem), and therefore naturally omitted a mere chronological reference like vi. 4: Cyril of Alexandria, in so far as his evidence is adverse to the words, appears to be incorporating a passage from the *Commentary* of Origen, not extant *in loc.*; and the only writer who perhaps really did omit the words—with the view, no doubt, of reconciling the witness of the fourth Gospel with the then widely spread tradition of the single-year ministry—is Origen himself.

(ii.) *Interpretation* (α) iv. 35: which is to be taken literally, the "four months to harvest" (about January), or the "fields white to harvest" (about May)? It does not seem possible to rule out either interpretation; the choice between them will follow from the view taken of the general chronological arrangement of the Gospel. (β) v. i.: if "the feast" is read, a choice remains between Passover and Tabernacles (the definite article would not be very definite after all); if the more probable "a feast," the greater feasts are presumably excluded, but a choice remains between, at any rate, Pentecost (May), Trumpets (September), Dedication (December) and Purim (February). Here again the decision will follow on the general chronological arrangement which may be adopted.

(iii.) *Arrangement.*—So far the amount of possible latitude left is not so great as to obscure the main outline of the chronology. For a first (ii. 13, 20), second (vi. 4), and third (xi. 55) Passover are established, with two indeterminate notices (iv. 35, v. 1) between the first and second, and two determinate notices (vii. 2 Tabernacles in October, x. 22 Dedication in December) between the second and third. But of late years an increasing desire has been manifested, especially in Germany and America, to manipulate the fourth Gospel on grounds of internal evidence, at first only in the way of particular transpositions of more or less attractiveness, but latterly also by schemes of thorough-going rearrangement. The former class of proposals will as a rule hardly affect the chronology of the Gospel; the latter will affect it vitally. The distinction here drawn may be illustrated from the earliest instance of the former and one of the latest of the latter. In 1871 Archdeacon J.P. Norris (*Journal of Philology*) wished to transpose chapters v. and vi.—ch. vi. was, like ch. xxi., a Galilean appendix, and was inserted by mistake at somewhat too late a point in the body of the Gospel—and to read "the feast" in v. 1, identifying it with the Passover which was near in vi. 4: in any case, whether "the feast" = Passover, or "a feast" = Pentecost, were read in v. 1, the transposition would not affect the two years' ministry. In 1900 Professor B.W. Bacon (*American Journal of Theology*, p. 770) proposed a rearrangement of the whole Gospel, according to which the time-notices would occur in the following order: vi. 4, Passover is near; iv. 35, the fields white to harvest = May; v. 1, "a feast" = Pentecost; vii. 2, Tabernacles; x. 22, Dedication; xi. 55, Passover is near; xii. 1, Jesus at Bethany six days before Passover; ii. 13, Passover is near and Jesus goes up to Jerusalem (ii. 23, an interpolation) for the Passover of the Crucifixion; and the ministry would thus be reduced to a single year. Such a scheme does not lend itself to discussion here; but as far as evidence is at present obtainable, the conclusion that the fourth evangelist drew up his narrative on the basis of a two years' rather than a one year's ministry appears to be irrefragable.

Not only do the fourth and second Gospels thus agree in indications of a two years' ministry, but the notes of the middle spring of the three (John vi. 4; Mark vi. 39) both belong to the feeding of the 5000, one of the few points of actual contact Detween the two Gospels.

The question, however, may still be raised, whether these time-indications of the two Gospels are exhaustive, whether (that is) two years, and two years only, are to be allotted to the ministry. Irenaeus (ii. xxii. 3-6 [xxxiii. 1-4]), in favour of a ministry of not less than ten years, appeals (i.) to the tradition of Asia Minor; (ii.) to the record in St John that Christ, who was thirty years old at the time of his baptism, was addressed by the Jews as "not yet [*i.e.* nearly] fifty years old": but both his arguments are probably derived from a single source, Papias's interpretation of John viii. 57. With this exception, however, all ancient writers, whether they enumerated two or three or four Passovers in the Gospel history, believed that the enumeration was exhaustive; and their belief appears correctly to represent the mind of the author of the Fourth Gospel, seeing that his various notes of time were probably in intentional contrast to the looser synoptic accounts. Moreover, the wide currency in early times of the tradition of the single-year ministry (Ptolemaeus, *ap.* Iren, *loc. cit.*; *Clementine Homilies*, xvii. 19; Clem. Alex. *Strom.* i. 145, vi. 279; Julius Africanus, *ap.* Routh, *Rell. Sacr.* ii. 240, 306; Hippolytus, *Paschal Cycle* and *Chronicle*; Origen, *in Levit. Hom.* ix. 5, *de Principiis*, iv. 5) becomes more difficult to account for the farther it is removed from the actual facts.

5. The date of the Crucifixion.

(*a*) *The Roman Governor.*—Pontius Pilate was on his way back to Rome, after ten years of office, when Tiberius died on the 16th March A.D. 37 (Josephus, *Ant.* XVIII. ii. 2, iv. 2). Luke xiii. 1, xxiii. 12, show that he was not a newcomer at the time of the Crucifixion. For the Crucifixion "under Pontius Pilate" the Passover of A.D. 28 is therefore the earliest possible and the Passover of A.D. 36 the latest.

(*b*) *The Jewish High-Priest.*—Caiaphas was appointed before Pilate's arrival, and was deposed at a Passover apparently not later than that of the year of Herod Philip's death, A.D. 34 (Josephus, *Ant.* XVIII. ii. 2, iv. 3-v. 3). The Crucifixion at some previous Passover would then fall not later than A.D. 33.

(*c*) *The Day of the Week.*—The Resurrection on "the first day of the week" (Sunday) was "on the third day" after the Crucifixion; and that "the third day" implies an interval of only two days hardly needed to be shown, but has been shown to demonstration in Field's *Notes on the Translation of the New Testament* (on Matt. xvi. 21). The Crucifixion was therefore on a Friday in some year between A.D. 28 and 33 inclusive.

(*d*) *The Day of the Jewish Month Nisan.*—The Passover was kept at the full moon of the lunar month Nisan, the first of the Jewish ecclesiastical year; the Paschal lambs were slain on the afternoon of the 14th Nisan, and the Passover was eaten after sunset the same day—which, however, as the Jewish day began at sunset, was by their reckoning the early hours of the 15th Nisan; the first fruits (of the barley harvest) were solemnly offered on the 16th. The synoptic Gospels *appear* to place the Crucifixion on the 15th, since they speak of the Last Supper as a Passover;[59] St John's Gospel, on the other hand (xiii. 1, 29, xviii. 28), distinctly implies that the feast had not yet taken place, and thus makes the Crucifixion fall on the 14th. Early Christian tradition is unanimous on this side; either the 14th is mentioned, or the Crucifixion is made the antitype of the slaughter of the Paschal Lamb (and the Resurrection of the first fruits), in the following authorities anterior to A.D. 235: St Paul, 1 Cor. v. 7, xv. 20; Quartodecimans of Asia Minor, who observed the Christian Pascha on the "14th," no matter on what day of the week it fell; Claudius Apollinaris, Clement of Alexandria, Hippolytus, all three quoted in the *Paschal Chronicle*; Irenaeus (apparently) iv. x. 1 [xx. 1]; [Tertullian] *adv. Judaeos*, 8; Africanus, in Routh, *Rell. Sacr.* ii. 297. The Crucifixion, then, should be placed rather on the 14th than on the 15th of Nisan.

These four lines of inquiry have shown that the Crucifixion fell on Friday, Nisan 14 (rather than 15), in one of the six years 28-33 A.D.; and therefore, if it is possible to discover (i.) exactly which moon or month was reckoned each year as the moon or month of Nisan, and (ii.) exactly on what day that particular moon or month was reckoned as beginning, it will, of course, be possible to tell in which of these years Nisan 14 fell on a Friday. To neither question can an answer be given in terms so precise as to exclude some latitude, but to both with sufficient exactness to rule out at once three of the six years. (i.) The difficulty with regard to the month is to know how the commencement of the Jewish year was fixed—in what years an extra month was intercalated before Nisan. If the Paschal full moon was, as in later Christian times, the first after the spring equinox, the difficulty would be reduced to the question on what day the equinox was reckoned. If, on the other hand, it was, as in ancient Jewish times, the first after the earliest ears of the barley harvest would be ripe, it would have varied with the forwardness or backwardness of the season from year to year. (ii.) The difficulty with regard to the day is, quite similarly, to know what precise relation the first day of the Jewish month bore to the astronomical new moon. In later Christian times the Paschal month was calculated from the astronomical new moon; in earlier Jewish times all months were reckoned to begin at the first sunset when the new moon was visible, which in the most favourable circumstances would be some hours, and in the most unfavourable three days, later than the astronomical new moon.

Direct material for answering the question when and how far astronomical calculations replaced simple observations as the basis of the Jewish calendar is not forthcoming. Jewish traditions represented the Sanhedrin as retaining to the end its plenary power over the calendar, and as still fixing the first day of every month and the first month of every year. But as it is quite inconceivable that the Jews of the Dispersion should not have known beforehand at what full moon they were to present themselves at Jerusalem for the Passover, it must be assumed as true in fact, whether or no it was true in theory, that the old empirical methods must have been qualified, at least partially, by permanent, that is in effect by astronomical rules. Exactly what modifications were first made in the system under which each month began by simple observation of the new moon we do not know, and opinions are not agreed as to the historical value of the rabbinical traditions; but probably the first step in the direction of astronomical precision would be the rule that no month could consist of less than twenty-nine or more than thirty days—to which appears to have been added, but at what date is uncertain, the further rule that Adar, the month preceding Nisan, was always to be limited to twenty-nine. In the same way the beginning of the Jewish year according to the state of the harvest was supplanted by some more fixed relation to the solar year. But this relation was not, it would seem, regulated by the date, real or supposed, of the equinox. Christian controversialists from Anatolius of Laodicea (A.D. 277) onwards accused the Jews of disregarding the (Christian) equinoctial limit, and of sometimes placing the Paschal full moon before it; and it is possible that in the time of Christ the 14th of Nisan might have fallen as far back as the 17th of March. In the following table the first column gives the *terminus paschalis*, or 14th of the Paschal moon, according to the Christian calendar; the second gives the 14th, reckoned from the time of the astronomical new moon of Nisan; the third the 14th, reckoned from the probable first appearance of the new moon at sunset. Alternative moons are given for A.D. 29, according as the full moon falling about the 18th of March is or is not reckoned the proper Paschal moon.

A.D.	28	Sat. Mar. 27	Mar. 28	Mar. 30
"	29	Th. Mar. 17	Mar. 17	Mar. 19
		F. Ap. 15	Ap. 16	Ap. 18
"	30	Tu. Ap. 4	Ap. 5	Ap. 7
"	31	Sat. Mar. 24	Mar. 25	Mar. 27
"	32	Sat. Ap. 12	Ap. 12	Ap. 14
"	33	W. Ap. 1	Ap. 1-2	Ap. 3 or 4

It will be seen at once that Friday cannot have fallen on Nisan 14th in any of the three years A.D. 28, 31 and 32. The choice is narrowed down to A.D. 29, Friday, 18th March (Friday, 15th April, would no doubt be too early even for the 14th of Nisan); A.D. 30, Friday 7th April; and A.D. 33, Friday, 3rd April.

(*e*) *The Civil Year* (consuls, or regnal years of Tiberius) in early Christian tradition. It is not *a priori* improbable that the year of the central event from which the Christian Church dated her own existence should have been noted in the apostolic age and handed down to the memory of succeeding generations; and the evidence does go some way to suggest that we have in favour of A.D. 29, the consulate of the two Gemini (15th or 16th year of Tiberius), a body of tradition independent of the Gospels and ancient, if not primitive, in origin.

The earliest witness, indeed, who can be cited for a definite date for the crucifixion gave not 29, but 33 A.D. The pagan chronicler, Phlegon, writing in the reign of Hadrian, noted under Olympiad 202.4 (= A.D. 32-33), besides a great earthquake in Bithynia, an eclipse so remarkable that it became night "at the sixth hour of the day." The eclipse meant is, presumably, that of the Crucifixion (so Origen, *contra Celsum*,, ii. 33 [but see *in Matt.* 134, Delarue iii. 922], Eusebius's *Chronicle* Tib. 19 [= A.D. 33], Anon, in Cramer's *Catena in Matt.* p. 237), but as the notice of it was clearly derived by Phlegon, pagan as he was, directly or indirectly from the Gospel narrative, there is no reason at all to ascribe any independent value to the date. Phlegon may have had grounds for dating the Bithynian earthquake in that year, and have brought the dateless portent into connexion with the dated one. Eusebius adopted and popularized this date, which fell in with his own system of Gospel chronology, but of the year 33 as the date of the Passion there is no vestige in Christian tradition before the 4th century.

The only date, in fact, which has any real claim to represent Christian tradition independent of the Gospels, is the year 29. Tiberius 15 is given by Clem. Alex. *Strom.* i. 147; Origen, *Hom. in Jerem.* xiv. 13; cf. *c. Cels.* iv. 22. Tiberius 16 by Julius Africanus (Routh, *Rell. Sacr.* ii. 301-304), and pseudo-Cyprian *de pascha computus* (A.D. 243), § 20. The consulship of the two Gemini by Lactantius, *Div. Inst.* iv. x. 18, and (Lactantius?) *de morte pers.* § 2; the consulship of the two Gemini = Tiberius 18 by Hippolytus, *Comm. in Danielem*, iv. (ed. Bonwetsch, p. 242); the consulship of the two Gemini = Tiberius 15 by [Tertullian] *adv. Judaeos*, § 8; the consulship of the two Gemini = Tiberius 15 (*al.* 18 or 19) = Ol. 202.4 [this last is a later interpolation from Eusebius] in the *Acts of Pilate*. Other methods of expressing the year 29 appear in Hippolytus's *Paschal Cycle* and *Chronicle*,

and in the Abgar legend (*ap.* Eusebius, *H.E.* i. 13). No doubt it would be possible to explain Tiberius 16 as a combination of Luke iii. 1 with a one-year ministry, and even to treat Tiberius 15 as an unintelligent repetition from St Luke—though the omission to allow a single year for the ministry would be so strange as to be almost unintelligible—but the date by the consuls has an independent look about it, and of its extreme antiquity the evidence gives two indications: (i.) Hippolytus's Commentary on Daniel (now generally dated *c.* A.D. 200) combines it with an apparently inconsistent date, Tiberius 18; the latter is clearly his own combination of the length of the ministry (he says in the same passage that Christ suffered in his 33rd year) with Luke iii. 1—the consulship must have been taken from tradition without regard to consistency; (ii.) the names of the Gemini are divergently given in our oldest authorities; in [Tert.] *adv. Judaeos* correctly as Rubellius Geminus and Fufius (or Rufius) Geminus, but in Hippolytus and the *Acts of Pilate* as Rufus and Rubellio. But if the tradition of the consulship was thus, it would seem, already an old one about the year 200, there is at least some reason to conclude that trustworthy information in early Christian circles pointed, independently of the Gospels, to the year 29 as that of the Crucifixion.

(*f*) *The Civil Month and Day.*—The earliest known calculations, by Basilidian Gnostics, quoted in Clem. Alex. *Strom.* i. 147, gave alternative dates, Phamenoth 25, Pharmuthi 25, Pharmuthi 19; that is, according to the fixed Alexandrine calendar of B.C. 26, 21st March, 20th April, 14th April; in the older, not wholly superseded, Egyptian calendar the equivalents with Roman days varied from year to year. But in all probability these dates were only one development of those speculations in the region of numbers to which Gnosticism was so prone; and in any case to look for genuine traditions among Egyptian Gnostics, or even in the church of Alexandria, would be to misread the history of Christianity in the 2nd century. Such traditions must be found, if anywhere, in Palestine and Syria, in Asia Minor, in Rome, not in Egypt; within the Church, not among the Gnostics. The date which makes the most obvious claim to satisfy these conditions would be the 25th of March, as given by Hippolytus, [Tert.] *adv. Judaeos*, and the *Acts of Pilate* (according to all extant MSS. and versions, but see below), *locc. citt.*—the same three authorities who bear the earliest witness for the consuls of the year of the Crucifixion—and by many later writers. It cannot be correct, since no full moon occurs near it in any of the possible years; yet it must be very early, too early to be explained with Dr Salmon (*Dictionary of Christian Biography*, iii. 92*b*), as originated by Hippolytus's Paschal cycle of A.D. 221. Now Epiphanius (*Haer.* l. 1) had seen copies of the *Acts of Pilate* in which the day given was not 25th March, but *a.d. xv. kal. Apr.* (= 18th March); and if this was the primitive form of the tradition, it is easy to see how 25th March could have grown out of it, since the 18th would from comparatively early times, in the East at any rate, have been thought impossible as falling before the equinox, and no substitution would be so natural as that of the day week, Friday, 25th March. But Friday, 18th March, A.D. 29, was one of the three alternative dates for the Crucifixion which on astronomical and calendar grounds were found (see above, 5*d*) to be possible.

Thus A.D. 29 is the year, the 18th of March is the day, to which Christian tradition (whatever value, whether much or little, be ascribed to it) appears to point. Further, the Baptism was tentatively placed in A.D. 26-27; the length of the ministry was fixed, with some approach to certainty, at between two and three years, and here too the resultant date for the Crucifixion would be the Passover of A.D. 29.

To sum up: the various dates and intervals, to the approximate determination of which this article has been devoted, do not claim separately more than a tentative and probable value. But it is submitted that their harmony and convergence give them some additional claim to acceptance, and at any rate do something to secure each one of them singly—the Nativity in 7-6 B.C., the Baptism in A.D. 26-27, the Crucifixion in A.D. 29—from being to any wide extent in error.

The Chronology of the Apostolic Age.

The chronology of the New Testament outside the Gospels may be defined for the purposes of this article as that of the period between the Crucifixion in A.D. 29 (30) on the one hand, and on the other the persecution of Nero in A.D. 64 and the fall of Jerusalem in A.D. 70. Of the events in Christian history which fall between these limits it must be admitted that there are many which with our present information we cannot date with exactness. But the book of Acts, our only continuous authority for the period, contains two synchronisms with secular history which can be dated with some pretence to exactness and constitute fixed points by help of which a more or less complete chronology can be constructed for at least the latter half of the apostolic age. These are the death of Herod Agrippa I. (xii. 23) and the replacement of Felix by Festus (xxiv. 27).

1. The death of Herod Agrippa I. This prince, son of Aristobulus and grandson of Herod the Great, was made (i.) king over the tetrarchy which had been Herod Philip's, "not many days" after the accession of Gaius, 16th of March A.D. 37; (ii.) ruler of the tetrarchy of Antipas, in A.D. 39-40; (iii.) ruler of the whole of Palestine (with Abilene), on the accession of Claudius at the beginning of A.D. 41. Josephus's *Jewish Wars* and *Antiquities* differ by one in the number of years they allot to his reign over the tetrarchies (the former work says three years, the latter four), but agree in the more important *datum* that he reigned three years more after the grant from Claudius, which would make the latest limit of his death the spring of A.D. 44. The *Antiquities* also place his death in the seventh year of his reign, which would be A.D. 43-44. On the other hand, coins whose genuineness there is no apparent reason to doubt are extant of Agrippa's ninth year; and this can only be reconciled even with A.D. 44 by supposing that he commenced reckoning a second year of his reign on Nisan 1, A.D. 37, so that his ninth would run from Nisan 1, A.D. 44. On the balance of evidence the only year which can possibly reconcile all the data appears to be A.D. 44 after Nisan, so that it will have been at the Passover of that year that St Peter's arrest and deliverance took place.

After Agrippa's death Judaea was once more governed by procurators, of whom Cuspius Fadus and Tiberius Alexander ruled from A.D. 44 to 48; the third, Cumanus, was appointed in A.D. 48; and the fourth, Felix, in A.D. 52. Under Tiberius Alexander, *i.e.* 892
in A.D. 46 or 47, occurred the great famine which Agabus had foretold, and in which the Antiochene church sent help to that of Jerusalem by the ministry of Barnabas and Saul (Acts xi. 30, xii. 25). Thus the earliest date at which the commencement of the first missionary journey (Acts xiii. 4) can be placed is the spring of A.D. 47. The journey extended from Salamis "throughout the whole island" of Cyprus as far as Paphos, and on the mainland from Pamphylia to Pisidian Antioch, Iconium, Lystra and Derbe, at each of which places indications are given of a prolonged visit (xiii. 49, xiv. 3, 6, 7, 21). The same places were visited in reverse order on the return journey, as far as Perga on the Pamphylian coast; but instead of revisiting Cyprus the voyage to Syria was this time made direct. In estimating the length of time occupied by this first missionary journey, it must be remembered that a sea voyage could never have been undertaken, and land travel only rarely, during the winter months, say November to March; and as the amount of the work accomplished is obviously more than could fall within the travelling season of a single year, the winter of 47-48 must have been spent in the interior, and return to the coast and to Syria made only some time before the end of autumn A.D. 48. The succeeding winter, at least, was spent again at Antioch of Syria (xiv. 28). The council at Jerusalem of Acts xv. will fall at earliest in the spring of A.D. 49, and as only "certain days" were spent at Antioch after it (xv. 36) the start on the second missionary journey might have been made in the (late) summer of the same year. The "confirmation" of the existing churches of Syria and Cilicia, and of those of the first journey beginning with Derbe (xv. 41, xvi. 5), cannot have been completed under several months, nor would the Apostle have commenced the strictly missionary part of the journey in districts not previously visited, before the opening of the travelling season of A.D. 50. No delay was then made on the Asiatic side: it may still have been in spring when St Paul crossed to Europe and began the course of preaching at Philippi, Thessalonica, Beroea and Athens which finally brought him to Corinth. The stay of eighteen months at the last-named place (xviii. 11) will naturally begin at the end of one travelling season and end at the beginning of another, *i.e.* from the autumn of A.D. 50 to the spring of A.D. 52. From Corinth the Apostle went to Jerusalem to "salute the church," and then again to Antioch in Syria, where he stayed only for "a time" (xviii. 22), and soon left—on the third missionary journey, as conventionally reckoned—proceeding "in order" through the churches of the interior of Asia Minor. These journeys and the intervening halts must have occupied seven or eight months, and it must have been about the end of the year when St Paul established his new headquarters at Ephesus. The stay there lasted between two and three years (xix. 8, 10, xx, 31), and cannot have terminated before the spring of A.D. 55. From Ephesus he went into Europe, and after "much teaching" given to the churches of Macedonia (xx. 2), spent the three winter months at Corinth, returning to Philippi in time for the Passover (xx. 3, 6) of A.D. 56. Pentecost of

the same year was spent at Jerusalem, and there St Paul was arrested, and kept in prison at Caesarea for two full years, until Festus succeeded Felix as governor (xx. 16, xxiv. 27), an event which, on this arrangement of the chronology of the missionary journeys, would therefore fall in A.D. 58.

Care, however, must be taken to remember exactly what this line of argument amounts to—what it can fairly be said to have proved, and what it still leaves open. It has been shown, firstly, that the missionary journeys cannot have commenced before the spring of A.D. 47, and, secondly, that between their commencement and the end of the two years' imprisonment at Caesarea not less than eleven full years must have elapsed. Consequently A.D. 58 appears to be the earliest date possible for the arrival of Festus. On the other hand, a later date for Festus is not absolutely excluded. It is possible that the first missionary journey should be placed in A.D. 48 instead of A.D. 47; and it is possible, though not probable, that the missionary journeys should be spread over one year more than has been suggested above. At any rate, then, the alternative is open that every date given above, from A.D. 47 to A.D. 58, should be moved on one year, with the result of placing Festus's arrival in A.D. 50.

It is now time to run to the direct evidence for the date of Festus's arrival as procurator, in order to test by it the result already tentatively obtained.

2. The replacement of Felix by Festus. This is the pivot date of St Paul's later life, but unfortunately two schools of critics date it as differently as A.D. 55 and A.D. 60 (or 61). The former are represented by Harnack, the latter by Wieseler, whom Lightfoot follows. It can be said confidently that the truth is between these two extremes (though in what exact year it is not easy to say), as will be evident from a consideration of the arguments urged, which in each case appear less to prove one extreme than to disprove its opposite.

Arguments for the Later Date, A.D. 60 or 61.—(α) St Paul, at the time of his arrest, two years before Felix's recall, addresses him as "for many years past a judge for this nation" (Acts xxiv. 10, 27). It is certain that Felix succeeded Cumanus in A.D. 52, for Tacitus mentions Cumanus's recall under that year, Josephus immediately before the notice of the completion of Claudius's twelfth year [January, A.D. 53], Eusebius probably under Claudius II, that is, between September 51 and September 52 (for the meaning of the regnal years in the *Chronicle* of Eusebius see the present writer's article in *Journal of Theological Studies*, January 1900, pp. 188-192). It is argued that "many years" cannot mean less than six or seven, so that St Paul must have been speaking at earliest in 58 or 59, and Felix will have left Judaea at earliest in 60 or 61. But this argument overlooks the fact that Felix had been in some position which might properly be described as that of "judge for this nation" before he became governor of all Palestine in A.D. 52. In the words of Tacitus, Felix was at the time of that appointment *iampridem Iudaeae impositus* (*Annals*, xii. 54); he certainly supposes Felix to have been already governor of Samaria, and apparently of Judaea too, and only recognizes Cumanus as governor of Galilee; and Josephus, though he says nothing of this, and treats Cumanus as the sole procurator down to A.D. 52, implies that Felix had been in some position where the Jewish authorities could judge of his fitness when he tells us that the high priest Jonathan used to press on Felix, as a reason for urging him to govern well, the fact he that had asked for his appointment to the procuratorship (*Ant.* xx. viii. 5). If Felix had acted in some position of responsibility in Palestine before 52 (perhaps for some time before), St Paul could well have spoken of "many years" at least as early as 56 or 57.

(β) Josephus enumerates after the accession of Nero (October 54) a long catalogue of events which all took place under the procuratorship of Felix, including the revolt of "the Egyptian" which was already "before these days" at the time of St Paul's arrest, two years from the end of Felix's tenure. This suggests, no doubt, that the Egyptian rebelled at earliest in 54-55, and makes it probable that St Paul's arrest did not take place before (the Pentecost of) A.D. 56; and it implies certainly that the main or most important part of Felix's governorship fell, in Josephus's view, under Nero. But as two years only of Felix's rule (52-54) fell under Claudius, this procedure would be quite natural on Josephus's part if his recall were dated in 58 or 59, so that four or five years fell under Nero. And there is no need at all to suppose that all the incidents which the historian masses under his account of Felix were successive: events in Emesa, Chalcis, Caesarea and Jerusalem may easily have been synchronous.

The arguments, then, brought forward in favour of A.D. 60 or 61 do not do more than bring the rule of Felix down to 58 or 59.

Arguments for an Early Date, A.D. 55 or 56.—(α) Eusebius's *Chronicle* places the arrival of Festus in Nero 2, October 55-56, and Eusebius's chronology of the procurators goes back probably through Julius Africanus (himself a Palestinian) to contemporary authorities like the *Jewish kings* of Justus of Tiberias. But (i.) Nero 2 is really September 56-September 57; (ii.) it is doubtful whether Eusebius had any authority to depend on here other than Josephus, who gives no precise year for Festus—Julius Africanus is hardly probable, since we know that his chronicle was very jejune for the Christian period—and if so, Eusebius had to find a year as best he could.[60]

(β) Felix, on his return to Rome, was prosecuted by the Jews for misgovernment, but was acquitted through the influence of his brother Pallas. Pallas had been minister and favourite of Claudius, but was removed from office in the winter following Nero's accession, 54-55. Felix must therefore have been tried at the very beginning of Nero's reign. But this argument would make Felix's recall—if Festus came in summer, as Acts xxv. 1, xxvii. 1, 9, seem to prove—to fall actually under Claudius. And, in fact, it would be a mistake look upon Pallas's retirement as a disgrace. He stipulated that no inquiry should be made into his conduct in office, and was left for another seven years unmolested in the enjoyment of the fortune he had amassed. There is, therefore, every likelihood that he retained for some years enough influence to shield his brother.

Of these arguments, then, the first, so far as it is valid, is an argument for the summer, not of A.D. 55 or 56, but of A.D. 57 as that of the recall, while the second will apply to any of the earlier years of Nero's reign.

In the result, then, the arguments brought forward in favour of each extreme fail to prove their case, but at the same time prove something against the opposite view. Thus the point that Josephus catalogues the events of Felix's procuratorship under Nero cannot be pressed to bring down Felix's tenure as far as 60 or 61, but it does seem to exclude as early a termination as 56, or even 57. Conversely, the influence of Pallas at court need not be terminated by his ceasing to be minister early in 55; but it would have been overshadowed not later than the year 60 by the influence of Poppaea, who in the summer of that year[61] enabled the Jews to win their cause in the matter of the Temple wall, and would certainly have supported them against Felix. Thus the choice again appears to lie between the years 58 and 59 for the recall of Felix and arrival of Festus.

If St Paul was arrested in 56 or 57, and appealed to Caesar on the arrival of Festus in 58 or 59, then, as he reached Rome in the early part of the year following, and remained there a prisoner for two full years, we are brought down to the early spring of either 61 or 62 for the close of the period recorded in the Acts. That after these two years he was released and visited Spain in the west, and in the east Ephesus, Macedonia, Crete, Troas, Miletus, and perhaps Achaea and Epirus, is probable, in the one case, from the evidence of Romans xv. 28, Clem. *ad Cor*. v. and the Muratorian canon, and, in the other, from the Pastoral Epistles. These journeys certainly cannot have occupied less than two years, and it is more natural to allow three for them, which takes us down to 64-65.

Early evidence is unanimous in pointing to St Peter and St Paul as victims of the persecution of Nero (Clem, *ad Cor*. v. vi., Dionysius of Corinth *ap*. Eus. *H.E*. ii. 25, &c., combined with what we know from Tacitus of the course of the persecution, and from Gaius of Rome, *ap*. Eus. ii. 25, of the burial-places of the two apostles); and tradition clearly distinguished the fierce outbreak at Rome that followed on the fire of the city in July 64 from any permanent disabilities of the Christians in the eye of the law which the persecution may have initiated. There is, therefore, no reason at all to doubt that both apostles were martyred in 64-65, and the date serves as a confirmation of the chronology adopted above of the imprisonment, release and subsequent journeys of St Paul.

Investigation, then, of that part of the book of Acts which follows the death of Agrippa, recorded in chap. xii.—*i.e*. of that part of the apostolic age which follows the year 44—has shown that apparent difficulties can be to a large extent set aside, and that there is nowhere room between A.D. 44 and 64 for doubt extending to more than a single year. The first missionary journey may have begun in 47 or 48; the arrival of Festus may have taken place in the summer of 58 or of 59; the two years of the Roman imprisonment recorded in the last chapter of Acts may have ended in the spring of 61 or 62; and the dates which fall in between these extremes are liable to the same variation. The present writer leans to the earlier alternative in each case, 47, 58, 61; but

he willingly concedes that the evidence, as he understands it, is not inconsistent with the later alternative.

But if the events of A.D. 44-64 can thus be fixed with a fair approximation to certainty, it is unfortunately otherwise with the events of A.D. 29-44. Here we are dependent (i.) on general indications given in the Acts; (ii.) on the evidence of the Epistle to the Galatians, which, though in appearance more precise, can be and is interpreted in very different ways.

(i.) The book of Acts is divided, by general summaries from time to time inserted in the narrative, into six periods: i. 1-vi. 7, vi. 8-ix. 31, ix. 32-xii. 24, xii. 25-xvi. 5, xvi. 6-xix. 20, xix. 2l-xxviii. 31. Of these the three last extend respectively from the death of Herod to the start for Europe in the second missionary journey (A.D. 44 to the spring of 50 [51]), from the start for Europe to the end of the long stay at Ephesus (A.D. 50 [51] to the spring of A.D. 55 [56]), and from the departure from Ephesus to the end of the two years' captivity at Rome (A.D. 55 [56] to the beginning of A.D. 61 [62]). It will be seen that these periods are of more or less the same length, namely, six (or seven) years, five years, six years. There is, therefore, some slight presumption that the three earlier periods, which together cover about fifteen years, were intended by so artistic a writer as St Luke to mark each some similar lapse of time. If that were so, the preaching of the apostles at Jerusalem and organization of the Church at the capital—the preaching of the seven and the extension of the Church all over Palestine—the extension of the Church to Antioch, and the commencement of St Paul's work—might each occupy five years more or less, that is to say, roughly, A.D. 29-34, 34-39, 39-44. The conversion of St Paul, which falls within the second period, would on this arrangement fall somewhere between five and ten years after the Crucifixion. Such conclusions are, however, of course general in the extreme.

(ii.) A nearer attempt to date at least the chronology of St Paul's earlier years as a Christian could be made by the help of the Galatian Epistle if we could be sure from what point and to what point its reckonings are made. The apostle tells us that on his conversion he retired from Damascus into Arabia, and thence returned to Damascus; then after three years (from his conversion) he went up to Jerusalem, but stayed only a fortnight, and went to the regions of Syria and Cilicia. Then after fourteen years (from his conversion? or from his last visit?) he went up to Jerusalem again to confer with the elder apostles. Now, if either of these visits to Jerusalem could be identified with any of the visits whose dates have been approximately settled in the chronology of A.D. 44-64, we should have a fixed point from which to argue back. Unfortunately, even less agreement exists on this head than on the question whether the fourteen years of the last-mentioned visit are to be reckoned from the conversion or from the previous visit. Most critics, indeed, are now agreed that the fourteen years are to be calculated from the conversion; and most of them still hold that the visit of Galatians ii. is the same as the council of Acts xv., partly, no doubt, on the ground that the latter visit was too important and decisive for St Paul to have omitted in giving even the most summary description of his relations with the twelve. This ground would, however, be cut away from their feet if it were possible to hold (with J.V. Bartlet, *Apostolic Age*, 1900, and V. Weber, *Die Abfassung des Galaterbriefs vor dem Apostelkonzil*, Ravensburg, 1900) that the epistle was actually written just before the council, *i.e.* in the winter of 48-49 [49-50]. In that case, of course, the two visits of Galatians i. and ii. would be those of Acts ix. 26 and xi. 30. The fourteen years reckoned back from the latter (*c.* A.D. 46) would bring us to A.D. 32-33 as the latest possible date for the conversion. With the older view, on the other hand, the fourteen years reckoned from the council in A.D. 49 [50] would allow us to bring down the conversion to A.D. 36. The new view clears away some manifest difficulties in the reconciliation of the Epistle and the Acts, and the early date for Galatians in relation to the other Pauline epistles is not so improbable as it may seem; but the chronology still appears more satisfactory on the older view, which enables the conversion to be placed at least three years later than on the alternative theory. But it is clear that the last word has not been said, and that definite results for this period cannot yet be looked for.

To sum up: an attempt has been made, it is hoped with some success, to provide a framework of history equipped with dates from the time of St Peter's arrest by Herod Agrippa I. at the Passover of A.D. 44 down to the martyrdom of St Peter and St Paul in the persecution of Nero, A.D. 64-65. For the previous period, on the other hand, from A.D. 29 to A.D. 44, it appeared impossible in our present state of knowledge to state conclusions other than in the most general form.

AUTHORITIES.—The views stated in this article are in general (though with some modifications) the same as those which the present writer worked out with more fulness of detail in Hastings' *Dictionary of the Bible*, i. (1898) 403-424. Of older books should be mentioned:—Ideler, *Handbuch der mathematischen und technischen Chronologie* (2 vols., 1825); Wieseler, *Chronologie des apostolischen Zeitalters* (1848); Lewin's *Fasti Sacri* (1865). Important modern contributions are to be found in Prof. (Sir) W.M. Ramsay's various works, and in Harnack's *Chronologie der altchristlichen Litteratur bis Eusebius*, i. 233-244. Mention should also be made of an article, containing much useful astronomical and Talmudical information, by Mr J.K. Fotheringham, "The Date of the Crucifixion," in the *Journal of Philology*, xxix. 100-118 (1904). Mr Fotheringham is of opinion that the evidence from Christian sources is too uncertain, and that the statements of the Mishnah must be the starting-point of the inquiry: taking then the phasis of the new moon as the true beginning of Nisan, he concludes that Friday cannot have coincided with Nisan 14 in any year, within the period A.D. 28-35, other than A.D. 33 (April 3rd). But in one of the two empirical tests of the value of these calculations that he was able to obtain (*loc. cit.* p. 106, n. 2), the new moon was seen a day earlier than his rules allowed. This being so, it would be premature to disregard the convergent lines of historical evidence which tell against A.D. 33. Among the latest German works may be cited the chapter on New Testament chronology in the *Neutestamentliche Zeitgeschichte* of Dr Oscar Holtzmann (2nd ed., 1906), pp. 117-147: regarded as a collection of historical material this deserves every praise, but the mass is undigested and the treatment of the evidence arbitrary. As might be expected, Dr Holtzmann's conclusions are clear-cut, and alternatives are rigidly excluded: the Crucifixion is dated on the 7th of April A.D. 30, and St Paul's arrest (with the older writers) at Pentecost A.D. 58.

(C. H. T.)

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1 The books of Samuel, Kings, Ezra and Nehemiah, and Chronicles, were by the Jews each treated (and written) as one book, and were not divided by them into two till the 16th century, through Christian influence.

2 For a discussion of the word "Massoretes" see W. Bacher (*J.Q.R.* vol. iii. pp. 785 f.), who maintains that the original pronunciation of these words was מסורת and מומרה.

3 The actual date of the introduction of vowel points is not known, but it must in any case have been later than the time of Jerome, and is probably to be assigned to the 7th century. Of the systems of punctuation which are known to us, the more familiar is the Tiberian, or sublinear, which is found in all printed editions of the Hebrew Bible. The other system, the Babylonian or superlinear, is chiefly found in certain Yemen MSS. For yet a third system of vocalization see M. Friedländer, *J.Q.R.*, 1895, pp. 564 f., and P. Kahle in *Z.A.T.W.* xxi. (1901), pp. 273 f. Probably the idea of providing vowel points was borrowed from the Syrians.

4 This represents the Western tradition as opposed to the Eastern text of ben Naphtali. For the standard copies such as the *Codex Hillelis* referred to by later writers see H.L. Strack, *Proleg. Critica*, pp. 14 f.

5 Cf. F.C. Burkitt, *Fragments of the Books of Kings according to the Translation of Aquila*.

6 The Talmudic story of the three MSS. preserved in the court of the temple (*Sopherim*, vi. 4) sufficiently illustrates the tentative efforts of the rabbis in this direction.

7 W. Robertson Smith, *Old Testament and the Jewish Church*, pp. 69 f.

8 For these *Tiqqunē Sopherim* or "corrections of the scribes" see Geiger, *Urschrift*, pp. 308 f.; Strack, *Prolegomena Critica*, p. 87; Buhl, *Canon and Text of the Old Testament*, pp. 103 f. In the *Mekilta* (Exod. xv. 7) only eleven passages are mentioned. Less important are the *Itturē Sopherim*, or five passages in which the scribes have omitted a *waw* from the text.

9 *Text of the Books of Samuel*, pp. xxxix. f.

10 According to Josephus (*Ant.* xi. 7. 8) the temple on Mt. Gerizim was set up by Manasseh in the reign of Darius Codomannus, *i.e.* about 332 B.C. It is possible that he is correct in placing the building of the temple at the later date, but probably he errs in connecting it with the secession of Manasseh, which, according to Nehemiah, occurred a century earlier; it has been suggested that he has confused Darius Codomannus with his predecessor, Darius Nothus.

11 *e.g.* Ex. xx. 17, 19 ff.; Num. xx. f.; Deut. xxvii. 4.

12 1 Kings xx. 7-17; 2 Kings xxiii. 12-17, ed. by Mr (now Professor) F.C. Burkitt in *Fragments of the Books of Kings according to the Translation of Aquila* (Cambridge, 1897), and Ps. xc. 6-13; xci. 4-10, and parts of Ps. xxiii. by Dr C. Taylor in *Sayings of the Jewish Fathers* (2nd ed., 1897).

13 On the question of Theodotion's date, Schürer (*Geschichte des jüdischen Volkes*, Bd. iii. p. 324) argues very plausibly for his *priority* to Aquila on the grounds, (1) that Irenaeus mentions him before Aquila, and (2) that, after Aquila's version had been adopted by the Greek Jews, a work such as that of Theodotion would have been somewhat superfluous. Theodotion's work, he suggests, formed the first stage towards the establishment of a Greek version which should correspond more closely with the Hebrew. Moreover, this theory affords the simplest explanation of its disappearance from Jewish tradition.

14 Only one MS. of the Septuagint version of Daniel has survived, the *Codex Chisianus*.

15 *Introduction to the Old Testament in Greek*, p. 51.

16 Hence the name *Hexapla*. In some books, especially the poetical, the columns were increased to eight by the addition of the *Quinta* and *Sexta*, but the *Octapla*, as the enlarged work was called, was not apparently a distinct work. The *Tetrapla*, on the other hand, was a separate edition which did not contain the first two columns of the *Hexapla*.

17 Lagarde's projected edition of the Lucianic recension was unfortunately never completed; the existing volume contains Genesis-2 Esdras, Esther. It may be noted here that the Complutensian Polyglott represents a Lucianic text.

18 Hastings's *Dict. of the Bible*, iii. pp. 54 ff.

19 *The Old Testament in Greek*, by A.E. Brooke and N. McLean, vol. i. pt. 1 (1906)

20 His arguments are stated briefly (and in order to be refuted) by Jerome in his commentary on *Daniel*.

21 In what follows the actual quotations are from his English work; some of the summaries take account of the brief expansions in his later Latin version.

22 See particularly B. Stade, *Geschichte des Volkes Israel* (1887-1888); J. Wellhausen, *Die Kleinen Propheten* (1892); B.I. Duhm, *Jesaia* (1892); T.K. Cheyne, *Introduction to the Book of Isaiah* (1895); K. Marti, *Jesaja* (1900), and *Das Dodekapropheton* (1904).

23 *The Old Testament in the Jewish Church* (1881); *The Prophets of Israel* (1882).

24 For details see an article in the *Zeitschr. für d. altest. Wissenschaft* for 1889, pp. 246-302, on "Alttestamentliche Studien in Amerika," by G.F. Moore, who has himself since done much distinguished and influential critical work.

25 To avoid any possibility of overstating the case, it is necessary to refer here to the fact that Tethmosis (Thothmes) III. in the 16th century B.C. mentions two Palestinian places named respectively Jacobel and Josephel, and Sheshonk in the both century B.C. mentions another called "The field of Abram." From these names alone it is impossible to determine whether the places derived their names from individuals or tribes.

26 Or according to some MSS., 167.

27 Shem, the father of Arphaxad, is aged 100 at the time of the Flood, and lives for 600 years.

28 Disregarding the "two years" of Gen. xi. 10; see v. 32, vii. 11.

29 Taking account of the reading of LXX. in Ex. xii. 40.

30 See further Driver's essay in Hogarth's *Authority and Archaeology* (1899), pp. 32-34; or his *Book of Genesis* (1904, 7th ed., 1909), p. xxxi. ff.

31 1 Petrie, *Hist. of Egypt*, i. (ed. 5, 1903), p. 251; iii. (1905), p. 2.

32 See Merenptah's account of the defeat of these invaders in Maspero, op. cit. pp. 432-437; or in Breasted's *Ancient Records of Egypt* (Chicago, 1906), iii. 240-252.

33 Namely, 40 years in the wilderness; Joshua and the elders (Judges ii. 7), x years; Othniel (iii. 11), 40 years; Ehud (iii. 30), 80 years; Barak (v. 31), 40 years; Gideon (viii. 28), 40 years; Jephthah and five minor judges (x. 2, 3, xii. 7, 9, 11, 14), 76 years; Samson (xvi. 31), 20 years; Eli (1 Sam. iv. 18), 40 years; Samuel (vii. 2), 20 years; Saul, y years; David, 40 years; and Solomon's first four years—in all 440 + x + y years.

34 Namely, Moses (in the wilderness), Joshua, Othniel, Ehud, Deborah, Gideon, Jephthah, Samson, Eli, Samuel, Saul and David.

35 The "300 years" of Judges xi. 26 agrees very nearly with the sum of the years (namely, 319) given in the preceding chapters for the successive periods of oppression and independence. The verse occurs in a long insertion (xi. 12-28) in the original narrative; and the figure was most probably arrived at by computation upon the basis of the present chronology of the book.

36 The real Biblical date, Ussher in Gen. xi. 26 interpolating 60 years, because it is said in Acts vii. 4 that Abraham left Haran *after* his father Terah's death (Gen. xi. 32), and also (as explained above) interpreting wrongly Ex. Xii. 40.

37 Hilprecht's dates (*The Bab. Expedition of the University of Pennsylvania*, vol. i. pt. i. 1893, pp. 11, 12; pt. ii. 1896, pp. 23, 24, 43, 44).

38 Petrie's dates, *Hist. of Egypt*, vol. i. (ed. 5, 1903), pp. 20, 30, 233, 251, 252; vol. iii. (1905), pp. 2, 235, 261-7, 296-360. Other authorities, however, assign considerably lower dates for the dynasties prior to the 18th. Thus Breasted (*Hist. of Egypt*, 1906, pp. 22 ff., 221, 597) agrees with Ed. Meyer in giving, for reasons which cannot be here explained, for the beginning of the 1st dynasty *c.* B.C. 3400, for the 4th dynasty *c.* B.C. 2900-2750, and for the rule of the Hyksos *c.* B.C. 1680-1580; and in his *Researches in Sinai*, 1906, p. 175, Petrie proposes for Menes B.C. 5510, and for the 4th dynasty B.C. 4731-4454. See EGYPT (*Chronology*).

39 So Sayce, Rogers (*Hist. of Bab. and Ass.*, 1900, i. 318 f.) and others. The date rests upon a statement of Nabu-na'id's, that Sargon's son, Naram-Sin, reigned 3200 years before himself. Lehmann holds that there are reasons for believing that the engraver, by error, put a stroke too many, and that 2200 should be read instead of 3200.

40 The real Biblical date.

41 Rogers, i. 373-375. Many monuments and inscriptions of other kings in Babylonia, between 4000 and 2000 B.C., are also known.

42 The lists of the Babylonian and Assyrian kings are not continuous; and before 1907, from the data then available (see the discussion in Rogers, op. cit. i. 312-348), Khammurabi, the sixth king of the first Babylonian dynasty, was commonly referred to such dates as 2376-2333 B.C. (Sayce) or 2285-2242 B.C. (Johns). But inscriptions recently discovered, by showing that the second dynasty was partly contemporaneous with the first and the third, have proved that these dates are too high; see L.W. King, *Chronicles Concerning Early Bab. Kings* (1907), i. 93-110; and the article BABYLONIA, *Chronology*. The data B.C. 2130-2088 is that adopted by Thureau-Dangin, after a discussion of the subject, in the *Journal des Savants*, 1908, p. 199; and by Ungnad in the *Orient. Litt.-zeitung*, 1908, p. 13, and in Gressmann's *Altorientalische Texte und Bilder zum A.T.* (1909), p. 103.

43 King, op. cit. i. 116, ii. 14.

44 The dates of the kings are, in most cases, those given by Kautzsch in the table in his *Outline of the Hist. of the Literature of the O.T.* (tr. by Taylor, 1898), pp. 167 ff.; see also A.R.S. Kennedy, "Samuel" in the *Century Bible* (1906), p. 31. The dates given by other recent authorities seldom differ by more than three or four years.

45 The figures after a king's name indicate the number of years assigned to his reign in the O.T. For Saul, see 1 Sam. xiii. 1, R.V.

46 The date of Sheshonq depends on that fixed for Rehoboam. Petrie places the accession of Rehoboam in 937 B.C.

47 If these dates are correct, there must be some error in the ages assigned to Ahaz and Hezekiah at their accession, viz. 20 and 25 respectively, for it would otherwise follow from them that Ahaz, dying at the age of [20 + 8 =] 28, left a son aged 25! The date 728 for Hezekiah's accession rests upon the assumption that of the two inconsistent dates in 2 Kings xviii. 10, 13, the one in ver. 10 (which places the fall of Samaria in Hezekiah's 6th year) is correct; but some scholars (as Wellhausen, Kamphausen, and Stade) suppose that the date in ver. 10 (which places Sennacherib's invasion in Hezekiah's 14th year) is correct, and assign accordingly Hezekiah's accession to 715. This removes, or at least mitigates, the difficulty referred to, and leaves more room for the reigns of Jotham and Ahaz; but it requires, of course, a corresponding reduction in the reigns of the kings succeeding Ahaz.

48 Breasted's dates for these three kings (*Hist. of Egypt*, 1906, p. 601) are: Shabaka 712-700; Shabataka 700-688; Taharqa 688-663.

49 See George Smith, *The Assyrian Eponym Canon* (1875), pp. 29 ff., 57 ff.; Schrader, *Keilinschriftliche Bibliothek* (transcriptions and translations of Assyrian and Babylonian inscriptions), i. (1889), pp. 204 ff.

50 It may be explained here that the dates of the Assyrian and Babylonian kings can be reduced to years B.C. by means of the so-called "Canon of Ptolemy," which is a list of the Babylonian and Persian kings, with the lengths of their reigns, extending from Nabonassar, 747 B.C., to Alexander the Great, drawn up in the 2nd century A.D. by the celebrated Egyptian mathematician and geographer Ptolemy; as the dates B.C. of the Persian kings are known independently, from Greek sources, the dates B.C. of the preceding Babylonian kings can, of course, be at once calculated by means of the Canon. The recently-discovered contemporary monuments have fully established the accuracy of the Canon.

51 Or, in any case, between 734 and 732; see Rost, *Die Keilschrifttexte Tiglat-pilesers III.*, 1893, pp. xii., 39, 81, with the discussion, pp. xxxii.-xxxiv., xxxv.-xxxvi.

52 This interval does not depend upon a mere list of Eponym years; we have in the annals of Sargon and Sennacherib full particulars of the events in all the intervening years.

53 The date of this epistle is rather uncertain. Something depends upon the vexed question as to the identity of the Galatian churches. The epistle may be placed conjecturally early in the stay at Ephesus (*c.* A.D. 52-53). It is to be noted that the chronological grouping of the epistles by minute comparison of style is apt to be deceptive; resemblances of this kind are due more to similarity of subject than to proximity in date.

54 *E.g.* from the preface to the Acts: "Dionysius, bishop of the Corinthians, a very ancient writer, quoted by Eusebius, writes that Peter and Paul obtained the crown of martyrdom by the command of Nero on the same day." And again: "Some industrious critics have added (to the narrative of Acts) that Paul was acquitted at his first trial by Nero .... This conjecture they make from the 2nd Ep. to Timothy...."

55 The phrase is Chillingworth's (1637), who may be described as a Broad High-churchman.

56 J. Wellhausen, *Einl. in die drei ersten Evangelien* (1905), p. 57.

57 If Luke used Josephus, as F.C. Burkitt and others believe, the later date must be taken; otherwise the earlier date is more probable, as in any case it must fall within the lifetime of a companion of St Paul.

58 It is a curious coincidence that a medieval Jew, R. Abarbanel (Abrabanel), records that the conjunction of these particular planets in this particular constellation was to be a sign of Messiah's coming. It is just conceivable that his statement may ultimately depend on some such ancient tradition as may have been known to Chaldaean magi.

59 If the Passover celebration could be anticipated by one day in a private Jewish family (and we know perhaps too little of Jewish rules in the time of Christ to be able to exclude this possibility), the evidence of the synoptic Gospels would no longer conflict with that of St John.

60 Dr C. Erbes (*Texte and Untersuchungen*, new series, iv. 1) attempts to interpret the evidence of Eusebius in favour of the later date for Festus as follows: Eusebius's date for Festus is to be found in Nero 1, by striking a mean between the Armenian, Claudius 12, and the Latin, Nero 2; it is really to be understood as reckoned, not by years of Nero, but by years of Agrippa; and as Eusebius erroneously antedated Agrippa's reign by five years, commencing it with A.D. 45 instead of A.D. 50, his date for Festus is five years too early also, and should be moved to Nero 6, A.D. 59-60. The whole of this theory appears to the present writer to be a gigantic mare's nest: see *Journal of Theological Studies* (October 1901), pp. 120-123.

61 This date appears to be satisfactorily established by Ramsay, "A Second Fixed Point in the Pauline Chronology," *Expositor*, August 1900.

BIBLE, ENGLISH. The history of the vernacular Bible of the English race resolves itself into two distinctly marked periods—the one being that of Manuscript Bibles, which were direct translations from the Latin Vulgate, the other that of Printed Bibles, which were, more or less completely, translations from the original Hebrew and Greek of the Old and New Testaments.

1. *The Manuscript Bible.*—The first essays in Biblical translation, or rather paraphrasing, assumed in English, as in many other languages, a poetical form. Even in the 7th century, according to the testimony of Bede (*Hist. Eccl.* iv. 24), Cædmon sang "de creatione mundi et origine humani generis, et tota Genesis historia, de egressu Israel ex Aegypto et ingressu in terram repromissionis, de aliis plurimis sacrae Scripturae historiis, de incarnatione Dominica, passione, resurrectione et ascensione in coelum, de Spiritus Sancti adventu, et apostolorum doctrina." It is, however, doubtful whether any of the poetry which has been ascribed to him can claim to be regarded as his genuine work.

Cædmon.

The first prose rendering of any part of the Bible—and with these we are mainly concerned in the present inquiry—originated in all probability in the 8th century, when Bede, the eminent scholar and churchman, translated the first portion (chs. i.-vi. 9) of the Gospel of St John into the vernacular, but no part of this rendering is extant. His pupil Cuthberht recorded this fact in a letter to a fellow-student, Cuthwine: "a capite sancti evangelii Johannis usque ad eum locum in quo dicitur, 'sed haec quid sunt inter tantos?' in nostram linguam ad utilitatem ecclesiae Dei convertit" (Mayor and Lumby, *Bedae Hist. Eccl.* p. 178).

Bede.

The 9th century is characterized by *interlinear glosses on the Book of Psalms*, and towards its close by a few attempts at independent translation. Of these "glossed Psalters" twelve MSS. are known to exist, and they may be ranged into two groups according to the Latin text they represent. The *Roman Psalter* is glossed in the following MSS.: (1) Cotton Vesp. A. 1 (*Vespasian Psalter*); (2) Bodl. Junius 27; (3) Univ. Libr. Camb. Ff. 1. 23; (4) Brit. Mus. Reg. 2. B. 5; (5) Trin. Coll. Camb. R. 17. 1 (*Eadwine's Psalter*); (6) Brit. Mus. Add. 37517. The *Gallican Psalter* in the following: (1) Brit. Mus. Stowe 2 (Spelman's text); (2) Cotton Vitell. E. 18; (3) Cotton Tib. C. 16; (4) Lambeth 48; (5) Arundel 60; (6) Salisbury Cath. 150.[1]

9th and 10th century glosses.

The oldest and most important of these MSS. is the so-called *Vespasian Psalter*, which was written in Mercia in the first half of the 9th century. It was in all probability the original from which all the above-mentioned Old English glosses were derived, though in several instances changes and modifications were introduced by successive scribes. The first verse of Psalm *c.* (Vulg. xcix. 2) may serve as a specimen of these glosses.

Roman Text. MS. Vespasian. A. 1.	*Gallican Text.* MS. Stowe. 2.
Wynsumiað gode, all eorðe ðiowiað Dryhtne in blisse; ingað in gesihðe his in wynsumnisse. *Jubilate Deo, omnis terra;* *servite Domino in laetitia;* *intrate in conspectu eius in* *exultatione.*	Drymað drihtne, eall eorðe; ðeowiað drihtne on blisse; infarað on gesyhðe hys on bliðnysse. *Jubilate Domino, omnis terra;* *Servite Domino in laetitia;* *introite in conspectu eius* *in exultatione.*

To the late 9th or early 10th century a work may be assigned which is in so far an advance upon preceding efforts as to be a real translation, not a mere gloss corresponding word for word with the Latin original. This is the famous *Paris Psalter*,[2] a rendering of the first fifty Psalms (Vulg. i.-l. 10), contained in the unique MS. *lat. 8824* in the Bibliothèque Nationale, Paris. The authorship of this version is doubtful, being by some scholars attributed to King Alfred (d. 901), of whom William of Malmesbury writes (*Gesta Regum Anglorum*, ii. 123), "Psalterium transferre aggressus vix prima parte explicata vivendi finem

fecit." This view is, however, denied by others.

Lindisfarne Gospels.

In the course of the 10th century the Gospels were glossed and translated. The earliest in date is a *Northumbrian Gloss on the Gospels*, contained in a beautiful and highly interesting MS. variously known as the *Durham Book*, the *Lindisfarne Gospels*, or the *Book of St Cuthbert* (MS. Cotton, Nero. D. 4). The Latin text dates from the close of the 7th century, and is the work of Eadfrith, bishop of Lindisfarne (698-721). The English gloss was added about a century and a half later (*c.* 950) by one Aldred, whom Dr Charles O'Conor (*Bibl. Stowensis*, 1818-1819, ii. 180) supposes to have been the bishop of Durham of that name. The Lord's Prayer is glossed in the following way:—

Lindisfarne Gospels.

Matthew vi. 9. Suae ðonne iuih gie bidde fader urer ðu arð
sic ergo uos orabitis + Pater noster qui és

ðu bist in heofnum & in heofnas; sie gehalgad noma ðin;
in caelis; sanctificetur nomen tuum;

(10) to-cymeð ric ðin. sie willo ðin suae is in heofne
adueniat regnum tuum fiat uoluntas tua sicut in caelo

J in eorðo.
et in terra.

(11) hlaf userne oferwistlic sel ús to dæg.
panem nostrum super-substantiale[m] dá nobis hodie.

(12) J forgef us scylda usra suae uoe forgefon scyldgum
et demitte nobis debita nostra sicut nos dimittimus debitoribus

usum.
nostris.

(13) J ne inlæd usih in costunge ah gefrig usich from yfle
et ne inducas nos in temtationem sed libera nos a malo.[3]

Rushworth Version.

Of a somewhat later date is the celebrated *Rushworth Version of the Gospels* (MS. Bodl. Auct. D. ii. 9), which contains an independent translation of the Gospel of St Matthew, and a gloss on those of St Mark, St Luke and St John, founded upon the Lindisfarne glosses. From a note in the manuscript we learn that two men, Færman and Owun, made the version. Færman was a priest at Harewood, or Harwood, in the West Riding of Yorkshire, and to him the best part of the work is due. He translated the whole of St Matthew, and wrote the gloss of St Mark i.-ii. 15, and St John xviii. 1-3. The remaining part, a mere transcript, is Owun's work. The dialect of the translation of St Matthew is Mercian.[4]

West-Saxon Gospels.

A further testimony to the activity which prevailed in the field of Biblical lore is the fact that at the close of the century—probably about the year 1000—the Gospels were rendered anew for the first time in the south of England. Of this version—the so-called *West-Saxon Gospels*—not less than seven manuscripts have come down to us. A note in one of these, MS. Corpus Christi College, Cambridge, 140, states, *ego Ælfricus scripsi hunc librum in Monasterio Baðþonio et dedi Brihtwoldo preposito*, but of this Ælfric and his superior nothing further is known.[5]

The Lord's Prayer is rendered in the following way in these gospels:—

West-Saxon Gospels.—MS Corpus 140.

Matthew vi. 9. Eornustlice gebiddað eow ðus; Fæder úre þu þe. eart on heofonum; si þin nama gehalgod (10) to-becume þin ríce; gewurþe ðin willa on eorðan swa swa on heofonum. (11) úrne gedæghwamlican hlaf syle us to dæg, (12) J forgyf us úre gyltas swa swa wé forgyfað úrum gyltendum. (13) J ne gelaéd þu us on costnunge ac alys us of yfele soþlice.

Ælfric.

Towards the close of the century the Old Testament found a translator in Ælfric (*q.v.*), the most eminent scholar in the close of the 10th and the opening decades of the 11th century. According to his own statement in *De vetere testamento*, written about 1010, he had at that period translated the Pentateuch, Joshua, Judges, Kings, Job, Esther, Judith and the Maccabees.[6] His rendering is clear and idiomatic, and though he frequently abridges, the omissions never obscure the meaning or hinder the easy flow of the narrative.

Dietrich, Ælfric's most competent biographer (Niedner's, *Zeitschrift für historische Theologie*, 1855-1856), looks upon the Pentateuch, Joshua and Judges as a continuation of his *Lives of Saints*, including as they do in a series of narratives the Old Testament saints. Genesis is but slightly abridged, but Job, Kings, Judges, Esther and Judith as well as the Maccabees are mere homilies epitomized from the corresponding Old Testament books. Judith is metrical in form.

The 11th century, with its political convulsions, resulting in the establishment of an alien rule and the partial suppression of the language of the conquered race, was unfavourable to literary efforts of any kind in the vernacular. With the exception of Ælfric's late works at the very dawn of the century, we can only record two transcripts of the West-Saxon Gospels as coming at all within the scope of our inquiry.

In the 12th century the same gospels were again copied by pious hands into the Kentish dialect of the period.

Anglo-Norman Period.

The 13th century, from the point of view of Biblical renderings into the vernacular, is an absolute blank. French—or rather the Anglo-Norman dialect of the period—reigned supreme amongst the upper classes, in schools, in parliament, in the courts of law and in the palace of the king. English lurked in farms and hovels, amongst villeins and serfs, in the outlying country-districts, in the distant monasteries, amongst the lower clergy, amongst the humble and lowly and ignorant. There were certainly renderings of the Bible during the 12th, 13th and early 14th centuries, but they were all in French. Some of these translations were made in England, some were brought over to England and copied and recopied. Amongst the latter was the magnificently illuminated Norman Commentary on the Apocalypse, some of the earliest copies of which were written in an English hand. In fact before the middle of the 14th century the entire Old Testament and the greater part of the New Testament had been translated into the Anglo-Norman dialect of the period. (MSS. Bibl. Nat. fr. 1, 9562, Brit. Mus. Reg. I.C. iii. Cf. S. Berger, *La Bible française au moyen âge*, Paris, 1884, pp. 78 ff.)

14th-century renderings.

When English finally emerged victorious, towards the middle and latter half of the 14th century, it was for all practical purposes a new language, largely intermixed with French, differing from the language of the older period in sound, flexion and structure. It is evident that any Old English versions which might have survived the ravages of time would now be unintelligible, it was equally natural that as soon as French came to be looked upon as an alien tongue, the French versions hitherto in use would fail to fulfil their purpose, and that attempts should again be made to render the Bible into the only language intelligible to the greater part of the nation—into English. It was also natural that these attempts should be made where the need was most pressing, where French had gained least footing, where parliament and court were remote, where intercourse with France was difficult. In fact in the Northern Midlands, and in the North even before the middle of the 14th century, the book of Psalms had been twice rendered into English, and before the end of the same century, probably before the great Wycliffite versions had spread over the country, the whole of the New Testament had

been translated by different hands into one or other of the dialects of this part of the country.

At the same time we can record only a single rendering during the whole century which originated in the south of England, namely the text of James, Peter, 1 John and the Pauline Epistles (edited by A.C. Paues, Cambridge, 1904).

Of these pre-Wycliffite versions possibly the earliest is the *West Midland Psalter*, once erroneously ascribed to William of Shoreham.[7] It occurs in three MSS., the earliest of which, Brit. Mus. Add. 17376, was probably written between 1340 and 1350. It contains a complete version of the book of Psalms, followed by the usual eleven canticles and the Athanasian Creed. The Latin original is a glossed version of the Vulgate, and in the English translation the words of the gloss are often substituted for the strong and picturesque expressions of the Biblical text; in other respects the rendering is faithful and idiomatic. The following two verses of the first psalm may exemplify this:—

MS. British Mus. Add. 17376.

(i. 1.) *Beatus uir, qui non abijt in consilio impiorum, & in uia peccatorum non stetit, et in cathedra ·i· iudicio pestilencie ·i· falsitatis non sedit.* Blesced be þe man þat ȝede nouȝt in þe counseil of wicked, ne stode nouȝt in þe waie of sinyeres, ne sat nouyt in fals iugement. (2) *Set in lege domini uoluntas eius, & in lege eius meditabitur die ac nocte.* Ac hijs wylle was in þe wylle of oure Lord, and he schal þenche in hijs lawe boþe daye and nyȝt.

Richard Rolle.

Before the middle of the century Richard Rolle (*q.v.*), the hermit of Hampole (+ 1349), turned into English, with certain additions and omissions, the famous *Commentary on the Psalms* by Peter Lombard. The work was undertaken, as the metrical prologue of one of the copies tells us (MS. Laud. misc. 286), "At a worthy recluse prayer, cald dame Merget Kyrkby." The Commentary gained immediate and lasting popularity, and spread in numerous copies throughout the country, the peculiarities of the hermit's vigorous northern dialect being either modified or wholly removed in the more southerly transcripts. The translation, however, is stiff and literal to a fault, violating idiomatic usage and the proper order of words in its strict adherence to the Latin. The following brief extracts may exemplify the hermit's rendering and the change the text underwent in later copies.[8]

MS. Univ. Coll. 64.

(i. 1.) Blisful man þe whilk oway ged noght in þe counsaile of wicked, and in þe way of synful stode noght, & in þe chaiere of pestilens he noght sate. (2) Bot in laghe of lord þe will of him; and in his laghe he sall thynke day & nyght.

MS. Reg. 18 B. 21

Blessed is þat man þat haþ not gone in þe counsell of wicked men, and in þe weye of sinfull men haþ not stonde, and in þe chaire of pestilence sat not. 2. But in þe lawe of our lorde is þe will of him; and [in] his lawe we shall þinke day and nyght.

Approximately to the same period as these early renderings of the Psalter belongs a version of the *Apocalypse with a Commentary*, the earliest MS. of which (Harleian 874) is written in the dialect of the North Midlands. This Commentary, for a long time attributed to Wycliffe, is really nothing but a verbal rendering of the popular and widely-spread Norman Commentary on the Apocalypse (Paul Meyer and L. Delisle, *L'Apocalypse en Français au XIII^e siècle*, Paris, 1901), which dates back as far as the first half of the 13th century, and in its general tenor represents the height of orthodoxy. The English apocalypse, to judge from the number of MSS. remaining, must have enjoyed great and lasting popularity. Several revisions of the text exist, the later of which present such striking agreement with the later Wycliffite version that we shall not be far wrong if we assume that they were made use of to a considerable extent by the revisers of this version.

To the North Midlands or the North belongs further a complete version of the *Pauline Epistles* found in the unique MS. 32, Corpus Christi College, Cambridge, of the 15th century.

Commentaries on the Gospels of St Matthew, St Mark and St Luke, we are told by the heading in one of the MSS. (Univ. Libr. Camb. Ii. 2. 12), were also translated into English by "a man of þe north cuntre." The translation of these Gospels as well as of the Epistles referred to above is stiff and awkward, the translator being evidently afraid of any departure from the Latin text of his original. The accompanying commentary is based on the Fathers of the Church and entirely devoid of any original matter. The opening lines of the third chapter of Matthew are rendered in the following way:—

MS. Camb. Univ. Libr. Ii. 2. 12.

(iii. 1.) In þo dayes come Ihone baptist prechand in desert of þe Iewry, & seyand, (2) Do ȝe penaunce; forwhy þe kyngdome of heuyne sal come negh. (3) Þis is he of whome it was seide be Isay þe prophete, sayand, "þe voice of þe cryand in þe desert, redye ȝe þe way of God, right made ȝe þe lityl wayes of him." (4) & Ihone his kleþing of þe hoerys of camels, & a gyrdyl of a skyn about his lendys; & his mete was þe locust & hony of þe wode.

A version of the *Acts and the Catholic Epistles* completes the number of the New Testament books translated in the northern parts of England. It is found in several MSS. either separately or in conjunction with a fragmentary *Southern Version of the Pauline Epistles, Peter, James and 1 John* in a curiously compiled volume, evidently made, as the prologue tells us, by a brother superior for the use and edification of an ignorant "sister," or woman vowed to religion.[9] The translation of this, our only southern text, surpasses all previous efforts from the point of view of clearness of expression and idiomatic use of English, and, though less exact, it may be even said in these respects to rank equal with the later or revised Wycliffite version.

Apart from these more or less complete versions of separate books of the Bible, there existed also numerous renderings of the Lord's Prayer, the Ten Commandments, accounts of the Life, Passion and Resurrection of our Lord, translations of the epistles and gospels used in divine service, and other means of familiarizing the people with Holy Scripture. It was the custom of the medieval preachers and writers to give their own English version of any text which they quoted, not resorting as in later times to a commonly received translation. This explains the fact that in collections of medieval homilies that have come down to us, no two renderings of the Biblical text used are ever alike, not even Wyclilfe himself making use of the text of the commonly accepted versions that went under his name.

It is noteworthy that these early versions from Anglo-Saxon times onwards were perfectly orthodox, executed by and for good and faithful sons of the church, and, generally speaking, with the object of assisting those whose knowledge of Latin proved too scanty for a proper interpretation and understanding of the holy text. Thus Richard Rolle's version of the Psalms was executed for a nun; so was in all likelihood the southern version of the epistles referred to above. Again the earliest MS. (Harl. 874) of the Commentary on the Apocalypse gives the owner's name in a coeval hand as "Richard Schepard, *presbiter*," and the Catholic Epistles of MS. Douce 250[10] were probably glossed for the benefit of men in religious orders, if one may judge from a short Commentary to James ii. 2, "& þerfore if eny man come into youre siȝt, *þat is, into youre cumpenye þat beþ Godes religiouse men in what degre so ȝe be.*" Nor do any of the remaining works contain anything but what is strictly orthodox.

The Wycliffite Versions.

It is first with the appearance of Wycliffe (*q.v.*) and his followers on the arena of religious controversy that the Bible in English came to be looked upon with suspicion by the orthodox party within the Church. For it is a well-known fact that Wycliffe proclaimed the Bible, not the Church or Catholic tradition, as a man's supreme spiritual authority, and that he sought in consequence by every means in his power to spread the knowledge of it among the people. It is, therefore, in all likelihood to the zeal of Wycliffe and his followers that we owe the two noble 14th-century translations of the Bible which tradition has always associated with his name, and which are the earliest complete renderings that we possess of the Holy Scriptures into English.[11]

The first of these, the so-called *Early Version*, was probably completed about 1382, at all events before 1384, the year of Wycliffe's death. The second, or *Later Version*, being a thorough revision of the first, is ascribed to the year 1388 by Sir Frederic Madden and the Rev. Joshua Forshall in their edition of these two versions.[12]

It is a matter of uncertainty what part, if any, Wycliffe himself took in the work. The editors of the Wycliffite versions say in the Preface, pp. xv. ff.—"The New Testament was naturally the first object. The text of the Gospels was extracted from the Commentary upon them by Wycliffe, and to these were added the Epistles, the Acts and the Apocalypse, all now translated anew. This translation might probably be the work of Wycliffe himself; at least the similarity of style between the Gospels and the other parts favours the supposition." The Wycliffite authorship of the Commentaries on the Gospels, on which the learned editors base their argument, is, however, unsupported by any evidence beyond the fact that the writer of the Prologue to Matthew urges in strong language "the propriety of translating Scripture for the use of the laity." The Biblical text found in these Commentaries is in fact so far removed from the original type of the Early Version as to be transitional to the Late, and, what is still more convincing, passages from the Early Version, from both the Old Testament and the New Testament, are actually quoted in the Commentary. Under such circumstances it would be folly to look upon them as anything but late productions, at all events later than the Early Version, and equal folly to assign these bulky volumes to the last two years of Wycliffe's life merely because the text used in them happens to be that of the Early Version. It is therefore at present impossible to say what part of the Early Version of the New Testament was translated by Wycliffe.[13]

The Old Testament of the Early Version was, according to the editors (Preface, p. xvii.), taken in hand by one of Wycliffe's coadjutors, Nicholas de Herford. The translator's original copy and a coeval transcript of it are still extant in the Bodleian library (Bodl. 959, Douce 360). Both break off abruptly at Baruch iii. 19, the latter having at this place a note inserted to the following effect: *Explicit translacionem Nicholay de herford*. There is consequently but little doubt that Nicholas de Herford took part in the translation of the Old Testament, though it is uncertain to what extent. The translator's copy is written in not less than five hands, differing in orthography and dialect. The note may therefore be taken to refer either to the portion translated by the last or fifth hand, or to the whole of the Old Testament up to Baruch iii. 19. Judging from uniformity of style and mode of translation the editors of the Bible are inclined to take the latter view; they add that the remaining part of the Old Testament was completed by a different hand, the one which also translated the New Testament. This statement is, however, not supported by sufficient evidence. In view of the magnitude of the undertaking it is on the contrary highly probable that other translators besides Wycliffe and Nicholas de Herford took part in the work, and that already existing versions, with changes when necessary, were incorporated or made use of by the translators.

The Early Version, apart from its completeness, shows but little advance upon preceding efforts. It is true that the translation is more careful and correct than some of the renderings noticed above, but on the other hand it shares all their faults. The translation of the Old Testament as far as Baruch iii. 19 is stiff and awkward, sometimes unintelligible, even nonsensical, from a too close adherence to the Latin text (*e.g.* Judges xx. 25). In the remaining parts the translation is somewhat easier and more skilful, though even here Latinisms and un-English renderings abound.

It is small wonder, therefore, if a revision was soon found necessary and actually taken in hand within a few years of the completion of the Earlier Version. The principles of work adopted by the revisers are laid down in the general prologue to their edition, the so-called "Later Version."

> For these resons and orhere ... a symple creature hath translatid the bible out of Latyn into English. First, this symple creature hadde myche traueile, with diuerse felawis and helperis, to gedere manie elde biblis, and othere doctouris, and comune glosis, and to make oo Latyn bible sumdel trewe; and thanne to studie it of the newe, the text with the glose, and othere doctouris, as he mi3te gete, and speciali Lire on the elde testament, that helpide ful myche in this work; the thridde tyme to counseile with elde gramariens, and elde dyuynis, of harde wordis, and harde sentencis, hou tho mi3ten best be vndurstonden and translatid; the iiij tyme to translate as cleerli as he coude to the sentence, and to haue manie gode felawis and kuonynge at the correcting of the translacioun.

It is uncertain who the revisers were; John Purvey, the leader of the Lollard party after Wycliffe's death, is generally assumed to have taken a prominent part in the work, but the evidence of this is extremely slight (cf. Wycl. Bible, Preface, oo. xxv. f.). The exact date of the revision is also doubtful: the editors of the Wycliffe Bible, judging from the internal evidence of the Prologue, assume it to have been finished about 1388. This Revised or Later Version is in every way a readable, correct rendering of the Scriptures, it is far more idiomatic than the Earlier, having been freed from the greater number of its Latinisms; its vocabulary is less archaic. Its popularity admits of no doubt, for even now in spite of neglect and persecution, in spite of the ravages of fire and time, over 150 copies remain to testify to this fact. The following specimens of the Early and Late Versions will afford a comparison with preceding renderings:—

Early Version.

(Psalm i. 1.) Blisful the man, that went not awei in the counseil of vnpitouse, and in the wei off sinful stod not; and in the chayer of pestilence sat not. (2) But in the lawe of the Lord his wil; and in the lawe of hym he shal sweteli thenke dai and ny3t.

(Matthew iii. 1.) In thilke days came Ioon Baptist, prechynge in the desert of Iude, sayinge, (2) Do 3e penaunce, for the kyngdom of heuens shal nei3, *or cume ni3e*. (3) Forsothe this is he of whome it is said by Ysaye the prophet. A voice of a cryinge in desert, Make 3e redy the wayes of the Lord; Make 3e ri3tful the pathes of hym. (4) Forsothe that ilk Ioon hadde cloth of the heeris of cameylis, and a girdil of skyn aboute his leendis; sothely his mete weren locustis, and hony of the wode.

Late Version.

(i. 1.) Blessid *is* the man, that 3ode not in the councel of wickid men; and stood not in the weie of synneris, and sat not in the chaier of pestilence. (2) But his wille *is* in the lawe of the Lord; and he schal bithenke in the lawe of hym dai and ny3t.

(iii. 1.) In tho daies Ioon Baptist cam, and prechide in the desert of Iudee, and seide, (2) Do 3e penaunce, for the kyngdom of heuenes shal nei3e. (3) For this is he, of whom it is seid bi Ysaie, the prophete, seyinge, A vois of a crier in desert, Make 3e redi the weies of the Lord; make 3e ri3t the pathis of hym. (4) And this Ioon hadde clothing of camels heeris, and a girdil of skynne aboute his leendis; and his mete was honysoukis and hony of the wode.

The Lollards.

The 15th century may well be described as the *via dolorosa* of the English Bible as well as of its chief advocates and supporters, the Lollards. After the death of Wycliffe violence and anarchy set in, and the Lollards came gradually to be looked upon as enemies of order and disturbers of society. Stern measures of suppression were directed not only against them but against "Goddis Lawe," the book for which they pleaded with such passionate earnestness. The bishops' registers bear sufficient testimony to this fact.[14] It would appear, however, as if at first at all events the persecution was directed not so much against the Biblical text itself as against the Lollard interpretations which accompanied it. In a convocation held at Oxford under Archbishop Arundel in 1408 it was enacted "that no man hereafter by his own authority translate any text of the Scripture into English or any other tongue, by way of a book, booklet, or tract; and that no man read any such book, booklet, or tract, now lately composed in the time of John Wycliffe or since, or hereafter to be set forth in part or in whole, publicly or privately, upon pain of greater excommunication, until the said translation be approved by the ordinary of the place, or, if the case so require, by the council provincial. He that shall do contrary to this shall likewise be punished as a favourer of heresy and error."[15]

It must be allowed that an enactment of this kind was not without justification. The Lollards, for instance, did not hesitate to introduce into certain copies of the pious and orthodox Commentary on the Psalms by the hermit of Hampole interpolations of their own of the most virulently controversial kind (MSS. Trin. Coll. Camb. B.V. 25, Brit. Mus. Reg. 18. C. 26, &c.), and although the text of their Biblical versions was faithful and true, the General Prologue of the Later Version was interlarded with controversial matter. It is small wonder if the prelates and priests sought to repress such trenchant criticism of their lives and doctrines as appeared more especially in the former work, and probably in many others which since have perished in "faggots

and burning."

For all this, manuscripts of Purvey's Revision were copied and re-copied during this century, the text itself being evidently approved by the ecclesiastical authorities, when in the hands of the right people and if unaccompanied by controversial matter.

Of the Lollard movement in Scotland but little is known, but a curious relic has come down to our times in the shape of a New Testament of Purvey's Revision in the Scottish dialect of the early 16th century. The transcriber was in all probability a certain Murdoch Nisbet, who also showed his reforming tendencies by adding to it a rendering of Luther's Prologue to the New Testament.[16]

2. The Printed Bible.—It is singular that while France, Spain, Italy, Bohemia and Holland possessed the Bible in the vernacular before the accession of Henry VIII., and in Germany the Scriptures were printed in 1466 and seventeen times reprinted before Luther began his great work, yet no English printer attempted to put the familiar English Bible into type. No part of the English Bible was printed before 1525, no complete Bible before 1535, and none in England before 1538. 898

Versions of the Scriptures so far noticed were all secondary renderings of the Vulgate, translations of a translation. It was only with the advent of the "new learning" in England that a direct rendering from the originals became possible. Erasmus in 1516 published the New Testament in Greek, with a new Latin version of his own; the Hebrew text of the Old Testament had been published as early as 1488.

William Tyndale.

The first to take advantage of these altered conditions was William Tyndale (*q.v.*), "to whom," as Dr Westcott says,[17] "it has been allowed more than to any other man to give its characteristic shape to the English Bible." Of Tyndale's early life but little is known. Be it enough for our purpose to say that he thoroughly saturated his mind with the "new learning," first at Oxford, where in 1515 he was admitted to the degree of M.A., and then in Cambridge, where the fame of Erasmus still lingered. Before the beginning of 1522 we find Tyndale as chaplain and tutor in the family of Sir John Walsh of Old Sodbury in Gloucestershire. He was there constantly involved in theological controversies with the surrounding clergy, and it was owing to their hostility that he had to leave Gloucestershire. He then resolved to open their eyes to the serious corruptions and decline of the church by translating the New Testament into the vernacular. In order to carry out this purpose he repaired in July or August 1523 to London, and to the famous protector of scholars and scholarship, Bishop Cuthbert Tunstall. His reception was, however, cold, the bishop advising him to seek a livelihood in the town. During a year of anxious waiting, it became clear to him "not only that there was no rowme in my lorde of londons palace to translate the new testament, but also that there was no place to do it in all englonde."[18] In May 1524 he consequently betook himself to Hamburg, his resolution to carry out his great work never for a moment flagging, and it was probably during his stay in this free city and in Wittenberg, where he may have been stimulated by Luther, that his translation of the New Testament was actually made. At all events there is no doubt that in 1525 he was in Cologne, engaged in printing at the press of Peter Quentel a quarto edition of the New Testament. This edition was provided with prefaces and marginal glosses. He had advanced as far as the tenth sheet, bearing the signature K, when his work was discovered by Johann Cochlaeus (*q.v.*), a famous controversialist and implacable enemy of the Reformation, who not only caused the Senate of Cologne to prohibit the continuation of the printing, but also communicated with Henry VIII. and Wolsey, warning them to stop the importation of the work at the English seaports. Tyndale and his assistant, William Roye, managed, however, to escape higher up the Rhine to Worms, and they succeeded in carrying with them some or all of the sheets which had been printed. Instead of completing Quentel's work, Peter Schoeffer, the Worms printer, was employed to print another impression of 3000 in a small octavo size, without prefaces to the books or annotations in the margin, and only having an address "To the Reder" at the end in addition to the New Testament itself. Two impressions, the quarto having possibly been completed by Schoeffer, arrived in England early in the summer of 1526, and were eagerly welcomed and bought. Such strong measures of suppression were, however, at once adopted against these perilous volumes, that of the quarto only a single fragment remains (Matt, i.-xxii. 12), now preserved in the British Museum (Grenville, 12179),[19] of the octavo only one perfect copy (the title-page missing) in the Baptist College at Bristol,[20] and one imperfect in the library of St Paul's cathedral.

But Tyndale continued his labours undaunted. In 1529 the manuscript translation of Deuteronomy is mentioned as having perished with his other books and papers in a shipwreck which he suffered on the coast of Holland, on his way to Hamburg. In 1530, however, the whole of the *Pentateuch* was printed in Marburg by Hans Luft; it is provided with prefaces and marginal annotations of a strongly controversial character. The only perfect copy is preserved in the Grenville library of the British Museum.[21] It was reissued in 1534 with a new preface and certain corrections and emendations in Genesis, and again in London in 1551.

In 1531 the *Book of Jonah* appeared with an important and highly interesting prologue, the only copy known of which is in the British Museum.[22]

Meanwhile the demand for New Testaments, for reading or for the flames, steadily increased, and the printers found it to their advantage to issue the Worms edition of the New Testament in not less than three surreptitious reprints before 1534. This is testified by George Joye in his *Apology*, who himself brought out a fourth edition of Tyndale's New Testament in August 1534, freed from many of the errors which, through the carelessness of the Flemish printers, had crept into the text, but with such alterations and new renderings as to arouse the indignation of Tyndale. The only remaining copy, a 16mo, is in the Grenville library. To counteract and supersede all these unauthorized editions, Tyndale himself brought out his own revision of the New Testament with translations added of all the *Epistles of the Old Testament* after the use of Salisbury. It was published in November 1534 at Antwerp by Martin Emperowr. Prologues were added to all books except the Acts and the Apocalypse, and new marginal glosses were introduced. Three copies of this edition are in the British Museum, and it was reprinted in 1841 in Bagster's *Hexapla*. In the following year Tyndale once more set forth a revised edition, "fynesshed in the yere of oure Lorde God A.M.D. and XXXV.," and printed at Antwerp by Godfried van der Haghen.[23] In this headings were added to the chapters in the Gospels and the Acts, and the marginal notes of the edition of 1534 were omitted. It is chiefly noted for the peculiarities of its orthography. Of this edition one copy is in the University library, Cambridge, a second in Exeter College, Oxford, and a fragment in the British Museum. It is supposed to have been revised by Tyndale while in prison in the castle of Vilvorde, being the last of his labours in connexion with the English Bible. His execution took place on the 6th of October 1536, and about the same time a small folio reprint of his revised edition of 1534 was brought out in England, the first volume of Scripture printed in this country, probably by T. Berthelet.[24] A perfect copy is found in the Bodleian library. In later years, between 1536 and 1550, numerous editions of Tyndale's New Testament were printed, twenty-one of which have been enumerated and fully described by Francis Fry.[25]

"The history of our English Bible begins with the work of Tyndale and not with that of Wycliffe," says Dr Westcott in his *History of the English Bible*, p. 316, and it is true that one of the most striking features of the work of Tyndale is its independence. Attempts have been made to show that especially in the Old Testament he based a great deal of his work on the Wycliffite translations, but in face of this we have his own explicit statement, "I had no man to counterfet, nether was holpe with englysshe of eny that had interpreted the same (*i.e.* the New Testament), or soche lyke thīge ī the scripture beforetyme."[26] 899

He translated straight from the Hebrew and Greek originals, although the Vulgate and more especially Erasmus's Latin version were on occasion consulted. For his prefaces and marginal notes he used Luther's Bible freely, even to paraphrasing or verbally translating long passages from it.

Apart from certain blemishes and awkward and even incorrect renderings, Tyndale's translation may be described as a truly noble work, faithful and scholarly, though couched in simple and popular language. Surely no higher praise can be accorded to it than that it should have been taken as a basis by the translators of the Authorized Version, and thus have lived on through the centuries up to the present day.

The following specimens may prove of interest:—

The thryde Chapter.

(Matthew iii. 1-4.) In those dayes Ihon the baptyser cam and preached in the wyldernes of Iury, saynge, Repent, the kyngedom of heven ys at hond. Thys ys he of whom it ys spoken be the prophet Isay, whych sayth: the voice of a cryer in wyldernes, prepaire ye the lordes waye, and make hys pathes strayght. Thys Ihon had hys garment of camelles heere, and a gyrdyll of a skynne about hys loynes. Hys meate was locustes * and wyldhe ony.

* "Locustes are more then oware greshoppers, souche men vse to eate in divres parties of the est" (marginal note).

(Matthew vi. 9-13.) O oure father which art in heven, halewed be thy name. Let thy kingdom come. Thy wyll be fulfilled, as well in erth, as hit ys in heven. Geve vs this daye oure dayly breade. And forgeve vs oure treaspases, even as we forgeve them whych treaspas vs. Lede vs nott in to temptacion, but delyvre vs from yvell. Amen. (Grenville 12179.)

Miles Coverdale.

Meanwhile a complete English Bible was being prepared by Miles Coverdale (*q.v.*), an Augustinian friar who was afterwards for a few years (1551-1553) bishop of Exeter. As the printing was finished on the 4th of October 1535 it is evident that Coverdale must have been engaged on the preparation of the work for the press at almost as early a date as Tyndale. Foxe states (*op. cit.* v. 120) that Coverdale was with Tyndale at Hamburg in 1529, and it is probable that most of his time before 1535 was spent abroad, and that his translation, like that of Tyndale, was done out of England.

In 1877 Henry Stevens, in his catalogue of the Caxton Exhibition, pointed out a statement by a certain Simeon Ruytinck in his life of Emanuel van Meteren, appended to the latter's *Nederlandische Historie* (1614), that Jacob van Meteren, the father of Emanuel, had manifested great zeal in producing at Antwerp a translation of the Bible into English, and had employed for that purpose a certain learned scholar named Miles Conerdale (*sic*). In 1884 further evidence was adduced by W.J.C. Moens, who reprinted an affidavit signed by Emanuel van Meteren, 28 May 1609, to the effect that "he was brought to England *anno* 1550 ... by his father, a furtherer of reformed religion, and he that caused the first Bible at his costes to be Englisshed by Mr Myles Coverdal in Andwarp, the w'h his father, with Mr Edward Whytchurch, printed both in Paris and London" (*Registers of the Dutch Reformed Church, Austin Friars*, 1884, p. xiv.). Apart from the reference to Whytchurch and the place of printing, this statement agrees with that of Simeon Ruytinck, and it is possible that van Meteren showed his zeal in the matter by undertaking the cost of printing the work as well as that of remunerating the translator. Mr W. Aldis Wright, however, judging from the facts that the name of Whytchurch was introduced, that the places of printing were given as London and Paris, not Antwerp, and lastly that Emanuel van Meteren being born in 1535 could only have derived his knowledge from hearsay, is inclined to think that the Bible in which J. van Meteren was interested "was Matthew's of 1537 or the Great Bible of 1539, and not Coverdale's of 1535."[27]

It is highly probable that the printer of Coverdale's Bible was Christopher Froschouer of Zürich,[28] who printed the edition of 1550, and that the sheets were sent for binding and distribution to James Nicolson, the Southwark printer.[29] This first of all printed English Bibles is a small folio in German black letter, bearing the title: "*Biblia, The Bible*; that is, the Holy Scripture of the Olde and New Testament, faithfully and truly translated out of Douche (German) and Latyn into Englishe, M.D.XXXV." The volume is provided with woodcuts and initials, the title-page and preliminary matter in the only two remaining copies (British Museum and Holkam Hall) being in the same type as the body of the book. A second issue of the same date, 1535, has the title-page and the preliminary matter in English type, and omits the words "out of Douche and Latyn"; a third issue bears the date 1536. A second edition in folio, "newly oversene and corrected," was printed by Nicolson, with English type, in 1537; and also in the same year, a third edition in quarto. On the title-page of the latter were added the significant words, "set forth with the Kynge's moost gracious licence."

Coverdale, however, was no independent translator. Indeed, he disavows any such claim by stating expressly, in his dedication to the king, "I have with a cleare conscience purely & faythfully translated this out of fyue sundry interpreters, hauyng onely the manyfest trueth of the scripture before myne eyes," and in the Prologue he refers to his indebtedness to "The Douche (German) interpreters: whom (because of theyr synguler gyftes and speciall diligence in The Bible) I haue ben the more glad to folowe for the most parte, accordynge as I was requyred."[30] These "fyue interpreters" Dr Westcott (*ibid.* p. 163) identifies as Luther, the Zürich Bible, the Latin version of Pagninus, the Vulgate, and, in all likelihood, the English translation of Tyndale.

Though not endowed with the strength and originality of mind that characterized Tyndale's work, Coverdale showed great discrimination in the handling and use of his authorities, and moreover a certain delicacy and happy ease in his rendering of the Biblical text, to which we owe not a few of the beautiful expressions of our present Bible.

The following extracts from the edition of 1535 may serve as examples of his rendering:—

The first psalme.

(i. 1-2.) Blessed is þe man, þe goeth not in the councell of þe ungodly: þe abydeth not in the waye off synners, & sytteth not in þe seate of the scornefull. But delyteth in the lawe of þe Lorde, & exercyseth himself in his lawe both daye and night.

The gospell of S. Mathew.

(iii. 1-4.) In those dayes Ihon the Baptyst came and preached in the wildernes of Jury, saynge: Amende youre selues, the kyngdome of heuen is at honde. This is he, of whom it is spoken by the prophet Esay, which sayeth: The voyce of a cryer in þe wyldernes, prepare the *Lordes* waye, and make his pathes straight. This Ihon had his garment of camels heer, and a lethren gerdell aboute his loynes. Hys meate was locustes and wylde hony.

It should be added that Coverdale's Bible was the first in which the non-canonical books were left out of the body of the Old Testament and placed by themselves at the end of it under the title *Apocripha*.

Matthew's Bible.

The large sale of the New Testaments of Tyndale, and the success of Coverdale's Bible, showed the London booksellers that a new and profitable branch of business was opened out to them, and they soon began to avail themselves of its advantages. Richard Grafton and Edward Whitchurch were the first in the field, bringing out a fine and full-sized folio in 1537, "truely and purely translated into English by Thomas Matthew." Thomas Matthew, is, however, in all probability, an alias for John Rogers, a friend and fellow-worker of Tyndale, and the volume is in reality no new translation at all, but a compilation from the renderings of Tyndale and Coverdale. Thus the Pentateuch and the New Testament were reprinted from Tyndale's translations of 1530 and 1535 respectively, with very slight variations; the books from Joshua to the end of Chronicles are traditionally, and lately also by external evidence,[31] assigned to Tyndale and were probably left by him in the hands of Rogers. From Ezra to Malachi the translation is taken from Coverdale, as is also that of the Apocryphal books. John Roger's own work appears in a marginal commentary distributed through the Old and New Testaments and chiefly taken from Olivetan's French Bible of 1535. The volume was printed in black letter in double columns, and three copies are preserved in the British Museum. In 1538 a second edition in folio appeared; it was reprinted twice in 1549, and again in 1551. It is significant that this Bible, like Coverdale's second edition, was "set forth with the kinges most gracyous lycence," probably with the concurrence of Cranmer, since he, in a letter to Cromwell, begged him to "exhibit the book unto the king's highness, and to obtain of his grace ... a licence that the same may be sold and read of every person, without danger of any act, proclamation or ordinance, heretofore granted to the contrary."[32] And thus it came to pass, as Dr Westcott strikingly puts it, that "by Cranmer's petition, by Crumwell's influence, and by Henry's authority, without any formal ecclesiastical decision, the book was given to the English people, which is the foundation of the text of our present Bible. From Matthew's Bible—itself a combination of the labours of Tyndale and Coverdale—all later revisions have been successively formed" (*op. cit.* p. 71).

Meanwhile the successful sale of Matthew's Bible, the private venture of the two printers Grafton and Whitchurch, was threatened by a rival edition published in 1539 in folio and quarto by "John Byddell for Thomas Barthlet" with Richard Taverner as editor. This was, in fact, what would now be called "piracy," being Grafton's *Matthew Bible* revised by Taverner, a learned member of the Inner Temple and famous Greek scholar. He made many alterations in the Matthew Bible, characterized by critical acumen and a happy choice of strong and idiomatic expressions. He is, perhaps, the first purist among the Biblical translators, endeavouring, whenever possible, to substitute a word of native origin for the foreign expression of his predecessors.[33] His revision seems, however, to have had little or no influence on subsequent translators, and was only once, in 1549, reprinted in its entirety. Quarto and octavo editions of the New Testament alone were published in the same year, 1539, as the original edition, and in the following year, 1540, the New Testament in duodecimo. The Old Testament was reprinted as part of a Bible in 1551, but no other editions are known than those named.

Taverner.

It will have been observed that the translations of Holy Scripture which had been printed during these years (1525-1539) were all made by private men and printed without any public authority. Some of them had indeed been set forth by the king's licence, but the object of this is shown by the above-quoted letter of Archbishop Cranmer to Cromwell, touching Matthew's Bible. It is "that the same may be sold and read of every person ... until such time that we, the bishops, shall set forth a better translation, which I think will not be till a day after doomsday." This letter was written on the 4th of August 1537, and the impatient words at the end refer to an authorized version which had been projected several years before, and which was, in fact, at that very time in preparation, though not proceeding quickly enough to satisfy Cranmer. In the year 1530, Henry VIII. had issued a commission of inquiry respecting the expediency and necessity of having "in the English tongue both the New Testament and the Old" (Wilkins' *Concilia*, iii. 737). This commission reported against the expediency of setting forth a vernacular translation until there was a more settled state of religious opinion, but states that the king "intended to provide that the Holy Scripture shall be, by great, learned and Catholic persons, translated into the English tongue if it shall then seem to His Grace convenient to be" (*ib.* 740). The Convocation of Canterbury refreshed the royal memory on the subject by petitioning the king on the 19th of December 1534 "that His Majesty would vouchsafe to decree, that the Scriptures should be translated into the vulgar tongue ... and ... delivered to the people according to their learning" (*ibid.* 770). The subject was again before Convocation in 1536,[34] but the detailed history is lost to us—all that is known being that Cromwell had placed Coverdale at the head of the enterprise, and that the result was an entirely new revision, based on Matthew's Bible.[35] Coverdale consulted in his revision the Latin version of the Old Testament with the Hebrew text by Sebastian Münster, the Vulgate and Erasmus's editions of the Greek text for the New Testament.

The Great Bible, 1539.

Concerning the printing of this authorized Bible more details are known. Cromwell had planned the work on a large scale, too large evidently for the resources of the English presses, for it was determined that the printing should be entrusted to Francis Regnault, a famous Paris printer. At the request of Henry VIII., a licence was granted to Regnault for this purpose by Francis I., while Coverdale and Grafton were sent over in 1538 to superintend the work as it passed through the press. The work was pressed forward with all speed, for, as Coverdale writes to Cromwell, they were "dayly threatened" and ever feared "to be spoken withall."[36] Indeed, when the printing was far advanced, on the 17th of December 1538, its further progress was interdicted by the Inquisitor-general for France, and orders were given to seize the whole of the impression. Coverdale and Grafton left Paris quickly, but soon returned, rescued a great number of the finished sheets, "four great dry-vats" full of them having been sold to a haberdasher instead of being burnt—and conveyed types, printing-presses and workmen to England. Thus the volume which had been begun in Paris in 1538 was completed in London, the colophon stating that it was "Fynisshed in Apryll, *Anno* M.CCCCC.XXXIX." It is a splendid folio Bible of the largest volume, and was distinguished from its predecessors by the name of *The Great Bible*. The title-page represents Henry VIII. giving the "Word of God" to Cromwell and Cranmer, who, in their order, distribute it to laymen and clerics, and describes the volume as "truly translated after the veryte of the Hebreue and Greke texts by þe dylygent studye of dyverse excellent learned men, expert in the forsayde tongues. Prynted by Rychard Grafton and Edward Whitchurch." "Certain godly annotations," which Coverdale promised in the Prologue, did not, however, appear in the first issue, nor in any of the following. This was the first of seven editions of this noble Bible which issued from the press during the years 1539-1541,—the second of them, that of 1540, called *Cranmer's Bible* from the fact that it contained a long Preface by Archbishop Cranmer, having the important addition "This is the Byble apoynted to the vse of the churches" on the title-page. Seventy years afterwards it assumed the form ever since known as the *Authorized Version*, but its Psalter is still embedded, without any alteration, in the Book of Common Prayer.

For the sake of comparison the following extracts from St Matthew are given, according to the edition of 1539.

> (Matthew iii. 1-4.) In those dayes came Iohn the Baptyst, preaching in the wyldernes of Iewry, saying, Repent of the life that is past, for the kyngdome of heauen is at hande, For thys is he, of whom the prophet Esay spake, which sayeth, the voyce of a cryer in the wyldernes, prepare ye the waye of the lorde: make hys pathes straygh. Thys Iohn had hys garment of camels heer And a gyrdell of a skynne aboute hys loynes. His meate was locustes and wylde hony.

> (Matthew vi. 9-13.) Oure father which art in heauen, halowed be thy name. Let thy kingdome come. Thy will be fulfilled, as well in erth, as it is in heuen. Geue vs this daye oure dayly bred. And forgeue vs oure dettes, as we forgeue oure detters. And leade vs not into temptation: but delyuer vs from euyll. For thyne is the kyngdom and the power, and the glorye for euer. Amen.

Meanwhile the closing years of Henry VIII.'s reign were characterized by restrictive measures as to the reading and use of the Bible. Tyndale Version was prohibited by an act of parliament, 1543; at the same time it was enacted that all notes and marginal commentaries in other copies should be obliterated, and that "no woman (unless she be a noble or gentle woman), no artificers, apprentices, journeymen, servingmen, under the degree of yeomen ... husbandmen or labourers" should read or use any part of the Bible under pain of fines and imprisonment.[37]

In 1546 Coverdale's Bible was included in the proscription, the *Great Bible* being the only translation not interdicted. During Edward VI.'s reign there was a brief respite, but with the accession of Mary the persecutions of the English Bible and its friends were renewed. Cranmer suffered martyrdom at the stake, as John Rogers had done before him. Other prominent reformers, amongst them Coverdale, sought refuge in Geneva, the town of Calvin and Beza, where they employed their enforced leisure in planning and carrying out a new revision of the Bible. The first fruits of these labours was a New Testament issued in June 1557, with an introduction by Calvin, probably the work of William Whittingham.[38] The volume, in a convenient quarto size, printed in clear Roman type, and provided with marginal annotations, gained immediate popularity in England, where a Bible suited for household demands had long been needed. It was the first Bible which had the text divided into "verses and sections according to the best editions in other languages."[39]

William Whittingham.

Whittingham's enterprise was, however, soon superseded by an issue of the whole Bible, which appeared in 1560, the so-called *Genevan Bible*, popularly also known as the *Breeches Bible*, from its rendering of Gen. iii. 7, "They sewed fig leaves together and made themselves breeches." This edition was mainly due to the combined efforts of William Whittingham, Anthony Gilby and Thomas Sampson, and the expenses towards printing and publication were borne by members of the congregation at Geneva. It represented in the Old Testament a thorough and independent revision of the text of the *Great Bible* with the help of the Hebrew original, the Latin versions of Leo Judä (1543), Pagninus (1528), Sebastian Münster (1534-1535), and the French versions of Olivetan. The New Testament consisted of Tyndale's latest text revised to a great extent in accordance with Beza's translation and commentary. The changes introduced by the Genevan translators were, as a rule, a great improvement, and the version received a ready welcome and immediate popularity, not only on account of its intrinsic merits, but because of its handy size, usually that of a small quarto, and of its being printed, like Whittingham's New Testament, in a readable Roman type instead of black letter. Like this earlier publication, it had the division of the chapters into verses, and a marginal commentary which proved a great attraction to the Puritans. The popularity of the Genevan Bible was so great that between 1560 and 1644 at least 140 editions of it were published,[40] and this in spite of its not being allowed for use in the churches.

The Genevan Bible.

In 1576 the New Testament of the Genevan Bible was again revised by Lawrence Tomson and provided with a new commentary mainly translated from Beza. It soon became popular and even replaced the Genevan New Testament in later editions of this Bible.

The Bishops' Bible.

Some time after the accession of Queen Elizabeth an attempt was made to improve the authorized *Great Bible*, and in this way to challenge the ever growing popularity of the Calvinistic *Genevan Bible*. The initiative was taken by Archbishop Parker, about 1563-1565, who, according to Strype (Parker i. 414) "took upon him the labour to contrive and set the whole work a going ... by sorting out the whole Bible into parcels ... and distributing these parcels to able bishops and other learned men, to peruse and collate each the book or books allotted them ... and they to add some short marginal notes for the illustration or correction of the text."

The rules upon which they proceeded were these:—

1. "To follow the common English translation used in the churches, and not to recede from it, but where it varieth manifestly from the Hebrew or Greek original. 2. To use sections and divisions in the text as Pagnine in his translation useth, and for the verity of the Hebrew to follow the said Pagnine and Münster specially, and generally others learned in the tongues. 3. To make no bitter notes upon any text, or yet to set down any determination in places of controversy. 4. To note such chapters and places as contain matters of genealogies, or other such places not edifying, with some strike or note, that the reader may eschew them in his public reading. 5. That all such words as sound in the old translation to any offence of lightness or obscenity be expressed with more convenient terms and phrases."

The work was pushed forward with energy, and on the 5th of October 1568 the volume was ready for publication. It was a magnificent folio, generally known as the *Bishops' Bible*, since not less than eight of these dignitaries took part in the revision. But the detached and piecemeal way in which the revision had been carried out naturally caused certain inequalities in the execution of the work. The different parts of the Bible vary considerably in merit, the alterations in the New Testament, for instance, showing freshness and vigour, whereas most of the changes introduced in the Old Testament have been condemned as "arbitrary and at variance with the exact sense of the Hebrew text" (Westcott, *op. cit.* p. 237). Several editions of the *Bishops' Bible* were afterwards published, but it is doubtful whether the ecclesiastical authorities in spite of repeated enactments (Cardwell, *Synodalia*, pp. 115, 123, 210, 292) ever succeeded in entirely enforcing its public use in the churches. After 1569 the Great Bible ceased, however, to be reprinted. But in the homes the Genevan version still maintained its supremacy. One thing is certain, that the book of Psalms of the new revision had fairly soon to give way before the well-known and smooth rendering of the Great Bible. In the second edition of the Bishops' Bible, 1572, the two texts were actually printed side by side; in all later editions except one (1585) the older Psalter alone remained.

The Reims and Douai Version.

From the time of Tyndale onwards the translation of the Scriptures into English had been more or less an outcome of the great reformatory movements within the church. It was not until Queen Elizabeth's reign that members of the Romanist party found it expedient to translate the Bible into the vernacular "for the more speedy abolishing of a number of false and impious translations put forth by sundry sectes, and for the better preseruation or reclaime of many good soules endangered thereby" (*Preface* to the Rhemish Version).

According to the title-page the New Testament was "translated faithfvlly into English ovt of the authentical Latin, according to the best corrected copies of the same, diligently conferred vvith the Greeke and other editions in diuers languages.... In the English College of Rhemes, 1582." The Old Testament had been "long since" completed, but "for lacke of good meanes" (Preface to the New Testament), its appearance was delayed till 1609-1610, when it was published at Douai. The complete work, known as the *Rhemes and Douay Version*, was reprinted in Rouen in 1635, and after a considerable time revised by Dr Challoner (1749-1750). The translation is really anonymous, but there seems to be little doubt that it was carried out by some of the Romanist refugees connected with the Seminary at Douai and the English college at Reims, the chief amongst them being Gregory Martin, William Allen, Richard Bristow and J. Reynolds. Like the Wycliffite Versions it is merely a secondary rendering from the Latin Vulgate, and it suffered from many of the defects which characterized these versions, extreme literalness, often stilted, ambiguous renderings, at times unintelligible except by a reference to the Latin original, as in Luke xxii. 18, "I will not drink of the generation of the vine," or Phil. ii. 7, "But he exinanited himself."

As further examples of this rendering we print the same passages from St Matthew:— 902

(Matthew iii. 1-4.) And in those dayes cometh Iohn the Baptist preaching in the desert of Ievvrie, saying. Doe penance: for the Kingdom of heauen is at hand. For this is he that vvas spoken of by Esay the Prophet, saying, A voyce of one crying in the desert, prepare ye the way of our Lord, make straight his pathes. And the sayd Iohn had his garment of camels heare, & a girdle of a skinne about his loynes: and his meate was locustes & vvilde honie.

(Matthew vi. 9-13.) Ovr Father which art in heauen, sanctified be thy name. Let thy Kingdom come. Thy wil be done, as in heauen, in earth also. Giue vs to day our supersubstantial bread. And forgiue vs our dettes, as we also forgiue our detters. And leade vs not into tentation. But deliuer vs from evil. Amen.

The strongly Latinized vocabulary of this version was not without its influence on the next great venture in English translations of the Bible, the *Authorized Version*.[41]

The Authorized Version, 1611.

The English Bible, which is now recognized as the *Authorized Version* wherever the English language is spoken, is a revision of the Bishops' Bible, begun in 1604, and published in 1611. It arose incidentally out of a Conference between the High Church and the Low Church parties convened by James I. at Hampton Court Palace in January 1604, for the purpose of determining "things pretended to be amiss in the church," and was originally proposed by Dr Reynolds, president of Corpus Christi College, Oxford, the leader and spokesman of the Low Church party, and subsequently on the committee which revised the translation of the Prophets.

No real opposition was offered to the proposal, and the king cleverly sketched out on the moment a plan to be adopted. He "wished that some special pains should be taken in that behalf for one uniform translation—professing that he could never yet see a Bible well translated in English—and this to be done by the best learned in both the Universities; after them to be reviewed by the bishops and the chief learned of the Church; from them to be presented to the privy council; and lastly to be ratified by his royal authority; and so this whole church to be bound unto it and none other."[42] He also particularly desired that no notes should be added by way of comment in the margin, since some of those in the Genevan Bible appeared to him "very partial, untrue, seditious and savouring too much of dangerous and traiterous conceits."

The appointment of the revisers was a work of much responsibility and labour, and five months elapsed before they were selected and their respective portions assigned to them; but the list of those who began the work, and who, with some few changes in consequence of deaths, brought it to a happy conclusion, shows how large an amount of scholarship was enlisted. It includes Dr Andrewes, afterwards bishop of Winchester, who was familiar with Hebrew, Chaldee, Syriac, Greek, Latin and at least ten other languages, while his knowledge of patristic literature was unrivalled; Dr Overall, regius professor of theology and afterwards bishop of Norwich; Bedwell, the greatest Arabic scholar of Europe; Sir Henry Savile, the most learned layman of his time; and, to say nothing of others well known to later generations, nine who were then or afterwards professors of Hebrew or of Greek at Oxford or Cambridge. It is observable also that they were chosen without reference to party, at least as many of the Puritan clergy as of the opposite party being placed on the committees.

The following list[43] is drawn up in such a way as to show the academical or other position which each of them occupied, and the particular part of the work on which they were engaged.

Dr Lancelot Andrewes, dean of Westminster.
Dr John Overall, dean of St Paul's.

Genesis-2 Kings.	Dr Hadrian de Saravia, canon of Canterbury. Dr Richard Clark, fellow of Christ's Coll., Camb. Dr John Layfield, fellow of Trin. Coll., Camb. Dr Robert Teigh, archdeacon of Middlesex. Mr Francis Burleigh, Pemb. Hall, Camb., D.D., 1607. Mr Geoffrey King, fellow of King's Coll., Camb. Mr Thompson, Clare Hall, Camb. Mr William Bedwell, St John's Coll., Camb.	Westminster.
1 Chron.-Eccles.	Mr Edward Lively, fellow of Trin. Coll. Mr John Richardson, afterwards master of Trin. Coll. Mr Laurence Chatterton, master of Emm. Coll. Mr Francis Dillingham, fellow of Christ's Coll. Mr Thomas Harrison, vice-master of Trin. Coll. Mr Roger Andrewes, afterwards master of Jesus Coll. Mr Robert Spalding, fellow of St John's. Mr Andrew Byng, fellow of St Peter's Coll.	Cambridge.
Isaiah-Malachi.	Dr John Harding, pres. of Magd. Coll. Dr John Reynolds, pres. of Corpus Christi Coll. Dr Thomas Holland, afterwards rector of Ex. Coll. Mr Richard Kilbye, rector of Lincoln Coll. Dr Miles Smith, Brasenose Coll. Dr Richard Brett, fellow of Lincoln Coll. Mr Richard Fairclough, fellow of New Coll.	Oxford.
The Apocrypha.	Dr John Duport, master of Jesus Coll. Dr William Branthwait, master of Caius Coll. Dr Jeremiah Radcliffe, fellow of Trin. Coll. Dr Samuel Ward, afterwards master of Sid. Coll. Mr Andrew Downes, fellow of St John's Coll. Mr John Bois, fellow of St John's Coll. Mr Robert Ward, fellow of King's Coll.	Cambridge.
The Four Gospels, Acts, Apocalypse.	Dr Thomas Ravis, dean of Christ Church. Dr George Abbot, dean of Winchester. Dr Richard Eedes, dean of Worcester. Dr Giles Thompson, dean of Windsor. Mr (Sir Henry) Saville, provost of Eton. Dr John Perin, fellow of St John's Coll. Dr Ravens [fellow of St John's Coll.] Dr John Harmer, fellow of New Coll.	Oxford.
Romans-Jude.	Dr William Barlow, dean of Chester. Dr William Hutchinson, archdeacon of St Albans. Dr John Spencer, pres. of Corp. Chr. Coll., Ox. Dr Roger Fenton, fellow of Pemb. Hall, Camb. Mr Michael Rabbett, Trin. Coll., Camb. Mr Thomas Sanderson, Balliol Coll., Oxford, D.D., 1605. Mr William Dakins, fellow of Trin. Coll., Camb.	Westminster.

When this large body of scholars were set down to their task, an elaborate set of rules was drawn up for their guidance, which contained a scheme of revision as well as general directions for the execution of their work. This is one of the very few records that remain of their undertaking.[44]

> "(1) The ordinary Bible read in the Church, commonly called 'the Bishops' Bible,' to be followed, and as little altered as the truth of the original will permit. (2) The names of the prophets and the holy writers, with the other names of the text to be retained as nigh as may be, accordingly as they were vulgarly used. (3) The old ecclesiastical words to be kept, viz. the word *Church* not to be translated *Congregation*, &c. (4) When a word hath divers significations, that to be kept which hath been most commonly used by the most of the ancient fathers, being agreeable to the propriety of the place and the analogy of the faith. (5) The division of the chapters to be altered either not at all or as little as may be, if necessity so require. (6) No marginal notes at all to be affixed, but only for the explanation of the Hebrew or Greek words which cannot, without some circumlocution, so briefly and fitly be expressed in the text. (7) Such quotations of places to be marginally set down as shall serve for the fit reference of one Scripture to another. (8) Every particular man of each company to take the same chapter or chapters; and having translated or amended them severally by himself where he thinketh good, all to meet together, confer what they have done, and agree for their parts what shall stand. (9) As any one company hath dispatched any one book in this manner, they shall send it to the rest to be considered of seriously and judiciously, for his majesty is very careful in this point. (10) If any company, upon the review of the book so sent, doubt or differ upon any place, to send them word thereof, note the place, and withal send the reasons; to which if they consent not, the difference to be compounded at the general meeting, which is to be of the chief persons of each company at the end of the work. (11) When any place of special obscurity is doubted of, letters to be directed by authority to send to any learned man in the land for his judgment of such a place. (12) Letters to be sent from every bishop to the rest of his clergy, admonishing them of his translation in hand, and to move and charge as many as being skilful in the tongues and having taken pains in that kind, to send his particular observations to the company either at Westminster, Cambridge or Oxford. (13) The directors in each company to the deans of Westminster and Chester for that place; and the king's professors in the Hebrew or Greek in either university. (14) These translations to be used when they agree better with the text than the Bishops' Bible; viz. Tyndale's, Matthew's, Coverdale's, Whitchurch's, Geneva. (15) Besides the said directors before mentioned, three or four of the most ancient and grave divines in either of the universities, not employed in translating, to be assigned by the vice-chancellor upon conference with [the] rest of the heads to be overseers of the translations, as well Hebrew as Greek, for the better observation of the fourth rule above specified."

It is not possible to determine in how far all these rules were adhered to. All we know of the way this noble work was carried out is contained in the Preface, where Dr Miles Smith, in 1612 bishop of Gloucester, in the name of his fellow-workers gives an account of the manner and spirit in which it was done:—

> "Neither did we run ouer the worke with that posting haste that the *Septuagint* did, if that be true which is reported of them, that they finished it in 72 days.... The worke hath ... cost the workemen, as light as it seemeth, the paines of twise seuen times seuentie two dayes and more.... Truly (good Christian Reader), we neuer thought from the beginning, that we should neede to make a new Translation, nor yet to make of a bad one a good one... but to make a good one better, or out of many good ones, one principall good one, not iustly to be excepted against.... To that purpose there were many chosen, that were greater in other mens eyes than in their owne, and that sought the truth rather than their own praise.... Neither did wee thinke much to consult the Translators or Commentators, *Chaldee, Hebrewe, Syrian, Greeke*, or *Latine*, no mor the *Spanish, French, Italian* or *Dutch* [German]; neither did we disdaine to reuise that which we had done, and to bring back to the anuitl that which we had hammered: but hauing and vsing as great helpes as were needfull, and fearing no reproch for slownesse, nor coueting praise for expedition, wee haue at the length, through the good hand of the Lord vpon vs, brought the worke to that passe that you see."

From the above it appears that the actual work of revision occupied about two years and nine months, an additional nine months being required for the final preparation for press. The edition appeared at length in 1611, the full title being as follows: The Holy Bible, conteyning the Old Testament, and the New: Newly Translated out of the Originall tongues, & with the former

Translations diligently compared and reuised, by his Maiesties speciall comandement. Appointed to be read in Churches. Imprinted at London by Robert Barker, Printer to the Kings most Excellent Maiestie. *Anno Dom.* 1611.[45] Since that time many millions of this revised translation have been printed, and the general acceptance of it by all English-speaking people of whatever denomination is a testimony to its excellence.

Still the work of improving and correcting went on through the centuries, and a modern copy of the Authorized Version shows no inconsiderable departures from the standard edition of 1611. Dr Scrivener imputes some of those differences "to oversight and negligence ... but much the greater part of them" he holds to be "deliberate changes, introduced silently and without authority by men whose very names are often unknown."

(A. C. P.)

The Revised Version.

More ambitious attempts at amending the new version were not lacking, but they all proved fruitless, until in February 1870 the Convocation of Canterbury appointed a committee to consider the subject of revision. The report of this committee, presented in May, was adopted, to the effect "that Convocation should nominate a body of its own members to undertake the work of revision, who shall be at liberty to invite the co-operation of any eminent for scholarship, to whatever nation or religious body they may belong"; and shortly afterwards two companies were formed for the revision of the Authorized Version of the Old and New Testaments.

These companies consisted of the following:—1. For the Old Testament:—(α) *Appointed by Convocation.*—Connop Thirlwall, bishop of St David's (d. 1875); Alfred Ollivant (1798-1882), bishop of Llandaff; E. Harold Browne (1811-1891), bishop of Ely; Christopher Wordsworth, bishop of Lincoln; and Lord Arthur Hervey (1808-1894), bishop of Bath and Wells; Archdeacon H.J. Rose (d. 1873); William Selwyn (1806-1875), canon of Ely and Lady Margaret professor at Cambridge; Dr John Jebb (1805-1886), canon of Hereford; and Dr William Kay (1820-1886). (β) *Invited.*—Dr William Lindsay Alexander (1808-1884), congregational minister; Thomas Chenery (1826-1884), professor of Arabic at Oxford, and afterwards (1877) editor of *The Times*; Frederick Charles Cook (1810-1889), canon of Exeter; Professor A.B. Davidson; Dr Benjamin Davies (1814-1875), professor of oriental and classical languages at Stepney Baptist College; the Rev. A.M. Fairbairn, congregationalist; the Rev. Frederick Field (1801-1885), fellow of Trinity, Cambridge; Dr C.D. Ginsburg; the Rev. Dr Gotch of Bristol; Archdeacon Benjamin Harrison (1808-1887), Hebraist; the Rev. Stanley Leathes (1830-1900), professor of Hebrew at King's College, London; Professor M'Gill; Canon Robert Payne Smith (1819-1895), regius professor of divinity at Oxford, dean of Canterbury (1870); Professor J.J.S. Perowne, afterwards bishop of Worcester; the Rev. Edward Hayes Plumtre (1821-1891), professor of exegesis at King's College, London, afterwards dean of Wells; Canon E. Bouverie Pusey; William Wright (1830-1889), the orientalist; W. Aldis Wright, Cambridge. Of these Canons Cook and Pusey declined to serve, and ten members died during the progress of the work. The secretary of the company was Mr W. Aldis Wright, fellow of Trinity, Cambridge.

2. For the New Testament:—(α) *Appointed by Convocation.*—Samuel Wilberforce, bishop of Winchester; Charles J. Ellicott, bishop of Gloucester and Bristol; and George Moberly, bishop of Salisbury; Dr Edward Bickersteth (1814-1892), prolocutor of the lower house of convocation; Henry Alford, dean of Canterbury, and Arthur Penrhyn Stanley, dean of Westminster; Joseph Williams Blakesley (1808-1885), canon of Canterbury, and (1872) dean of Lincoln. (β) *Invited.*—The Rev. Dr Joseph Angus, president of the Stepney Baptist College; Dr David Brown; Richard Chenevix Trench, archbishop of Dublin; the Rev. Dr John Eadie (1810-1876), Presbyterian; the Rev. F.J.A. Hort; the Rev. W.G. Humphry (1815-1886), vicar of St Martin-in-the-Fields, London; the Rev. Benjamin Hall Kennedy, canon of Ely; William Lee (1815-1883), archdeacon of Dublin, and professor of ecclesiastical history in the university; J.B. Lightfoot, afterwards bishop of Durham; Professor William Milligan; the Rev. William Fieldian Moulton (1835-1898), Wesleyan biblical scholar; Dr J.H. Newman; the Rev. Samuel Newth (1821-1898), congregationalist, professor of ecclesiastical history at, and afterwards president of, New College, London; Dr A. Roberts; the Rev. G. Vance Smith; Dr Robert Scott; the Rev. F.H.A. Scrivener (1813-1891), rector of St Gerrans, Cornwall; Charles Wordsworth, bishop of St Andrews; Dr W.H. Thompson; Dr S.P. Tregelles; Dr C.J. Vaughan; Canon Westcott. Of these, Dr Thompson and Dr Newman declined to serve. Dean Alford, Dr Tregelles, Bishop Wilberforce and Dr Eadie were removed by death. Only the first vacancy was filled up. Dean Merivale was co-opted, and on his resignation Professor, afterwards Archdeacon, Edwin Palmer. The Rev. J. Troutbeck, minor canon of Westminster, acted as secretary.

Negotiations were opened with the leading scholars of the Protestant denominations in America, with the result that similar companies were formed in the United States. The work of the English revisers was regularly submitted to their consideration; their comments were carefully considered and largely adopted, and their divergences from the version ultimately agreed upon were printed in an appendix to the published work. Thus the Revised Version was the achievement of English-speaking Christendom as a whole; only the Roman Catholic Church, of the great English-speaking denominations, refused to take part in the undertaking. The Church of England, which had put forth the version of 1611, fitly initiated the work, but for its performance most wisely invited the help of the sister churches. The delegates of the Clarendon Press in Oxford, and the syndics of the Pitt Press in Cambridge, entered into a liberal arrangement with the revisers, by which the necessary funds were provided for all their expenses. On the completion of its work the New Testament company divided itself into three committees, working at London, Westminster and Cambridge, for the purpose of revising the Apocrypha.

The work of the Old Testament company was different in some important respects from that which engaged the attention of the New Testament company. The received Hebrew text has undergone but little emendation, and the revisers had before them substantially the same Massoretic text which was in the hands of the translators of 1611. It was felt that there was no sufficient justification to make any attempt at an entire reconstruction of the text on the authority of the versions. The Old Testament revisers were therefore spared much of the labour of deciding between different readings, which formed one of the most important duties of the New Testament company. But the advance in the study of Hebrew since the early part of the 17th century enabled them to give a more faithful translation of the received text. The value of their work is evident, especially in Job, Ecclesiastes and the prophetical books.

It is the work of the New Testament committee which has attracted most attention, whether for blame or praise. The critical resources at the disposal of scholars in 1611 were very meagre, and the few early manuscripts with which they were acquainted failed to receive the attention they deserved. The results of modern critical methods could not fail to make the incompleteness of the "Received Text," and of the "Authorized Version," which was based on it, obvious. It had long been the opinion of all competent scholars that a thorough revision was necessary. A proposal in favour of this course was made in Convocation in 1856, but it was not until fourteen years later that the committee was appointed to undertake the work. The revisers' first task was to reconstruct the Greek text, as the necessary foundation of their work. In this difficult duty they were no doubt influenced by Westcott and Hort's edition of the New Testament. These two scholars were members of the committee which prepared the Revised Version, and on the question of various readings they appear to have exercised a predominating influence. The revisers were privately supplied with instalments of Westcott and Hort's text as their work required them. But it is scarcely necessary to say that the Revised Version is not the work of one or two scholars. Different schools of criticism were represented on the committee, and the most careful discussion took place before any decision was formed. Every precaution was taken to ensure that the version should represent the result of the best scholarship of the time, applied to the work before it with constant devotion and with the highest sense of responsibility. The changes in the Greek text of the Authorized Version when compared with the *textus receptus* are numerous, but the contrast between the English versions of 1611 and 1881 is all the more striking because of the difference in the method of translation which was adopted. The revisers aimed at the most scrupulous faithfulness. They adopted the plan—deliberately rejected by the translators of 1611—of always using the same English word for the same Greek word. "They endeavoured to enable the English reader to follow the correspondences of the original with the closest exactness, to catch the solemn repetition of words and phrases, to mark the subtleties of expression, to feel even the strangeness of unusual forms of speech."

The revision of the New Testament was completed in 407 meetings, distributed over more than ten years. It was formally presented to Convocation on May 17, 1881. The revision of the Old Testament occupied 792 days, and was finished on June 20, 1884. The revised Apocrypha did not make its appearance until 1895.

The text of the Revised Version is printed in paragraphs, the old division of books into chapters and verses being retained for convenience of reference. By this arrangement the capricious divisions of some books is avoided. Various editions of the New Version have been published, the most complete being the edition of the whole Bible with marginal references. These references had their origin in the work of two small subcommittees of the revisers, but they received their present form at the hands of a specially appointed committee. The marginal references given in the original edition of the Authorized Version of 1611 have been retained as far as possible.

The work of the revisers was received without enthusiasm. It was too thorough for the majority of religious people. Partisans found that havoc had been played with their proof texts. Ecclesiastical conservatives were scandalized by the freedom with which the traditional text was treated. The advocates of change were discontented with the hesitating acceptance which their principles had obtained. The most vulnerable side of the revision was that on which the mass of English readers thought itself capable of forming a judgment. The general effect of so many small alterations was to spoil the familiar sonorous style of the Authorized Version. The changes were freely denounced as equally petty and vexatious; they were, moreover, too often inconsistent with the avowed principles of the revisers. The method of determining readings and renderings by vote was not favourable to the consistency and literary character of the Version. A whole literature of criticism and apology made its appearance, and the achievement of so many years of patient labour seemed destined to perish in a storm of resentments. On the whole, the Revised Version weathered the storm more successfully than might have been expected. Its considerable excellences were better realized by students than stated by apologists. The hue and cry of the critics largely died away, and was replaced by a calmer and juster appreciation.

The work of the revisers has been sharply criticized from the standpoint of specialists in New Testament Greek. Dr Rutherford stated the case briefly and pointedly in the preface to his translation of the Epistle to the Romans (London, 1900). He maintains that “the Greek of the New Testament may never be understood as classical Greek is understood,” and accuses the revisers of distorting the meaning “by translating in accordance with Attic idiom phrases that convey in later Greek a wholly different sense, the sense which the earlier translators in happy ignorance had recognized that the context demanded.”

The use of the new Version has become general. Familiarity has mitigated the harshness of the revisers’ renderings; scholarship, on the whole, has confirmed their readings. The Version has been publicly read in parish churches both in London and in the country. In Canterbury cathedral and Westminster Abbey it has definitely displaced the older Version. Bishops have acquiesced and congregations approved. It is no longer possible to maintain the plausible and damaging contention that the Revised Bible is ill suited for public use. The Upper House of the Convocation of Canterbury in May 1898 appointed a committee to consider the expediency of “permitting or encouraging” the use of the Revised Version in the public services of the Church.

(H. H. H.*)

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(A. C. P.; H. H. H.*)

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43 Compiled chiefly from the list found in Cardwell's *Synodalia* (ed. 1844), ii. 145-146, a reprint from Burnet's *Doc. Annals*, ii. 106 ff., "who himself took his list from a copy belonging originally to Bishop Ravis." The list is correct for the year 1604; cf. Westcott, op. cit. pp. 112 f.

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BIBLE CHRISTIANS, one of the denominations now merged in the United Methodist Church (see UNITED METHODISTS), so called because its early preachers appealed solely to the Bible in confirmation of their doctrines. The denomination arose in the agricultural districts and fishing villages of north Cornwall and Devon; a district only slightly influenced by John Wesley and the original Methodist movement. The founder was William O'Bryan (afterwards Bryant), a Methodist lay preacher of Luxillian, Cornwall. Finding that the people had no evangelical preaching he began an itinerary to supply the need. The coastmen were expert smugglers and wreckers, the agriculturists were ignorant and drunken, the parish clergy were slothful, in many cases intemperate, and largely given to fox-hunting. Only in a parish or two was there any approach to religious ministry. O'Bryan commenced his labours in north Devon, and in 1815 a small society was formed at Lake Farm, Shebbear. The movement had the seeds of great vitality in it. In 1819 the first conference was held at Launceston. There were present besides O'Bryan one accepted minister—James Thorne—fourteen ministers on trial and fifteen women preachers, a class that was always conspicuous in the denomination. At that conference the work had spread from Ring's Ash in Devon to Morrah, a lonely and desolate parish in west Cornwall. In 1820-1821 Kent, Northumberland, the Scilly and Norman (*i.e.* Channel) Islands appeared on the list of stations. Then came a serious break. In 1829 there was a severance between the larger part of the new body and O'Bryan, who had claimed to be perpetual president, and to have all property vested in him personally. He tried to establish a separate conference, but failed, and in 1836 there was a reunion. O'Bryan left England for America, where he remained for the rest of his life, and his contingent (numbering 565 members and 4 ministers) returned to the original conference. The growth continued. In 1831 agents were sent to Canada and Prince Edward's Island, in 1850 to South Australia, in 1855 to Victoria, in 1866 to Queensland, in 1877 to New Zealand and in 1885 to China, so that the original O'Bryan tradition of fervid evangelism was amply maintained.

On O'Bryan's departure, James Thorne, the first fully recognized minister, at whose father's farm the connexion started, became its leader. Although reared as an ordinary farm lad, he proved to be a man of singular devotion and spiritual genius. He laid the foundations broadly in evangelism, finance, temperance and education, founding in the latter connexion a middle-class school at Shebbear, at which generations of ministers' sons and numerous students for the ministry have been educated. James Thorne was five times president of the conference and fifteen times secretary. He died in 1872. In this period there was much persecution. Landowners refused sites, and in the Isle of Wight the people worshipped for many months in a quarry. The preachers were sometimes imprisoned and many times assaulted. The old Methodist body even excommunicated persons for

attending “Bryanite” meetings. Partly co-operative with James Thorne and at his death independently, the Church was favoured with the influence of Frederick William Bourne. He was a minister for fifty-five years, and served the Bible Christians as editor, missionary treasurer, book steward and three times president of conference. With him will always be associated the name of Billy Bray, an illiterate but inimitable Cornish evangelist, a memoir of whom, written by Bourne, exerted a great influence in the religious life of the denomination.

In doctrine the Bible Christians did not differ from the other Methodists. In constitution they differed only slightly. There was an annual conference with full legislative power, and ability to hold and dispose of property, composed of an equal number of lay and ministerial representatives meeting together. The local churches were grouped into circuits governed representatively by a quarterly meeting. The quarterly or circuit meetings were in turn organized into twelve districts, eleven in England and one in China. In 1906 the statistics showed 218 ministers, 32,549 members and 652 chapels, with 47,301 scholars in Sunday-schools. These figures include nearly 1400 full and probationary members in the China mission, the first-fruits of two years’ labour amongst the Miao tribe. In the various colonial Methodist unions the Bible Christians have contributed a total of 159 ministers, 14,925 members and 660 chapels.

The community supported a regular ministry from the beginning. Its members have been keen evangelists, trusting largely to “revivals” for their success, staunch Radicals in politics and total abstainers to a man. Both ministers and people entered with interest and sympathy into the scheme for union between themselves, the Methodist New Connexion and the United Methodist Free Church, which was successfully accomplished in 1906. See Methodism.

BIBLE SOCIETIES, associations for translating and circulating the Holy Scriptures. This object has engaged the attention of the leaders of Christendom from early times. In an extant letter, dated A.D. 331, the emperor Constantine requested Eusebius, bishop of Caesarea, to provide him with fifty copies of the Old and New Testaments for use in the principal churches in Constantinople. In 797 Charlemagne commissioned Alcuin to prepare an emended text of the Vulgate; copies of this text were multiplied, not always accurately, in the famous writing-schools at Tours. The first book printed in Europe was the Latin Bible, and Copinger estimates that 124 editions of the Vulgate had been issued by the end of the 15th century. The Italian Bible was printed a dozen times before A.D. 1500, and eighteen editions of the German Bible had already been published before Luther’s version appeared.

The Reformation quickened men’s interest in the Scriptures to an extraordinary degree, so that, notwithstanding the adverse attitude adopted by the Roman Church at and after the council of Trent, the translation and circulation of the Bible were taken in hand with fresh zeal, and continued in more systematic fashion.

Thus, the Revised French Geneva Bible of 1588, which was issued in folio, quarto and octavo, and became a standard text, bears the following note on the verso of the title: “*Les frais de cet ouvrage, imprimé en trois diuerses formes en mesme temps, pour la commodité et contentement de toutes sortes de personnes, ont esté liberalemet fournis par quelques gens de bien, qui n’ont cherché gagner pour leur particulier, mais seulement de servir à Dieu et à son Église.*” The Corporation for the Promoting and Propagating of the Gospel of Jesus Christ in New England (founded in 1649) bore the expense of printing both the New Testament and the Bible as a whole (Cambridge, Mass., 1663—the earliest Bible printed in America), which John Eliot, one of the Pilgrim Fathers, translated into “the language of the Massachusetts Indians,” whom he evangelized. In Arnauld’s *Defence* (1669) of the famous Port Royal version of the New Testament in French (issued, 1667), he states that it had been printed in many forms and sizes, including very cheap editions for the poor, and goes on to describe how its circulation was promoted by “*les sacrifices que s’imposaient les pieux solitaires pour faire participer les plus indigents au bienfait de leur entreprise. Dès que leur traduction fut prête, ils envoyèrent de Paris un grand nombre de colporteurs chargés de la vendre au prix de revient et même, dans certaines circonstances, à des prix réduits; et ils couvrirent la dépense par des dons volontaires*” (E. Pétavel, *La Bible en France*, p. 152).

To meet the cost of publishing the Finn Bible in 1685, the editor, J. Gezelius, bishop of Åbo, obtained an order from the Swedish government for the appropriation of certain corn-tithes, still known as *Bibel Tryck-Tunnan*. When the Finnish Bible Society began to publish editions of the Scriptures, the tsar Alexander I. contributed 5000 roubles from his privy purse, and ordered that these corn-tithes should again be appropriated to this purpose for five years from 1812. In 1701 at Frankfort-On-Main there appeared a quarto edition of the Ethiopic Psalter, whose editor, H. Ludolf, writes in his preface: “*Quamobrem nullum gratius officium Christianae huic nationi a me praestari posse putavi, quam si Psalterium Aethiopicum, quod apud illos non aliter quam in membrana manuscriptum habetur, et caro satis venditur, typis mandari, ejusque plurima exemplaria nomine Societatis Indicae in Habessinia gratis distribui curarem.*”

In 1719 appeared the first of numerous editions of the French New Testament, connected with the name of the Abbé de Barneville, a priest of the Oratory at Paris. Impressed by the popular ignorance of the Scriptures, he himself translated, or caused others to translate, the New Testament into French from the Vulgate, and formed an association to distribute copies systematically at low prices. The prefaces to his various editions contain details as to the methods of this association, and repeatedly insist on the importance of reading the Scriptures. (On this *Société biblique catholique française* see O. Douen, *Histoire de la société biblique protestante de Paris*, Paris, 1868, pp. 46-51.)

Christian missionaries to non-Christian lands have naturally been among the most skilful translators and the most assiduous distributors of the Bible. The earliest complete Arabic Bible was produced at Rome in 1671, by the *Congregatio de Propaganda Fide*. Protestant missionary societies have engaged energetically in the task not only of translating, but of printing, publishing and distributing the Scriptures. Thus the Society for Promoting Christian Knowledge (founded 1698), besides its other activities, has done much to cheapen and multiply copies of the Scriptures, not only in English and Welsh, but in many foreign languages. Early in the 18th century it printed editions in Arabic, and promoted the first versions of the Bible in Tamil and Telugu, made by the Danish Lutheran missionaries whom it then supported in south India. The earliest New Testament (1767) and Old Testament (1783-1801) in Gaelic were published by the Society in Scotland for Propagating Christian Knowledge (founded 1709). The S.P.C.K. now publishes versions of the Scriptures (either complete, or in part) in 38 different languages (without reckoning versions of the Prayer Book in 45 other languages); and during 1905-1906 the S.P.C.K. issued in England 116,126 Bibles and 17,783 New Testaments.

The earliest noteworthy organization, formed for the specific purpose of circulating the Scriptures, was the Canstein Bible Institute (*Bibelanstalt*), founded in 1710 at Halle in Saxony, by Karl Hildebrand, baron von Canstein (1667-1719), who was associated with P.J. Spener and other leaders of Pietism in Germany. He invented a method of printing, perhaps somewhat akin to stereotyping—though the details are not clearly known,—whereby the Institute could produce Bibles and Testaments in Luther’s version at a very low cost, and sell them, in small size, at prices equivalent to 10d. and 3d. per copy, respectively. In 1722 editions of the Scriptures were also issued in Bohemian and Polish. At von Canstein’s death he left the Institute to the care of his friend August Hermann Francke, founder in 1698 of the famous *Waisenhaus* (orphanage) at Halle. The Canstein Institute has issued some 6,000,000 copies of the Scriptures.

In England various Christian organizations, which arose out of the Evangelical movement in the 18th century, took part in the work. Among such may be mentioned the Society for Promoting Christian Knowledge among the Poor (1750); and the Society for the Support and Encouragement of Sunday Schools (1785). An institution was founded in 1780 under the name of the Bible Society, but as its sphere was restricted to soldiers and seamen the title was afterwards changed to the Naval and Military Bible Society. The first ship among whose crew it distributed the Scriptures was the “Royal George,” which had 400 of this society’s Bibles on board when it foundered at Spithead on the 29th of August 1782. The French Bible Society, instituted in

1792, came to an end in 1803, owing to the Revolution.

The British and Foreign Bible Society.—In 1804 was founded in London the British and Foreign Bible Society, the most important association of its kind. It originated in a proposal made to the committee of the Religious Tract Society, by the Rev. Thomas Charles of Bala, who found that his evangelistic and philanthropic labours in Wales were sorely hindered by the dearth of Welsh Bibles. His colleagues in the Religious Tract Society united with other earnest evangelical leaders to establish a new society, which should have for its sole object "to encourage a wider circulation of the Holy Scriptures, without note or comment." This simplicity of aim is combined with a catholicity of constitution which admits the co-operation of all persons interested in the society's object. The committee of management consists of thirty-six laymen, six of them being foreigners resident in or near London, while of the remaining thirty, half are members of the Church of England, and half are members of other Christian denominations.

Supported by representative Christian leaders, such as Granville Sharp, Zachary Macaulay, William Wilberforce, Charles Grant and Henry Thornton, with Lord Teignmouth, ex-governor-general of India, as its first president, and Dr Porteus, bishop of London, as its friendly counsellor, the new society made rapid progress. It spread throughout Great Britain, mainly by means of auxiliaries, *i.e.* local societies, affiliated but self-controlled, with subsidiary branches and associations (these last being often managed by women). Up to 1816-1817 the parent society had received from its auxiliaries altogether £420,000. This system continues to flourish. In 1905-1906 the society had about 5800 auxiliaries, branches and associations in England and Wales, and more than 2000 auxiliaries abroad, mainly in the British Colonies, many of which undertake vigorous local work, besides remitting contributions to London.

The society's advance was chequered by several controversies. (*a*) Its fundamental law to circulate the Bible alone, without note or comment, was vehemently attacked by Bishop Marsh and other divines of the Church of England, who insisted that the Prayer Book ought to accompany the Bible. (*b*) Another more serious controversy related to the circulation—chiefly through affiliated societies on the continent—of Bibles containing the Deutero-canonical books of the Old Testament. In 1826 the society finally resolved that its fundamental law be fully and distinctly recognized as excluding the circulation "of those Books, or parts of Books, which are usually termed Apocryphal." This step, however, failed to satisfy most of the society's supporters in Scotland, who proceeded to form themselves into independent organizations, grouped for the most part round centres at Edinburgh and Glasgow. These were finally amalgamated in 1861 into the National Bible Society of Scotland. (*c*) A third dispute turned upon the admissibility of non-Trinitarians to the privilege of co-operation. The refusal of the society to alter its constitution so as formally to exclude such persons led to the formation (1831) of the Trinitarian Bible Society, which is still in existence. (*d*) A fourth controversy arose out of the restrictive renderings of the term "baptize" and its cognate terms, adopted by William Carey and his colleagues in their famous "Serampore Versions," towards publishing which the society had contributed up to 1830 nearly £30,000. Protests from other Indian missionaries led the society to determine that it could circulate only such versions as gave neutral renderings for the terms in question. As a sequel, the Bible Translation Society was founded in 1839 to issue versions embodying distinctively Baptist renderings.

By one of its original laws the British and Foreign Bible Society could circulate no copies of the Scriptures in English other than King James's Version of 1611. In 1901 this law was widened to include the Revised English Version of 1881-1885.

From its foundation the society has successfully laboured to promote new and improved versions of the Scriptures. In 1804 the Bible, or some part of it, had been printed in about fifty-five different tongues. By the year 1906 versions, more or less complete, had been published in more than 530 distinct languages and dialects, and in 400 of these the work of translation, printing or distribution had been promoted by the society. Translations or revisions in scores of languages are still being carried on by companies of scholars and representative missionaries in different parts of the world, organized under the society's auspices and largely at its expense. New versions are made, wherever practicable, from the original Hebrew or Greek text, and the results thus obtained have a high philological value and interest. The society's interdenominational character has commonly secured—what could hardly otherwise have been attained—the acceptance of the same version by missions of different churches working side by side. The society supplies the Scriptures to missions of every Reformed Communion on such terms that, as a rule, the books distributed by the missions involve no charge on their funds. Except under special circumstances, the society does not encourage wholesale free distribution, but provides cheap editions at prices which the poorest can pay. On the whole it receives from sales about 40% of what it expends in preparing, printing and circulating the books.

During the year 1905-1906 the society's circulation reached the unprecedented total of 5,977,453 copies, including 968,683 Bibles and 1,326,475 Testaments. Of the whole 1,921,000 volumes were issued from the Bible House, London, and 1,331,000 were in English or Welsh, circulating chiefly in England and the British colonies. The other main fields of distribution were as follows:—France, 203,000 copies; Central Europe, 679,000; Italy, 117,000; Spain and Portugal, 120,000; the Russian empire, 595,000; India, Burma and Ceylon, 768,000; Japan, 286,000; and China, 1,075,000 (most of these last being separate gospels).

The society spends £10,000 a year in grants to religious and philanthropic agencies at home. Outside the United Kingdom it has its own agencies or secretaries in twenty-seven of the chief cities of the world, and maintains depots in 200 other centres. It employs 930 Christian colporteurs abroad, who sold in 1905-1906 over 2,250,000 volumes. It supports 670 native Christian Bible-women in the East, in connexion with forty different missionary organizations. The centenary festival in 1904 was celebrated with enthusiasm by the Reformed Churches and their foreign missions throughout the world. Messages of congratulation came from the rulers of every Protestant nation in Christendom, and a centenary thanksgiving fund of 250,000 guineas was raised for extending the society's work. During the year 1905-1906 the society expended £238,632, while its income was £231,964 (of which £98,204 represented receipts from sales). Up to the 31st of March 1906 the society had expended altogether £14,686,072, and had issued 198,515,199 copies of the Scriptures—of which more than 78,000,000 were in English.

In Scotland the Edinburgh Bible Society (1809), the Glasgow Bible Society (1812), and other Scottish auxiliaries, many of which had dissociated themselves from the British and Foreign Bible Society after 1826, were finally incorporated (1861) with the National Bible Society of Scotland, which has carried on vigorous work all over the world, especially in China. During 1905, with an income of £27,108, it issued 1,590,881 copies, 907,000 of which were circulated in China. Its total issues from 1861 to 1906 were 26,106,265 volumes.

In Ireland the Hibernian Bible Society (originally known as the Dublin Bible Society) was founded in 1806, and with it were federated kindred Irish associations formed at Cork, Belfast, Derry, &c. The Hibernian Bible Society, whose centenary was celebrated in 1906, had then issued a total of 5,713,837 copies. It sends an annual subsidy to aid the foreign work of the British and Foreign Bible Society.

Other European Societies.—The impulse which founded the British and Foreign Bible Society in 1804 soon spread over Europe, and, notwithstanding the turmoils of the Napoleonic wars, kindred organizations on similar lines quickly sprang up, promoted and subsidized by the British and Foreign Bible Society. Many of these secured royal and aristocratic patronage and encouragement—the tsar of Russia, the kings of Prussia, Bavaria, Sweden, Denmark and Württemberg all lending their influence to the enterprise.

Within fourteen years the following Bible societies were in active operation: the Basel Bible Society (founded at Nuremberg, 1804), the Prussian Bible Society (founded as the Berlin Bible Society, 1805), the Revel Bible Society (1807), the Swedish Evangelical Society (1808), the Dorpat Bible Society (1811), the Riga Bible Society (1812), the Finnish Bible Society (1812), the Hungarian Bible Institution (Pressburg, 1812), the Württemberg Bible Society (Stuttgart, 1812), the Swedish Bible Society (1814), the Danish Bible Society (1814), the Saxon Bible Society (Dresden, 1814), the Thuringian Bible Society (Erfurt, 1814), the Berg Bible Society (Eberfeld, 1814), the Hanover Bible Society (1814), the Hamburg-Altona Bible Society (1814), the Lübeck Bible Society (1814), the Netherlands Bible Society (Amsterdam, 1814). These were increased in 1815 by the Brunswick, Bremen, Schleswig-Holstein, Strassburg and Eichsfeld (Saxony) Bible Societies, and the Icelandic Bible Society. In 1816-1817 came the Norwegian Bible Society, the Polish Bible Society and ten minor German Bible Societies. Twelve cantonal

societies had also been formed in Switzerland.

Up to 1816-1817 these societies had printed altogether 436,000 copies of the Scriptures, and had received from the British and Foreign Bible Society gifts amounting to over £62,000. The decision of the British and Foreign Bible Society in 1826 with regard to circulating the Apocrypha (see above) modified its relations with the most influential of these continental societies. Some of them were ultimately dissolved or suppressed through political or ecclesiastical opposition, the Roman Church proving especially hostile. But many of them still flourish, and are actively engaged in their original task.

The circulation of the Scriptures by German Bible Societies during 1905 was estimated as follows:—The Prussian Bible Society (Berlin), 182,000 copies; the Württemberg Bible Institute (Stuttgart), 247,000; the Berg Bible Society (Eberfeld), 142,000; the Saxon Bible Society (Dresden), 44,000; the Central Bible Association (Nuremberg), 14,000; the Canstein Bible Institute (Halle), the Schleswig-Holstein Bible Society, the Hamburg-Altona Bible Society and others, together 56,000.

During 1905, nine cantonal Bible societies in Switzerland circulated altogether 71,000 copies; the Netherlands Bible Society reported a circulation of 54,544 volumes, 48,137 of which were in Dutch; the Danish Bible Society circulated 45,289 copies; the Norwegian Bible Society circulated 67,058 copies; and in Sweden the Evangelical National Society distributed about 110,000 copies.

In Italy, by a departure from the traditional policy of the Roman Church, the newly formed "Pious Society of St Jerome for the Dissemination of the Holy Gospels" issued in 1901 from the Vatican press a new Italian version of the Four Gospels and *Acts*. By the end of 1905 the society announced that over 400,000 copies of this volume had been sold at 2d. a copy.

In France, the *Société biblique protestante de Paris*, founded in 1818, with generous aid from the British and Foreign Bible Society, had a somewhat restricted basis and scope. In 1833 the *Société biblique française et étrangère* was formed on wider lines; after its dissolution in 1863, many of its supporters joined the *Société biblique de France*, which dates from 1864, and represents chiefly members of the *Église libre*, and kindred French Evangelicals. During 1905 its issues were 34,475 copies, while the *Société biblique protestante de Paris* issued 8061 copies.

Of these non-British societies the most noteworthy was established in Russia. In December 1812, while "the last shattered remnants of Napoleon's Grand Army struggled across the ice of the Niemen," the tsar Alexander I. sanctioned plans for a Bible society, which was promptly inaugurated at St Petersburg under the presidency of Prince Galitzin. Through the personal favour of the tsar, it made rapid and remarkable progress. Nobles and ministers of state, with the chief ecclesiastics not only of the Russian Church but of the Roman, the Uniat, the Armenian, the Greek, the Georgian and the Lutheran Churches, found themselves constrained to serve on its committees. By the close of 1823 the Russian Bible Society had formed 289 auxiliaries, extending eastwards to Yakutsk and Okhotsk; and had received altogether £145,640. In 1824, however, Prince Galitzin ceased to be procurator of the Holy Synod, and Seraphim, metropolitan of St Petersburg, became president of the Russian Bible Society. And in 1826, soon after his accession, the tsar Nicholas I. issued a *ukase* suspending the society's operations—after it had printed the Scriptures in thirty different languages, seventeen of which were new tongues, and had circulated 600,000 volumes from the Caucasus to Kamchatka. In 1828 Nicholas I. sanctioned the establishment of a Protestant Bible Society, which still exists, to supply the Scriptures only to Protestant subjects of the tsar (cf. Th. Schiemann, *Geschichte Russlands unter Nikolaus I.* vol. i. chap. ix.). In 1839 St Petersburg became the headquarters of an agency of the British and Foreign Bible Society, which enjoys special facilities in Russia, and now annually circulates about 600,000 copies of the Scriptures, in fifty different languages, within the Russian empire.

In America the earliest Bible society was founded at Philadelphia in 1808. Six more societies—including those of New York and of Massachusetts—were formed during 1809, and other societies, auxiliaries and associations quickly followed. In 1816 a convention of delegates representing 31 of these institutions met at New York and established the American Bible Society, with Elias Boudinot as president. All kindred organizations in the states gradually became amalgamated with this national body, and the federation was completed in 1839 by the adhesion of the Philadelphia Society (which now changed its name to the Pennsylvania Bible Society). Not a few noteworthy versions of the Bible, such as those in Arabic, 15 dialects of Chinese, Armenian, and Zulu, and many American Indian, Philippine, and African languages have appeared under the auspices of the American Bible Society. Turkish, classical Chinese, and Korean versions have been made by the American and British societies jointly. The society's foreign agencies extend to China, Japan, Korea, the Turkish empire, Bulgaria, Egypt, Micronesia, Siam, Mexico, Central America, the South American republics, Cuba and the Philippines. In the year ending March 31st 1909 the income of the Society was $502,345, and it issued 2,153,028 copies of the Scriptures, nearly half of which went to readers outside the United States. The total distribution effected by the American Bible Society and its federated societies had in 1909 exceeded 84,000,000 volumes, in over a hundred different languages.

AUTHORITIES.—Besides the published reports of the societies in question, the following works may be mentioned: J. Owen, *History of the First Ten Years of the British and Foreign Bible Society* (London, 1816-1820); G. Browne, *History of the Bible Society* (London, 1859); Bertram, *Geschichte der Cansteinschen Bibelanstalt* (Halle, 1863); E. Pétavel, *La Bible en France* (Paris, 1864); O. Douen, *Histoire de la société biblique protestante de Paris* (Paris, 1868); G. Borrow, *The Bible in Spain* (London, 1849); W. Canton, *The History of the British and Foreign Bible Society* (London, 1904 foll.); J. Ballinger, *The Bible in Wales* (London, 1906); T.H. Darlow and H.F. Moule, *Historical Catalogue of the Printed Editions of Holy Scripture* (London, vol. i. 1903, vol. ii. 1908).

(T. H. D.)

BIBLIOGRAPHY AND BIBLIOLOGY. The word βιβλιογραφία was used in post-classical Greek for the writing of books, and as late as 1761, in Fenning's *English Dictionary*, a bibliographer is defined as "one who writes or copies books." The transition from the meaning "a writing *of* books" to that of "a writing *about* books," was accomplished in France in the 18th century—witness the publication in 1763 of the *Bibliographie instructive* of de Bure. In England the new meaning seems to have been popularized by the Rev. Thomas Frognall Dibdin early in the 19th century, while Southey preferred the rival form *bibliology*, which is now hardly used. Present custom inclines to restrict the province of bibliography to printed books as opposed to manuscripts, and on the other hand recognizes as coming within its scope almost everything in which a book-loving antiquary can be interested, including the history of printing (see TYPOGRAPHY), book-binding (*q.v.*), book-illustration (see ILLUSTRATION) and book-collecting (*q.v.*). The present article is only concerned with bibliography as the art of the examination, collation and description of books, their enumeration and arrangement in lists for purposes of information, and further with the literature of this subject, *i.e.* with the bibliography of bibliography.

Examination and Collation.—Books are submitted to examination in order to discover their origin, or to test statements concerning it which there is reason to doubt, or to ascertain if they are perfect, and if perfect whether they are in their original condition or have been "made up" from other copies. The discovery of where, when and by whom a book, or fragment of a book, was printed, is the most difficult of these tasks, though as regards books printed in the 15th century it has been much facilitated by the numerous facsimiles enumerated under INCUNABULA (*q.v.*). In the article BOOK (*q.v.*) a sketch is given of the chief external characteristics of books in each century since the invention of printing. Familiarity with books of different ages and countries soon creates a series of general ideas as to the dates and places with which any combination of these characteristics may be connected, and an experienced bibliographer, more especially if he knows something of the history of paper, will quickly narrow down the field of inquiry sufficiently to make special search possible.

As regards the correction of mis-statements in early books as to their place and origin, glaring piracies such as the Lyonnese counterfeits of the octavo editions of the classics printed by Aldus at Venice, and the numerous unauthorized editions of works

by Luther, professing to be printed at Wittenberg, have long ago been exposed. A different variety of the same kind of puzzle arises from the existence of numerous original editions with fictitious imprints. As early as 1499 a Brescia printer, in order to evade the privilege granted to Aldus, gave to an edition of Politian the spurious imprint "Florentiae," and in the 16th century many controversial books printed in England purported to have been issued in German towns, or with pleasant humour, "at Rome before the castle of S. Angel at the sign of S. Peter." Only a knowledge of the general characteristics which a book printed at such a place and such a time should possess will secure avoidance of these traps, but when suspicion has been aroused the whole story will often be found in such books as Weller's *Die maskirte Literatur der älteren und neueren Sprachen* (1856-1867), and *Die falschen und fingirten Druckörte* (1864), Brunet's *Imprimeurs imaginaires et libraires supposés* (1866), de Brouillant's *La Liberté de la Presse en France; Histoire de Pierre du Marteau, imprimeur à Cologne, &c.* (1888); in the various bibliographies of Erotica and in Brunet's *Manuel de l'Amateur* and other handbooks for the use of collectors. A special case of this problem of piracies and spurious imprints is that of the modern photographic or type-facsimile forgery of small books possessing a high commercial value, such as the early editions of the letter of Columbus announcing his discovery of the New World. Bad forgeries of this kind can be detected by the tendency of all photographic processes of reproduction to thicken letters and exaggerate every kind of defect, but the best of these imitations when printed on old paper require a specific knowledge of the originals and often cause great trouble. The type-facsimile forgeries are mostly of short pieces by Tennyson, George Eliot and A.C. Swinburne, printed (or supposed to have been printed—for it is doubtful if some of these "forgeries" ever had any originals) for circulation among friends. These trifles should never be purchased without a written guarantee.

When the edition to which a book belongs is known, further examination is needed to ascertain if it is perfect and in its original state. Where no standard collation is available, this can only be ascertained by a detailed examination of the quires or gatherings of which it is made up (see below). In the earliest books these are often very irregular. A large book was usually printed simultaneously in four or six sections on as many different presses, and the several compositors, if unable to end their sections at the end of a complete quire, would insert a single leaf to give more space, or sometimes leave a blank page, or half page, for lack of matter, occasionally adding the note "*Hic nullus est defectus.*" A careful examination of the text, a task from which bibliographers often shrink, and a comparison with other editions, are the only remedies in these cases.

If a copy contains the right number of leaves, the further question arises as to whether any of these have been supplied from other copies, or are in facsimile. Few collectors even now are educated enough to prefer copies in the condition in which the ravages of time have left them to those which have been "completed" by dealers; hence many old books have been "made up" with leaves from other copies, or not infrequently from other editions. These meddlings often defy detection, but proof of them may be found in differences in the height and colour of the paper, in the two corresponding leaves at either end of a folio quire both possessing a watermark, or in their wiremarks not corresponding, or (in very early books) by the ornamentation added by hand being in a different style.

When it has been ascertained that a copy contains the right number of leaves and that all these leaves are original, the last point to be settled is as to whether it differs in any respect from the standard collation. Owing to the extreme slowness of the presswork for the first two centuries after the invention of printing, there were more opportunities for making small corrections while an old book was passing through the press than there are in the case of modern ones, and on the other hand the balls used for inking the type sometimes caught up words or individual letters and these were replaced by the compositors as best they could. The small variations in the text noticed in different copies of the First Folio edition of Shakespeare, and again of Milton's *Paradise Lost*, are probably to be explained by a mixture of these two causes. Where a serious error was discovered after a sheet had been printed off, the leaf on which it occurred was sometimes cut out and a new leaf (called a "cancel") printed to replace it and pasted on to the rest of the sheet. Variations between different copies of the first edition of Herrick's *Hesperides* which have puzzled all his editors are due to the presence of several of such cancels. Lastly, a printer when he had printed part of a book might wish to increase the size of the edition, and the leaves already printed off would have to be reprinted, thus causing a combination of identical and different leaves in different copies. The famous 42-line Bible of *c.* 1455, variously attributed to Gutenberg and to Fust and Schoeffer, and the *Valerius Maximus* printed by Schoeffer in 1471, are instances of editions being thus enlarged while passing through the press. As each book was set up simultaneously on several different presses, the reprinted leaves occur at the beginning of each of the sections.

It should be mentioned that there are books of which it is difficult to find two copies in exact agreement. Either to quicken presswork or to comply with trade-regulations made in the interest of compositors, in some books of which large numbers were required, *e.g.* the *Paraphrases of Erasmus*, the *First Prayer-book of Edward VI.*, and the "Songs and Sonnets" known as *Tottell's Miscellany*, each forme was set up two or more different times. The formes were then used at haphazard for printing, and both at this stage and when the printed sheets came to be stitched almost any number of different combinations might be made. The books named were all printed in the middle of the 16th century, but probably later instances could be produced.

Description.—The ideal towards which all bibliographical work should be directed is the provision in an accessible form of a standard description of a perfect copy of every book of literary, historical or typographical interest as it first issued from the press, and of all the variant issues and editions of it. When such standard descriptions shall have been made, adequately checked and printed, it will be possible to describe every individual copy by a simple reference to them, with a statement of its differences, if any, and an insistence on the points bearing on the special object with which it is being re-described. Only in a few cases has any approach been made to a collection of such standard descriptions. One instance which may be cited is that of the entries of the 15th century books in the *Repertorium Bibliographicum* of Ludwig Hain (1826-1838), which the addition of an asterisk marks as having been examined by Hain himself in the copies in the Royal library at Munich. The high standard of accuracy of these asterisked entries (save for the omission to note blank leaves at the beginning or end) has been so well established, and the *Repertorium* is so widely known, that in many catalogues of incunabula the short title of the book together with the number of Hain's entry has been usefully substituted for a long description. Books printed at Oxford up to 1640 can be equally well described by their short titles and a reference to Mr Falconer Madan's *Early Oxford Press* published in 1895. At present the number of works which can thus be taken as a standard is only small, owing partly to the greater and more accurate detail now demanded, partly to the absence of any system of co-operation among libraries, each of which is only willing to pay for catalogues relating exclusively to its own collections. It may be hoped that through the foundation of bibliographical institutes more work of this kind may be done.

A standard description of any book must, as a rule, consist of the following sections, though in the case of works which have no typographical interest, some of the details may be advantageously omitted:—(*a*) A literal transcript of the title-page, also of the colophon, if any, and of any headings or other portions of the book serving to distinguish it from other issues; (*b*) Statements as to the size or form of the book, the gatherings or quires of which it is made up, with the total number of leaves, the measurement of an uncut copy or of the type-page, a note of the types in which different parts of the book are printed, and a reference to any trustworthy information already in print; (*c*) A statement of the literary contents of the book and of the points at which they respectively begin; (*d*) A note giving any additional information which may be needed.

(*a*) In transcribing the title-page and other parts of the book it is desirable not to omit intermediate words; if an omission is made it should be indicated by three dots placed close together. The end of a line should be indicated by an upright stroke.[1] It is a considerable gain to indicate to the eye in what types the words transcribed are printed, *i.e.* whether in roman, gothic letter, or italic, and in each case whether in majuscules or minuscules ("upper or lower case"). To do this, however, adds greatly not only to the cost of printing, but also to the liability of error. If roman minuscules are used throughout, or roman for the text and italic for the imprint of colophon, the method of transliteration which the printer himself would have used should be adopted. Many of the best modern catalogues and bibliographies are disfigured by the occurrence in them of such forms as "qvinqve," "qveen," "Evrope," due to an unintelligent transliteration of the forms QVINQVE, QVEEN, EVROPE, as they occur on title-pages at a date when "V" was the majuscule form of both "v" and "u." If it is desired to retain the V forms the words should be printed in majuscules. If minuscules are used, the words should be transliterated as quinque, queen, Europe, according to the practice of the old printers themselves.

A troublesome question often arises as to what notice should be taken in reproducing the misprints which frequently occur in the original titles. Bibliographers who have satisfied themselves (and their readers) of their own accuracy may reproduce them in silence, though it will need constant watchfulness to prevent the printer from "setting them right." Transcribers of only average accuracy will consult their happiness by indicating the misprint in some way, and the frequent use of (*sic*), more especially when printed in italics, or of the German (!), being ugly, probably the simplest plan is to add a note at the end stating that the misprints in question occur in the original.

(*b*) The "size" of a book is a technical expression for the relation of the individual leaves to the sheet of paper of which they form a part. A book in-folio means one in which the paper has been folded once, so that each sheet has made two leaves. In a book in-quarto, each sheet has been folded twice so as to make four leaves. In an octavo another fold has produced eight leaves, and so on for books in 16mo, 32mo and 64mo. For books in twelves, twenty-fours, &c., the paper has at some stage to be folded in three instead of in two, and there will be some difference in form according to the way in which this is done. The size of a book printed on handmade paper "is very simply recognized by holding up a page to the light. Certain white lines, called wire-lines, will be noticed, occurring as a rule about an inch apart, and running at right angles to the fine lines. These wire-lines are perpendicular in a folio, octavo, 32mo, and horizontal in a quarto and 16mo. In a 12mo, as the name implies, the sheet is folded in twelve; and in the earlier part at least of the 16th century this was done in such a way that the wire-lines are perpendicular, the height of the sheet forming two pages, as is the case in an octavo, while the width is divided into six instead of into four as in an octavo. The later habit has been to fold the sheet differently, the height of the sheet forming the width of four pages, and the width of the sheet the height of three pages, consequently the wire-lines are horizontal" (E.G. Duff, *Early Printed Books*, pp. 206-207).

The recognition of what is meant by the size of a book has been obscured by the erroneous idea that the quires or gatherings of which books are made up necessarily consist of single sheets.[2] If this were so all folios would be in gatherings of two leaves each; all quartos in gatherings of four leaves; all octavos in gatherings of eights. In the case of books printed on handmade paper, this is generally true of octavos, but to reduce the amount of sewing the earliest folios were usually arranged in tens, *i.e.* in gatherings of five sheets or ten leaves, while in Shakespeare's time English folios were mostly in sixes. In the same way quartos are often found made up in eights, and on the other hand the use of a half-sheet produces a gathering of only two leaves.

When a manuscript or early printed book was being prepared for binding, it was usual for the order in which the quires or gatherings were to be arranged to be indicated by signing them with the letters of the alphabet in their order, the alphabet generally used being the Latin, in which I stands for both I and J; V for both U and V, and there is no W. If more than twenty-three letters were needed the contractions for *et, con, rum* and (less often) that for *us*, were used as additional signs, and for large books minuscules were used as well as majuscules, and the letters were doubled. In 1472 printed signatures came into use. If the quires or gatherings in the book to be described are signed in print, the signatures used should be quoted without brackets. If they are not signed, the order of the gatherings should be noted by the letters of the alphabet in square brackets. In each case the number of leaves in each gathering should be shown by index-figures. Thus, six gatherings of eight leaves followed by one of four should be represented by the symbols A-F^{8} G^{4}. The "make-up" of an old book in original binding is usually sufficiently shown by the strings in the middle of each quire. In books which have been rebound help may sometimes be obtained from the fact that between (roughly) 1750 and 1850, a period during which there was much rebinding of early books, the gatherings before being put into their new quires were mostly separately pressed, with the result that the outer pages of each gathering are much smoother than the rest. But the only safe guide to the make-up of an old book without printed signatures is a collation by means of the watermarks, *i.e.* the devices with which the papermaker as a rule marked each sheet (see Paper). In a folio book one of every pair of leaves should have a watermark in the middle of the paper. In a quarto some pairs of leaves will have no watermark; in others it will be found divided by the fold of the paper. As the great majority of books without printed signatures are in folio or quarto, the sequence of watermarked and un-watermarked leaves, if carefully worked out, will mostly reveal the "make-up" of the successive gatherings.

After the size and sequence of the gatherings has been stated, the total number of leaves should be noted, with a mention of any numeration of them given in the book. Any discrepancy between the total of the leaves assigned to the successive gatherings and the total as separately counted of course points to an error, and the reckonings must be repeated till they tally. Errors in the printed enumeration of the leaves of old books are common, and it is seldom necessary to point them out in detail. When reference has to be made to a particular page of an old book, the printed signatures offer the readiest means, an index number placed below the letter indicating the number of the leaf in the gathering and the addition of "recto" or "verso" marking the upper or under page of the leaf. Thus "X$_{4}$ recto" (some bibliographers prefer the rather clumsier form "X 4 recto") stands for the first page of the fourth leaf of the gathering signed X. Where there are no printed signatures the leaf-number may be given, the letters "a" and "b" above the numeral taking the place of "recto" and "verso" (leaf 99^{a}). Where some leaves of a book are numbered and others not, if the reference is to the printed numeration this should be stated. Printed leaf numeration is found as early as 1470, and became common about ten years later. Printed pagination did not become common till nearly the middle of the 16th century.

The foregoing details are all directed to showing which leaves of a book would be printed by the same pull of the press, how it was made up for binding, and how imperfections in any copy may be detected. They give little or no indication of the dimensions of the book. In the case of modern editions this may be done by adding one of the trade epithets, pott, foolscap, crown, &c., to the name of the size, which when thus qualified denotes paper of a particular measurement (see Paper). As, however, these measurements are not easily remembered, it is better to give the actual measurements in inches or millimetres of a page of an uncut copy. In old books uncut copies are not easily found, and it is useful instead of this to give the measurement in millimetres of the printed portion of the page (technically called the "type-page"), although this is subject to a variation of about 3% in different copies, according to the degree to which they were damped for printing. To this is added a statement of the number of lines in the page measured. The character of the type (roman, gothic or italic) is next mentioned, and in the case of 15th-century books, its number in the sequence of founts used by the printer (see Incunabula). Finally a reference to any authoritative description already printed completes this portion of the entry. Thus the description of the collation of the first-dated book printed at Augsburg, the *Meditationes* of S. Bonaventura, printed by Günther Zainer in 1468, should read: Folio (a^{10}, b-d^{8}, e-g^{10}, h^{8}) 72 leaves. Type-page ([3]) 202 × 120 mm.; 35 lines. Type 1 (gothic letter). Hain 3557.

(*c*) While many books, and this is especially true of early ones, contain little or nothing beyond the bare text of a well-known work, others are well provided, not only with commentaries which are almost sure to be mentioned on the title-page, or in the colophon (which the editor himself often wrote), but also with dedicatory letters, prefaces, complimentary verses, indexes and other accessories, the presence of which it is desirable to indicate. In these cases it is often convenient to show the entire contents of the book in the order in which they occur, noting the leaves or pages on which each begins. Thus in the first edition (1590) of the first three books of Spenser's *Faerie Queene*, the literary contents, their order, and the space they occupy can be concisely noted by taking the successive gatherings according to their signatures and showing what comes on each page. Thus: A$_{1}$, recto, title; verso, dedication, "To the Most Mightie and Magnificent Empresse Elizabeth"; A$_{2}$-Oo$_{8}$, text of books i.-iii.; Pp$_{1}$, letter dated the 23rd of January 1589 [1590] to Sir Walter Raleigh expounding the intention of the work; Pp$_{3}$ verso, commendatory verses signed W. R[aleigh], Hobynoll (Gabriel Harvey), R.S., H.B., W.L. and Ignoto; Pp$_{5-8}$, complimentary sonnets severally inscribed to Sir C. Hatton, the earls of Essex, Oxford, Northumberland and Ormond, Lord Ch. Howard, Lord Grey of Wilton and Sir W. Raleigh, and to Lady Carew and to the Ladies in the Court; and "Faults escaped in the print"; Qq$_{1-4}$, fifteen other sonnets.

Some bibliographers prefer to reverse the order of notation, (title, A$_{1}$, recto; dedication, A$_{1}$, verso, &c.), and no principle is sacrificed in doing so, though the order suggested usually works out the more neatly.

Enumeration and Arrangement.—In the 18th and early 19th centuries there was a tendency, especially among French writers, to exaggerate the scope of bibliography, on the ground that it was the duty of the bibliographer to appraise the value of all the books he recorded, and to indicate the exact place which each work should occupy in a logical classification of all literature based on a previous classification of all knowledge. Bibliographers are now more modest. They recognize that the classification

of human knowledge is a question for philosophers and men of science, that the knowledge of chemistry and of its history needed to make a good bibliography of chemistry is altogether extrinsic to bibliography itself; that all, in fact, to which bibliography can pretend is to suggest certain general principles of arrangement and to point out to some extent how they may be applied. The principles are neither numerous nor recondite. To illustrate the history of printing, books may be arranged according to the places and printing-houses where they were produced. For the glorification of a province or county, they are sometimes grouped under the places where their authors were born or resided. For special purposes, they may be arranged according to the language or dialect in which they are written. But, speaking generally, the choice for a basis of arrangement rests between the alphabetical order of authors and titles, a chronological order according to date of publication, a "logical" or alphabetical order according to subjects, and some combination of these methods. In exercising the choice the essential requisite is a really clear idea of the use to which the bibliography, when made, is to be put. If its chief object be to give detailed information about individual books, a strictly alphabetical arrangement "by authors and titles" (*i.e.* by the names of authors in their alphabetical order, and the titles of their books in alphabetical sequence under the names) will be the most useful, because it enables the student to obtain the information he seeks with the greatest ease. But while such an alphabetical arrangement offers the speediest access to individual entries, it has no other merit, unless the main object of the bibliography be to show what each author has written. If it is desired to illustrate the history and development of a subject, or the literary biography of an author, the books should be entered chronologically. If direction in reading is to be given, this can best be offered by a subject-index, in which the subjects are arranged alphabetically for speedy reference, and the books chronologically under the subject, so that the newest are always at the end. Lastly if the object is to show how far the whole field has been covered and what gaps remain to be filled, a class catalogue arranged according to what are considered the logical subdivisions of the subject has its advantages. It is important, however, to remember that, if the bulk of the bibliography is very large, a principle of arrangement which would be clear and useful on a small scale may be lost in the quantity of pages over which it extends. An arrangement which cannot be quickly grasped, whatever satisfaction it may give its author, is useless to readers, the measure of its inutility being the worn condition of the alphabetical index to which those who cannot carry a complicated "logical" arrangement in their heads are obliged to turn, in the first instance, to find what they want. It should be obvious that any system which necessitates a preliminary reference to a key or index rests under grave suspicion, and needs some clear counterbalancing gain to justify the loss of time which it entails. The main classification should always be that which will be most immediately useful to readers of the books. To throw light on the history of a subject and to indicate how far the field is covered are honourable objects for compilers, but should mostly be held subordinate to practical use. It is noteworthy also that they may often be better forwarded by means of an index or table than by the main arrangement. The history of Hain's *Repertorium Bibliographicum*, which enumerates in an alphabetical arrangement of authors and titles some 16,000 books printed in the 15th century, is a good example of this. For sixty-five years it was of the utmost use for its accurate descriptions of individual books, but threw practically no light on the history of printing. In 1891 Dr Konrad Burger published an appendix to it containing an Index of Printers, since greatly enlarged in his index to Dr Copinger's *Supplement to Hain* (1902). The form of the index enables each printer's work to be seen at a glance, and the impetus given to the study of the history of printing was very great. But if the book had originally been arranged under Printers instead of Authors, it would have been far more difficult to use; its literary value would have been halved, and the record of the output of each press, now instantly visible, would have been obscured by the fuller entries causing it to extend over many pages.

The Bibliography of Bibliography.—The zeal of students of early printing has provided the material for an almost exhaustive list (see Incunabula) of the books printed in the 15th century still extant. Of those printed in the years 1501-1536 there is a tentative enumeration in the continuation of Panzer's *Annales Typographici* (1803), and materials are gradually being collected for improving and extending this. But the projects once formed for a universal bibliography have dwindled in proportion as the output of the press has increased, and the nearest approaches to such a work are the printed catalogue of the library of the British Museum, and that of the Bibliothèque Nationale at Paris, now in progress. Of books of great rarity unrepresented in these catalogues a fairly sufficient record exists in Brunet's *Manuel du libraire*, the bibliographical collections of Mr W.C. Hazlitt, the *Bibliographer's Manual* by Lowndes, and the other bibliographical works enumerated in the article on book-collecting (*q.v.*). When a universal bibliography was recognized as an impossibility, patriotism suggested the compilation of national bibliographies, and the *Bibliotheca Britannica* of Robert Watt (Edinburgh, 1824) remains an extraordinary example of what the zeal of a single man could accomplish in this direction. Quérard's *La France littéraire* (Paris, 1827-1839), while it gives fuller titles, is much less comprehensive, embracing mainly books of the 18th and early 19th centuries, and only such of these as appeared to the compiler to be written by "savants, historiens, et gens de lettres." In the works of Heinsius (*Allgemeines Bücherlexikon, 1700-1815*, Leipzig, 1812-1817), and Kayser (*Bücherlexikon, 1750*, &c., Leipzig, 1834, &c.) Germany possesses a fine record of her output of books during the last two centuries, and since the organization of the book-trade, contemporary lists of books, with *résumés* and indexes issued at intervals, exist for most European countries. For the period before these became of importance in England much bibliographical material has been collected in the Catalogues of English Books printed up to the end of the year 1640, issued by the British Museum in 1884, by the John Rylands library, Manchester, in 1895, and by the University library, Cambridge, in 1900-1906. A similar record of the rich English collections in the Bodleian library, Oxford, remains a great *desideratum*. While these substitutes for a universal author catalogue have gradually been provided, similar contributions to a universal subject catalogue have been made in the form of innumerable special bibliographies compiled by students or bookmen interested in special subjects or departments of literature. The most important of these are enumerated in the bibliographical notes appended to articles in this Encyclopaedia, but many attempts have been made to compile separate catalogues of them.

The most recent of these bibliographies of bibliographies naturally take over all that is of any value in their predecessors, and it may suffice therefore to make special mention of the following:—*Bibliotheca bibliographica. Kritisches Verzeichniss der das Gesammtgebiet der Bibliographie betreffenden Litteratur des In- und Auslandes, in systematisches Ordnung bearbeitet von Dr Julius Petzholdt. Mit alphabetischen Namen und Sachregister* (Leipzig, 1866), 8vo, pp. xii. 940; *Manuel de bibliographie générale*, par Henri Stein (Paris, 1898), 8vo, pp. xx. 896; *Manuel de bibliographie historique*, par Ch. V. Langlois (Paris, 1901), 12mo, pp. xi. 623; *A Register of National Bibliography. With a selection of the chief bibliographical works and articles printed in other Countries*, by W.P. Courtney (London, 1905), 8vo, pp. viii. 631.

It should also be noted that the *List of Books of Reference in the Reading-Room of the British Museum*, first published in 1889, and the *Subject-index of the Modern Works added to the Library of the British Museum in the years 1881-1900*, edited by G.K. Fortescue (supplements published every five years), include entries of a vast number of bibliographical works, and that an eclectic list, with a valuable introduction, will be found in Professor Ferguson's *Some Aspects of Bibliography* (Edinburgh, 1900).

(A. W. Po.)

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1 Some bibliographers prefer to use double strokes to avoid confusion with the old-fashioned long commas. Others use a single stroke to indicate the space between two lines and increase the number of strokes where the space left is wider than this.

2 It may be noted that some confusion is caused in descriptions of books by the word "sheet," which should be restricted to the original sheet of paper which by folding becomes folio, quarto, &c., being applied also to the double-leaf of four pages. A word specially appropriated to this is greatly needed, and as gatherings of two, three, four, &c., of such double-leaves are known technically as duernions, ternions, quaternions, &c., the double-leaf itself might well be called a "unit."

3 Here specify the page measured.

BIBLIOMANCY (from the Gr. βιβλίον, a book, and μαντεία, prophecy), a form of divination (*q.v.*) by means of the Bible or other books. The method employed is to open the Bible haphazard and be guided by the first verse which catches the eye. Among the Greeks and Romans the practice was known under the name of *sortes Homericae* or *sortes Virgilianae*, the books consulted being those of Homer or Virgil.

BIBRACTE, an ancient Gaulish town, the modern Mont Beuvray, near Autun in France. Here, on a hilltop 2500 ft. above sea-level, excavation has revealed a vast area of 330 acres, girt with a stone and wood rampart 3 m. long, and containing the remains of dwelling-houses, a temple of Bibractis, and the workshops of iron and bronze workers and enamellers. It was the capital of the Aedui in the time of Julius Caesar. Later on Augustus removed the inhabitants to his new town Augustodunum (Autun), to destroy the free native traditions. Another far more obscure town in Gaul, near Reims, also bore the name.

See Bulliot, *Fouilles de Beuvray*; Déchelette, *Oppidum de Bibracte*; also references *s.v.* AEDUI.

BIBULUS, a surname of the Roman gens Calpurnia. The best-known of those who bore it was Marcus Calpurnius Bibulus, consul with Julius Caesar, 59 B.C. He was the candidate put forward by the aristocratical party in opposition to L. Lucceius, who was of the party of Caesar; and bribery was freely used, with the approval of even the rigid Cato (Suetonius, *Caesar*, 9), to secure his election. But he proved no match for his able colleague. He made an attempt to oppose the agrarian law introduced by Caesar for distributing the lands of Campania, but was overpowered and even personally ill-treated by the mob. After making vain complaints in the senate, he shut himself up in his own house during the remaining eight months of his consulship, taking no part in public business beyond fulminating edicts against Caesar's proceedings, which only provoked an attack upon his house by a mob of Caesar's partisans. His conduct gave rise to the jest, that Julius and Caesar were consuls during that year. When the relations of Caesar and Pompey became strained, Bibulus supported Pompey (Plutarch, *Cato Minor*, 41) and joined in proposing his election as sole consul (52 B.C.). Next year he went to Syria as proconsul and claimed credit for a victory gained by one of his officers over the Parthians, before his own arrival in the province. After the expiration of his term of office, Pompey gave him command of his fleet in the Ionian Sea. He proved himself utterly incapable; his chief exploit was the burning of thirty transports on their return from Epirus whither they had succeeded in conveying Caesar and some troops from Brundusium. He died soon afterwards (48) of fatigue and mortification (Caesar, *Bell. Civ.* iii. 5-18; Dio Cassius xli. 48). Although not a man of great importance, Bibulus showed great persistency as the enemy of Caesar. Cicero says of him that he was no orator, but a careful writer. By his wife Porcia, daughter of Cato, afterwards married to Brutus, he had three sons. The two eldest were murdered in Egypt by some of the soldiery of Gabinius; the youngest, Lucius Calpurnius Bibulus, fought on the side of the republic at the battle of Philippi, but surrendered to Antony soon afterwards, and was by him appointed to the command of his fleet. He died (about 32) while governor of Syria under Augustus. He wrote a short memoir of his step-father Brutus, which was used by Plutarch (Appian, *B.C.* iv. 136; Plutarch, *Brutus*, 13. 23).

BICE (from Fr. *bis*, a word of doubtful origin, meaning dark-coloured), a term erroneously applied in English to particular shades of green or blue pigments from the French terms *vert bis* and *azur bis*, dark green or blue. These colours are generally prepared from basic copper carbonates, but sometimes from ultramarine and other pigments.

BICESTER, a market town in the Woodstock parliamentary division of Oxfordshire, England, 12 m. N.N.E. of Oxford by a branch of the London & North-Western railway. Pop. of urban district (1901) 3023. It lies near the northern edge of the flat open plain of Ot Moor, in a pastoral country. The church of St Eadburg, the virgin of Aylesbury, is cruciform, with a western tower, and contains examples of Norman and each succeeding style. There is, moreover, in the nave a single rude angular arch considered to be Saxon. Incorporated with a farm-house, scanty Perpendicular remains are seen of an Augustinian priory founded at the close of the 12th century. Bicester has considerable agricultural trade and a brewing industry. It is a favourite hunting centre.

The termination *cester*, commonly indicating Roman origin, does not do so here, and is perhaps copied from Alchester and Chesterton, 2 m. west of Bicester, where there is a small Roman site, probably a wayside village, at the meeting of roads from the south (Dorchester), west, north-east and east.

Bicester (Berncestre, Burencestre, Bissiter), according to the Domesday survey, was held by Robert d'Oily. In 1182 Gilbert Basset founded here an Augustinian priory, which from that date until its dissolution in 1538 became the centre of the industrial life and development of the town. In 1253 William Longspey obtained a grant of a fair at the feast of St Edburg, and a Friday market is mentioned in the 14th century. Richard II. granted a Monday market and a fair at the feast of St James the Apostle, and in 1440 an additional market was granted to be held in that part of the town called Bury-End, from this date known as Market-End. Bicester never possessed any manufactures of importance, but the fairs and markets were much frequented, and in the 16th century the cattle market was especially famous.

See J.C. Blomfield, *History of the Deanery of Bicester* (London, 1882-1894); John Dunkin, *History of Bicester* (London, 1816).

BICHAT, MARIE FRANÇOIS XAVIER (1771-1802), French anatomist and physiologist, was born at Thoirette (Jura) on the 14th of November 1771. His father, a physician, was his first instructor. He entered the college of Nantua, and afterwards studied at Lyons. In mathematics and the physical sciences he made rapid progress, but ultimately devoted himself to the study of anatomy and surgery, under the guidance of M.A. Petit (1766-1811), chief surgeon to the Hôtel Dieu at Lyons. The revolutionary disturbances compelled him to fly from Lyons and take refuge in Paris in 1793. He there became a pupil of P.J.

Desault, who was so strongly impressed with his genius that he took him into his house and treated him as his adopted son. For two years he actively participated in all the labours of Desault, prosecuting at the same time his own researches in anatomy and physiology. The sudden death of Desault in 1795 was a severe blow to Bichat. His first care was to acquit himself of the obligations he owed his benefactor, by contributing to the support of his widow and her son, and by conducting to a close the fourth volume of Desault's *Journal de Chirurgie*, to which he added a biographical memoir of its author. His next object was to reunite and digest in one body the surgical doctrines which Desault had published in various periodical works. Of these he composed *Œuvres chirurgicales de Desault, ou tableau de sa doctrine, et de sa pratique dans le traitement des maladies externes* (1798-1799), a work in which, although he professes only to set forth the ideas of another, he develops them with the clearness of one who is a master of the subject. In 1797 he began a course of anatomical demonstrations, and his success encouraged him to extend the plan of his lectures, and boldly to announce a course of operative surgery. In the following year, 1798, he gave in addition a separate course of physiology. A dangerous attack of haemoptysis interrupted his labours for a time; but the danger was no sooner past than he plunged into new engagements with the same ardour as before. He had now scope in his physiological lectures for a fuller exposition of his original views on the animal economy, which excited much attention in the medical schools at Paris. Sketches of these doctrines were given by him in three papers contained in the Memoirs of the Société Médicale d'Émulation, which he founded in 1796, and they were afterwards more fully developed in his *Traité sur les membranes* (1800). His next publication was the *Recherches physiologiques sur la vie et sur la mort* (1800), and it was quickly followed by his *Anatomie générale* (1801), the work which contains the fruits of his most profound and original researches. He began another work, under the title *Anatomie descriptive* (1801-1803), in which the organs were arranged according to his peculiar classification of their functions, but lived to publish only the first two volumes. It was completed on the same plan by his pupils, M.F.R. Buisson (1776-1805) and P.J. Roux (1780-1854).

Before Bichat had attained the age of eight-and-twenty he was appointed physician to the Hôtel Dieu, a situation which opened an immense field to his ardent spirit of inquiry. In the investigation of diseases he pursued the same method of observation and experiment which had characterized his researches in physiology. He learned their history by studying them at the bedside of his patients, and by accurate dissection of their bodies after death. He engaged in a series of examinations, with a view to ascertain the changes induced in the various organs by disease, and in less than six months he had opened above six hundred bodies. He was anxious also to determine with more precision than had been attempted before, the effects of remedial agents, and instituted with this view a series of direct experiments which yielded a vast store of valuable material. Towards the end of his life he was also engaged on a new classification of diseases. A fall from a staircase at the Hôtel Dieu resulted in a fever, and, exhausted by his excessive labours and by constantly breathing the tainted air of the dissecting-room, he died on the 22nd of July 1802. His bust, together with that of Desault, was placed in the Hôtel Dieu by order of Napoleon.

BICHROMATES AND CHROMATES. Chromium trioxide dissolves readily in water, and the solution is supposed to contain chromic acid, H_2CrO_4; the salts of this acid are known as the chromates. In addition to these normal salts, others exist, namely bichromates, trichromates, &c., which may be regarded as combinations of one molecular proportion of the normal salt with one or more molecular proportions of chromium trioxide. The series will thus possess the following general formulae:—

M_2CrO_4	$M_2Cr_2O_7$	$M_2Cr_3O_{10}$ &c.	(M = one atom of a
normal chromate	bichromate	trichromate	monovalent metal.)

Chromates.—The alkaline chromates are usually obtained by fusion of a chromium compound with an alkaline carbonate and an oxidizing agent, such for example as potassium nitrate or chlorate. The native chrome-ironstone (Cr_2O_3·FeO) may be used in this way as a source of such compounds, being fused in a reverberatory furnace, along with soda-ash and lime, the oxidizing agent in this case being atmospheric oxygen. They may also be prepared by oxidizing chromium salts (in alkaline solution) with hydrogen peroxide, chlorine, bleaching powder, potassium permanganate and manganese dioxide. The majority of the chromates are yellow in colour, and many of them are isomorphous with the corresponding sulphates. The alkaline chromates are soluble in water, those of most other metals being insoluble. By the addition of mineral acids, they are converted rapidly into bichromates. They are easily reduced in acid solution by sulphuretted hydrogen, and also by sulphur dioxide to chromium salts. The chromates are stable towards heat; they are poisonous, and may be recognized by the yellow precipitates they give with soluble barium and lead salts.

Potassium chromate, K_2CrO_4, may be prepared by neutralizing a solution of potassium bichromate with potassium carbonate or with caustic potash. It crystallizes in yellow rhombic prisms, and is readily soluble in water, the solution having a bitter taste and an alkaline reaction. When heated in a current of sulphuretted hydrogen, or carbon bisulphide, it yields a mixture of chromium sesquioxide and sulphide. When heated with sulphur it yields chromium sesquioxide. Sodium chromate, $Na_2CrO_4·10H_2O$, forms pale yellow crystals isomorphous with hydrated sodium sulphate, $Na_2SO_4·10H_2O$. It is deliquescent, and melts at 23° C. (M. Berthelot). By evaporation of its aqueous solution at temperatures above 30° C. it may be obtained in the anhydrous condition. Lead chromate, $PbCrO_4$, occurs native as the mineral crocoisite, and may be obtained as an amorphous pale yellow solid by precipitating a soluble lead salt by an alkaline chromate. It is used as a pigment under the name "chrome yellow." When digested for some time with a caustic alkali it is converted into a basic salt, $PbCrO_4·PbO$, a pigment known as "chrome red." It melts readily, and on cooling resolidifies to a brown mass, which at moderately high temperatures gives off oxygen and leaves a residue of a basic lead salt; for this reason fused lead chromate is sometimes made use of in the analysis of organic compounds. Silver chromate, Ag_2CrO_4 is a dark red amorphous powder obtained when silver nitrate is precipitated by an alkaline chromate. It is decomposed by the addition of caustic alkalis, forming silver oxide and an alkaline chromate.

Bichromates.—The bichromates are usually of a red or reddish-brown colour, those of the alkali metals being readily soluble in water. They are readily decomposed by heat, leaving a residue of the normal chromate and chromium sesquioxide, and liberating oxygen; ammonium bichromate, however, is completely decomposed into chromium sesquioxide, water and nitrogen. Sulphuretted hydrogen and sulphur dioxide reduce them in acid solution to the condition of chromium salts.

Potassium bichromate, $K_2Cr_2O_7$, is obtained by fusing chrome ironstone with soda ash and lime (see above), the calcium chromate formed in the process being decomposed by a hot solution of potassium sulphate. After the calcium sulphate has settled, the potassium chromate solution is converted into bichromate by the action of sulphuric acid, and the salt is allowed to crystallize. It forms large triclinic prisms of specific gravity 2.6-2.7, which are moderately soluble in cold water and readily soluble in hot water. The solution is strongly acid in reaction and is very poisonous. Potassium bichromate finds extensive application in organic chemistry as an oxidizing agent, being used for this purpose in dilute sulphuric acid solution, $K_2Cr_2O_7 + 4H_2SO_4 = KaSO_4 + Cr_2(SO_4)_3 + 4H_2O + 3O$. On the addition of concentrated sulphuric acid to a cold saturated solution of the salt, red crystals of chromium trioxide, CrO_3, separate (see Chromium), whilst when warmed with concentrated hydrochloric acid and a little water, potassium chlorochromate is produced. When heated with phosphorus trichloride in a sealed tube to 160° C., potassium chlorochromate, phosphorus oxychloride, potassium chloride, and a complex chromium oxide (possibly Cr_3O_6) are produced (A. Michaelis, *Jour. prak. Chem.*, 1871, ii. 4, p. 452). Potassium bichromate finds application in photography, in calico-printing and in the preparation of bichromate cells. Sodium bichromate, $Na_2Cr_2O_7·2H_2O$, may be obtained by the addition of the requisite quantity of chromium trioxide to a solution of sodium chromate. It crystallizes in hyacinth-red prisms, which are very hygroscopic and melt at 320° C.

Trichromates.—The trichromates are obtained by the addition of nitric acid (of specific gravity about 1.2) to solutions of the bichromates. They form rhombic crystals of a red or brown red or brown red colour and are readily decomposed by warm water,

with formation of the bichromate.

Perchromic Acid.—By the addition of hydrogen peroxide to a solution of chromic acid, a fine blue coloration due to a perchromic acid is produced which is readily absorbed by shaking out with ether. The following formulae have been assigned to the compound:—$H_2O_2 \cdot CrO_3$ (H. Moissan, *Comptes rendus*, 1883, 97, p. 96); $H_2O_2 \cdot 2HCrO_4$ (M. Berthelot, *Comptes rendus*, 1889, 108, p. 25); $Cr_2O_7 \cdot xH_2O$ (L.C.A. Barreswil, *Ann. chim. et phys.*, 1847 [3], 20, p. 364), and $CrO_6 \cdot 3H_2O$ (T. Fairley, *Chem. News*, 1876, 33, p. 237). The more recent investigations of H.G. Byers and E.E. Reed (*Amer. Chem. Jour.*, 1904, 32, p. 503) show that if metallic potassium be added to an ethereal solution of the blue compound at −20° C., hydrogen is liberated and a purple black precipitate of the perchromate, of composition $KCrO_4$ or $K_2Cl_2O_8$, is produced; this compound is very unstable, and readily decomposes into oxygen and potassium bichromate. Similar sodium, ammonium, lithium, magnesium, calcium, barium and zinc salts have been obtained. It is shown that the blue solution most probably contains the acid of composition, $H_2Cr_2O_8$, whilst in the presence of an excess of hydrogen peroxide more highly oxidized products probably exist.

BICKER (connected by Skeat with *bike*, to thrust or strike), an Old English word (traced from the 13th century) implying conflict or disputation. A poetical use, from the noise, is seen in Tennyson's *Brook*, "to bicker down the valley."

BICKERSTAFFE, ISAAC (*c.* 1735-*c.* 1812), English dramatist, was born in Ireland about 1735. At the age of eleven he was appointed a page to Lord Chesterfield, then lord lieutenant of Ireland, and subsequently held a commission in the Marines, but was dismissed the service under discreditable circumstances. He was the author of a large number of plays and burlesque farces interspersed with songs, produced between 1760 and 1771. The best-known are *Maid of the Mill* (founded on Richardson's *Pamela*), *The Padlock, He Would if he Could, Love in a Village, The Hypocrite* and *The Captive*. In 1772 Bickerstaffe, suspected of a capital offence, fled to the continent. The exact date of his death is unknown, but he is stated to have been still living in abject misery in 1812.

A full account of his dramatic productions is given in *Biographia Dramatica*, edited by Stephen Jones (1812).

BICKERSTETH, EDWARD (1786-1850), English evangelical divine, brother of Henry, Baron Langdale, master of the rolls (1836-1851), and uncle of Robert Bickersteth, bishop of Ripon (1857-1884), was born at Kirkby Lonsdale, and practised as a solicitor at Norwich from 1812 to 1815. In 1816 he took orders, and was made one of the secretaries of the Church Missionary Society. On receiving the living of Watton, Hertfordshire, in 1830, he resigned his secretaryship, but continued to lecture and preach, both for the Church Missionary Society and the Society for the Conversion of the Jews. His works include *A Scripture Help* (London, 1816), which has been translated into many European languages, and *Christian Psalmody* (London, 1833), a collection of over 700 hymns, which forms the basis of the *Hymnal Companion* (London, 1870), compiled by his son, E.H. Bickersteth, bishop of Exeter (1885-1890). He was active in promoting the Evangelical Alliance of 1845, strongly opposed the Tractarian Movement, and was one of the founders of the Irish Church Missions, and Parker, Societies.

Edward Bickersteth (1814-1892), dean of Lichfield, was his nephew, and Edward Bickersteth (1850-1897), bishop of South Tokyo, his grandson.

BICYCLE (from prefix *bi* = twice, and κύκλος a circle, wheel). The modern bicycle, as developed from the old velocipede (see Cycling), consists essentially of two wheels placed one behind the other and mounted on a frame which carries a saddle for the rider. Between the wheels is a crank-axle which the rider drives by means of the cranks and pedals, and its motion is transmitted to the rear or driving wheel either by a chain which passes over two chain wheels, one fixed on the crank-axle and the other on the hub of the rear wheel, or, in the chainless bicycle, by a tubular shaft and two pairs of bevel-wheels. The rear wheel is usually so arranged that it can turn, when the bicycle is running by its own momentum, independently of the chain and pedals ("free-wheel"), and a variable speed gear is often provided so that the rider may at will alter the ratio between the rate of revolution of the crank-axle and the driving wheel. The front, or steering wheel, is mounted in a fork having its two upper ends brazed into the "crown," to which also the lower end of the steering tube is brazed. The steering tube is mounted by ball bearings in the socket tube, which forms the forward portion of the rear-frame.

The highest quality of materials and the most accurate workmanship are required to produce a first-class bicycle. Steel of 75 to 100 tons per sq. in. tensile strength is used in chains, spokes, &c. In balls and ball-races, hardness without brittleness, and homogeneity are of primary importance. Broken balls, or even traces of wear in bearings, are now seldom heard of in a first-class bicycle. The process of case-hardening, whereby an extremely hard outer skin is combined with a tough interior, has been brought to a high degree of perfection, and is applied to many parts of the bicycle, particularly chains, free-wheels and toothed-wheel variable speed gears. Interchangeability of parts is secured by working to the smallest possible limits of error of workmanship.

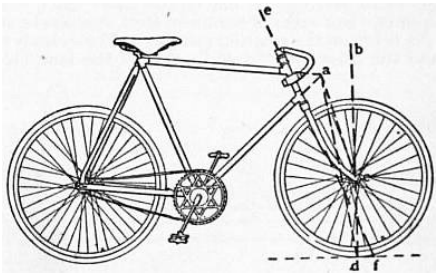

Fig. 1.

Frames.—Fig. 1 represents a road-racer. A full roadster would have the handles a little higher relatively to the saddle, and would be provided with mud-guards, free-wheel and sometimes a gear-case and variable speed gear. Fig. 2 shows a lady's bicycle with gear-case and dress-guard. The rear frame of the "diamond" type (fig. 1) is subjected to very small stresses due to vertical load. The front fork and steering post are subject to bending moment due to the reaction from the ground in the direction *dcb*. A slight amount of elasticity in the front fork adds considerably to the comfort in riding over rough roads. When the brake is applied lightly to the front wheel, the reaction from the ground falls more closely along the axis of the front fork, and the bending moment at the crown is diminished. If the front brake is applied harder the reaction from the ground at d may pass through the crown, in which case the bending moment at the crown is zero. Still harder application of the brake causes a bending moment in the opposite direction. In fig. 1 the axes of the top and bottom tubes of the rear frame are produced to meet at *a*. If the reaction from the ground is in the direction *da*, the top and bottom tubes are subjected to pure compressive and tensile stresses respectively. When no brake pressure is applied a bending moment due to the overhang *ab* is superimposed on these tubes. Thus a short socket head with top tube sloping downwards towards the head gives a stronger frame than a horizontal top tube. The steering axis *ef* is arranged so as to cut the ground at *f*, a little in front of the point of contact *d* of the wheel with the ground, giving a slight castor action, and making steering possible without use of the handle-bar. The rake of the steering head (that is the angle between *ef* and *bd*) and the set of the fork (that is the displacement of the wheel centre *c* from the axis *ef*) may be varied within tolerably large limits without much affecting the easy steering properties of the bicycle. The transverse stresses on the rear frame due to the action of pedalling are more severe than those due to the vertical load. The pedal pressure is applied at a considerable distance from the central plane of the bicycle, and the pedal pin, cranks and crank-axle are subjected to a bending moment which is transmitted by the ball bearings to the frame. The down-tube from the seat lug to the crank-bracket and the bottom tube from the foot of the steering socket tube to the crank-bracket are made fairly stout to resist this bending moment. Further, the pull of the chain causes a transverse bending moment in the plane of the chain-stays, which must be stiff enough under heavy pedal pressure.

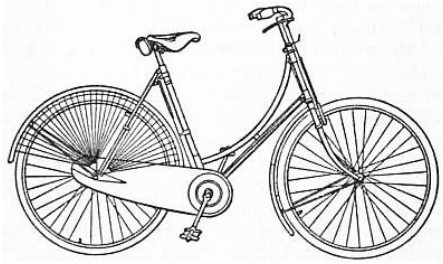

Fig. 2.

The tubular portions of the frame are made of weldless cold-drawn steel tube. The junctions or lugs are usually of malleable cast iron, bored to fit the outside of the tube, the final union being effected by brazing. In very light bicycles the tubes are kept thin, 22 or 24 W.G. (.028 in. or .022 in. thickness) at the middle, and are strengthened at the ends by internal liners. Or butt-ended tubes are employed, the tubes being drawn thicker at the ends than in the middle. The steering post and fork sides especially should be thus strengthened at their junction with the crown. Some of the best makers use sheet steel stampings instead of cast lugs, greater lightness and strength being secured, and in some cases the sheet steel lugs are inside the tubes, so that the joints are all flush on the outside. The front fork blades are best made of sheet steel stamped to shape and with the edges brazed together to form a hollow tube. The sheet steel that can be thus employed has a much higher elastic limit than a weldless steel tube.

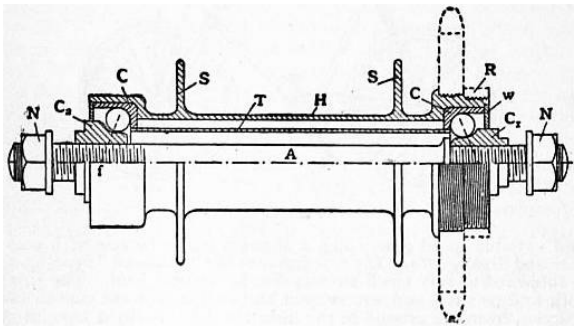

Fig. 3.

Bearings.—Ball bearings are universally used. Each row of balls runs between two ball-races of hardened steel, one on the stationary member, the other on the rotating member. The outer is called the "cup," and the inner the "cone." One of the four ball-races is adjustable axially so that the bearing may run without any shake. The ball-races are often made of separate pieces of steel, but the crank-axle usually has the cones formed integral with it, the necessary hardness being obtained by case-hardening. According as the two cups face outwards or inwards the bearing is said to have outward or inward cups, and according as the adjustable ball race is the cone or cup, the bearing is said to be cone-adjusting or cup-adjusting. Fig. 3 shows a ball-bearing hub with outward cups. The hub-shell H is turned out of mild steel, and the cups C are forced into the ends of the hub-shell and soldered thereto. A thin washer W is then spun into the end, for the purpose of retaining oil, and a thin internal tube T unites the two cups, and guides the oil fed in at the middle of the hub to the balls. The projecting flanges S are for the attachment of the tangent spokes used to build the hub into the wheel. The spindle A has the two cones screwed on it, one C_1 against a shoulder, the other C_2 adjustable. The spindle ends are passed through the back-fork ends and are there adjusted in position by the chain-tension adjusters. After adjustment the nuts N clamp the spindle securely between the fork-ends. The chain-wheel or free-wheel clutch is screwed on the end of the hub-shell, with a right-hand thread. The chain being at the right-hand side of the bicycle (as the rider is seated) the driving pull of the chain tends to screw the chain-wheel tight against the shoulder. A locking-ring R with a left-hand thread, screwed tight against the chain-wheel, prevents the latter from being unscrewed by back-pedalling. With a free-wheel clutch screwed on the hub, the locking-ring may be omitted.

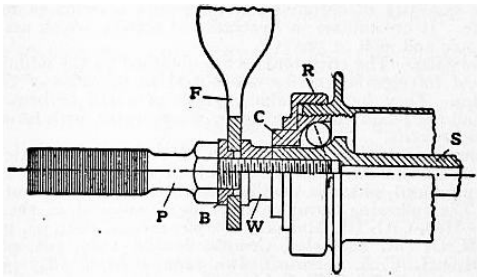

Fig. 4 shows one end of the cup-adjusting hub, with inward bearings. The cones are formed of one piece with the spindles, and the adjusting cup C is screwed in the end of the hub shell, and locked in position by the screwed locking-ring R. The figure also illustrates a divided spindle for facilitating the removal of the tire for repair when required without disturbing the wheel, bearings, chain or gear-case. The chain side of the hub-spindle, not shown in the figure, is secured to the frame in the usual way; on the left side the spindle S projects very little beyond the adjusting cup. A distance washer W is placed between the end of the spindle S and the fork-end F. A detachable screw-pin, or the footstep, P, passes through the chain-adjusting draw-bolt B, the fork-end F, and the distance washer W, and is screwed into the end of the spindle S, the hexagon head of the detachable pin drawing all the parts securely together. On unscrewing the detachable pin, the distance washer W drops out of place, leaving a clear space for removing the tire without disturbing any other part.

The inward-cups bearing retains more oil than the other form. The pressure on a ball being normal to the surface of contact with the ball race, and each ball touching two ball races, the two points of contact must be in line with the centre of the ball. All the lines of pressure on the balls of a row meet at a point *f* on the axis of the spindle. The distance between the two points *f* (fig. 5) may be called the virtual length of the bearing. Other things being equal, the outward-cups bearing has a greater virtual length than the inward-cups bearing. In hubs and pedals where the actual distance between the two rows of balls is sufficient, this point is of little importance. At the crank-axle bearing, however, where the pedal pressure which produces pressure on the axle bearings is applied at a considerable overhang beyond the ball-races, the greater virtual length of the outward-cups is an advantage.

Fig. 5 shows diagrammatically the usual form of crank-axle bearing which has inward-cups and is cup-adjusting. The end of the bracket is split and the cup after adjustment is clamped in position by the clamping screw S. The usual mode of fastening the cranks to the axle is by round cotters C with a flat surface at a slight angle to the axis, thus forming a wedge, which is driven in tight. The small end of the cotter projects through the crank, and is screwed and held in place by a nut. The chain-wheel at the crank-axle is usually detachably fastened to the right-hand crank.

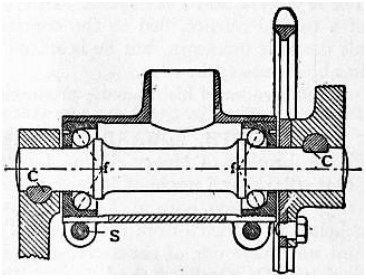

Fig. 5.

The Rudge-Whitworth crank-bracket has outward cups and is cup-adjusting. The cranks are cotterless. Fig. 6 is a sectional view. The left crank and axle are forged in one piece. The fastening of the right crank and chain-wheel is by multiple grooves and teeth, this fastening being better mechanically than the cotter type.

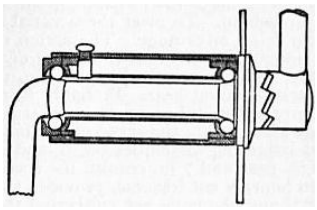

Fig. 6.

Pedals.—The pedal consists of a pedal body, on which the foot of the rider rests, mounted by ball-bearings on a pedal-pin, which is secured to the end of the crank and turns with it. The pedal body is made in many forms, but usually the bearing-cups are contained in a tube from the ends of which project plates, carrying rubber blocks, or serrated plates (rat-trap pedals), on which the foot of the rider rests. Cone adjustment is most used. The fastening of the pedal pin to the crank is best effected by screwing it up against a shoulder, the right and left crank eyes being tapped with right and left hand screws respectively. With this arrangement, if the pedal pin screw is a slack fit in the crank eye, the pressure on the pedal tends to screw it up against the shoulder.

Wheels.—Bicycle and tricycle wheels are made on the “suspension” principle, the spokes being of high-tenacity steel wire, screwed up to a certain initial tension, thus putting a circumferential compression on the rim. In the “artillery” wheel, the wooden spokes are in compression, and the rim is under tension. The rims, which are made to a section suitable for pneumatic tires (see Tire), may be of sheet steel or aluminium alloy rolled to the required section, either without joint or jointed by brazing or riveting. Wood rims are used on racing bicycles, but in England are not popular for roadster bicycles. Holes are drilled at or near the central plane of the rim for the spoke nipples, which have shoulders resting on the outer surface of the rim and shanks projecting through the rim towards the hub. The spoke ends are screwed to fit the nipples. The shank of the nipple has a square cut on its outside surface by which it can be screwed up. The spoke flanges on the hub are placed far apart and the spread of the spokes gives the wheel lateral stability. Tangential rigidity under driving and braking is obtained by fastening the spokes to the hub tangentially (figs. 1 and 2). The hub fastening of the spoke is simply obtained by forming a hook and head on the spoke end, and passing it through a hole in the hub flange. The best spokes are butted at the ends, *i.e.* made of larger diameter than at the middle, to allow for screwing at one end and the hook bend at the other.

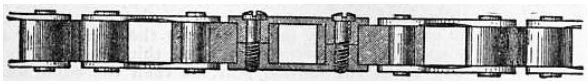

Fig. 7.

Chains.—There are two widely used types of chains. The “block” chain (fig. 7) consists of a series of central blocks connected by side plates. The “roller” chain (fig. 8) consists of a series of outside and inside links. The outside link A is made up of two steel side plates P united by two shouldered rivets R. The inside link B consists of two side plates P united by two tubular pieces T, which form bushes for the rivets R and pivots for the rollers L. The rivets, bushes and rollers are case-hardened.

Roller chains for cycles are made in two pitches, ½ in. and ⅝ in., and in widths from ⅛ in. to ¼ in. between the side plates of the inside links. The weight of 4 ft. length (96 links) of a ½ in. pitch ⅛ in. wide roller chain is about 12¼ oz., and its breaking load is about 2000 lb. In a block chain the ends of the blocks engage with the teeth of the chain-wheels, and the same surfaces continually coming into contact, the wear may become excessive, especially when exposed to mud and grit. In the roller chain the outer surfaces of the rollers engage with the teeth of the chain-wheels, and during the engagement and disengagement may roll slightly on the tubular rivets. The surface of contact of the roller and tubular rivet is not directly exposed to the dust and grit from the road. The rollers therefore serve the double purpose of (1) transferring the relative motion of the parts to a pair of surfaces under better conditions as regards lubrication, and (2) presenting a new part of the outside surface of the roller for the next engagement with the chain-wheel. The durability of roller chains is thus much greater than that of block chains, under the usual conditions of cycling.

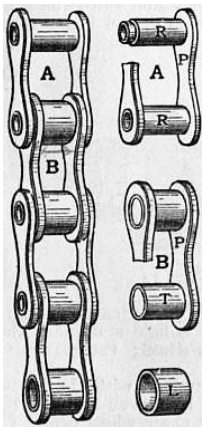

Fig. 8.

Chain-wheels.—The pitch line of the chain-wheel is polygonal (fig. 9), *a, b, c, d* being centres of adjacent joints of the chain when lying in contact with the wheel. The path of the joint *a* of the chain, relative to the chain-wheel as it enters on to and leaves the chain-wheel, is evidently the curve $a_3\ a_2\ a\ a'_1\ a'_2$ made up of a series of circular arcs having centres *d, c, b, b′, c′*, respectively. Similarly for the path of the adjacent joint *b*. The fullest possible form of the tooth is that between the two parallel curves, of radii less by an amount equal to the radius of the

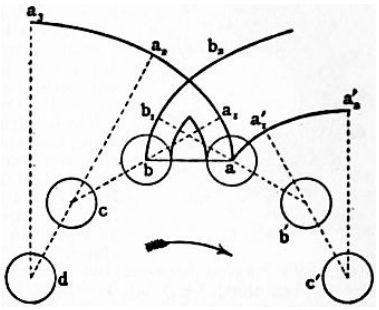

FIG. 9.

roller, as indicated in fig. 9. But since it is neither necessary nor desirable that the roller should roll along the whole length of the tooth, the radii of curvature of the tooth outline may be less than shown in fig. 9. A good arrangement of tooth form is shown in fig. 10.

FIG. 10.

Owing to the polygonal pitch surfaces of the chain-wheels a chain does not transmit motion with constant speed-ratio of the shafts. The variation of speed-ratio in a chain with links of equal pitch is approximately inversely proportional to the square of the number of teeth in the smaller chain-wheel, as shown in the table annexed, in which the percentage variation is—

$$\frac{\text{maximum speed-ratio} - \text{minimum speed-ratio}}{\text{average speed-ratio}} \times 100.$$

Number of teeth on hub chain-wheel	10	12	14	16	18	20	24	28
Percentage Variation	5.1	3.5	2.7	2.1	1.6	1.3	0.9	0.7

The rollers as they come in contact with the chain-wheel strike it with a speed proportional to the angular speed of the chain-wheel and to the pitch of the chain, causing a certain amount of noise.

Chain Adjustment.—To keep the chain running at correct tension, it is necessary to have some adjustment of the distance between the crank-axle and hub. This is obtained either by an eccentric adjustment at the crank-bracket, an eccentric adjustment at the hub-spindle or by draw-bolts at the fork-ends, the last method being most common.

Gear-case.—The modern roller chain by makers of repute is so durable that the necessity for a gear-case is not so great as when chains were of inferior quality. But if the bicycle is to require the minimum amount of care and attention a gear-case should be fitted. The Sunbeam gear-case is built into the frame and is oil-retaining, and the chain, chain-wheels, free-wheel and two-speed gear are continually lubricated by an oil-bath. A detachable gear-case is not usually oil-retaining, but serves to exclude grit and mud from the chain.

Gear and Crank-length.—The "gear" of a bicycle is given by the formula Dn_1/n_2 where D is the diameter of the driving wheel in inches, n_1 and n_2 the numbers of teeth on the crank-axle and hub chain-wheels respectively. At each revolution of the crank-axle, the bicycle is moved forward a distance equal to the circumference of the circle of diameter equal to the gear. Thus with a 28 in. diameter driving-wheel, 18 teeth on the hub chain-wheel, 45 teeth on the crank-axle chain-wheel, the bicycle is geared to 70 in. The usual crank-length is 6½ to 7 in. Cranks of 7½, 8 and 9 in. length can be had, but require a bicycle frame of special design. The gear should be roughly proportional to the crank-length. The gear 10 times the crank-length is a good proportion for an average rider.

Free-wheels.—A free-wheel clutch transmits the drive in one direction only, allowing the pedals to remain at rest at the will of the rider, while the bicycle runs on. With a free-wheel, chain breakages are reduced or nearly eliminated, as should the chain get accidentally caught the free-wheel comes into play. There are three principal types of free-wheel clutches —roller, ratchet and friction cone. The roller type was the earliest in use, but has fallen into disfavour. A sectional view of a ball-bearing ratchet free-wheel, with outer cover removed, is shown in fig. 11. The ring on which the three pawls and springs are carried is screwed on the end of the hub; the chain-wheel is combined with an inner ratchet wheel and is mounted by two rows of ball bearings on the pawl ring. The friction cone type of free-wheel clutch is usually combined with a brake inside the hub, the whole combination being termed a coaster hub. Fig. 12 shows a sectional view of the Eadie two-speed coaster, in which the free-wheel clutch and brake are combined with a two-speed gear. The free-wheel clutch action is as follows: A forward pressure of the pedals turns the externally threaded driving cone H in the internally threaded cone F, the latter being thus forced to the right into engagement with the cup J which is screwed to the hub-shell, thus forming a friction driving clutch. The pedals being held stationary the driving cone H is stationary, and the hub running on the ball bearings G, the cone F travels towards the left until released from the cup J, when it also remains at rest. In this type of free-wheel clutch it is essential that there be little or no friction between the screwed surfaces of H and F, else on beginning to pedal, the cone F may remain stationary relative to the driving cone H, and no engagement between F and J may take place. If F be prevented from turning faster than the hub-shell, as is sometimes done by a light spring between the two, the engagement of the friction clutch must take place as soon as the pedals tend to move faster than the speed corresponding to that of the hub-shell.

FIG. 11.

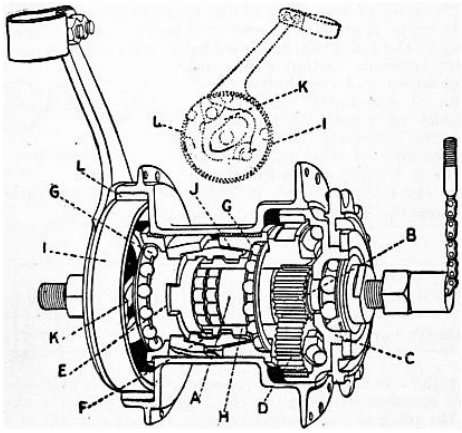

FIG. 12.—Eadie Two-speed Coaster Hub.

Brakes of many types are used, differing in the place and mode of application. The tire brake has fallen into disuse, rim brakes and internal hub brakes being usual. The retarding force that can be applied by a brake is limited by the possibility of skidding the wheel. In riding at uniform speed, without acceleration, the greater part of the load is on the rear-wheel; but as soon as the brake is applied to cause retardation the wheel load distribution is altered, more load being thrown on the front wheel. Thus the most powerful brake is one applied to the front wheel. On the other hand, a front-wheel brake often sets up an unpleasant vibration of the front fork. On a greasy road too powerful pressure on the front-wheel brake may cause a side-slip with no chance of recovery; while with the back-wheel brake recovery is possible. The Bowden system of transmission, which is largely used for cycle brake work, consists of a steel stranded cable inside a flexible tube formed by a closely wound spiral of steel wire, the cable being practically inextensible and the spiral tube practically incompressible; if the ends of the latter be fastened it forms a guide tube for the cable, any movement given to one end of the cable being transmitted to the other end. The spiral tube may be led round any corners, but the frictional resistance of the cable inside the spiral tube increases with the total angle

of curvature of the guide tube; the laws of friction of a rope passing over a drum apply. In fitting the Bowden system the total curvature should therefore be kept as small as possible. With a back-pedalling rim brake the cycle cannot be wheeled backwards unless a special device is used to throw the operating clutch out of action. A back-pedalling brake is most conveniently applied inside the hub, as in the coaster hub. In the Eadie two-speed coaster (fig. 12) the braking action is obtained by the expansion of the steel band I against a phosphor bronze ring L carried by the rotating hub-shell. The steel band I is mounted on a disk with a projecting arm, the end of which is clipped to the frame tube. The expansion of the steel band is effected by the movement of the lever K fixed to the cone E. On moving the pedals backward the screw drive-ring H forces the cone nut F with which it engages to the left into contact with the cone E. The backward movement of the pedals being continued sets up the required movement of the lever K, and applies the brake.

Variable Speed Gears.—The effort required to propel a bicycle varies greatly, according to the conditions of road surface, gradient up or down hill, wind against or behind. To meet these variable conditions, a variable speed-gear is an advantage. The action of the human motor is, however, so entirely different from that of a mechanical motor that it is easy, without practical experience, to over-estimate the value of a variable speed gear. Probably from 50 in. to 80 in. represents the greatest useful range of gear for an average rider. With a gear lower than 50 in., the speed of climbing a steep gradient is so slow that balancing difficulties begin, and it is better to walk up. With 80 in. gear and 7 in. cranks, the speed of pedalling, even at 25 miles an hour, is not irksome, provided the conditions are favourable. For those who have not cultivated the art of quick pedalling the useful range of gear under favourable conditions may be extended to say 90 in. or 100 in. The gear-ratio of a two-speed gear is the ratio of the high to the low gear. The most suitable gear-ratio for any rider will depend upon his personal physique and the nature of the country in which he rides. For a middle-aged rider of average physique a gear-ratio of 125 : 100 is suitable, for those of weaker physique the gear-ratio may with advantage be greater, say 137.5 : 100; while for road racing it may be smaller, say 117:100. With a three-speed gear the low and high gears should be chosen respectively below and above the single gear which suits the rider, the middle gear being about the same as the rider's usual single gear.

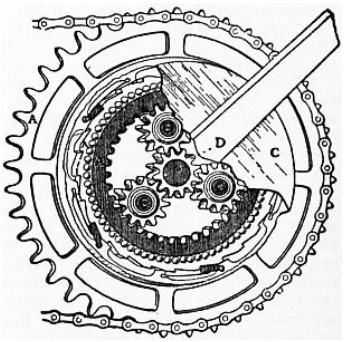

Fig. 13: Sunbeam Two-Speed Gear.

All the variable speed gears at present made consist of toothed wheel mechanism either at the hub or crank-bracket, and nearly all are based on the same epicyclic train of toothed wheels. At one speed there is no relative motion of the toothed wheels, the whole mechanism revolving as one solid piece; this is called the "normal" speed. At the other speed one part of the mechanism is held stationary and the driven part revolves faster or slower than the driver, according as the gearing is up or down. In some two-speed gears the normal is the high speed, in others the low. In expressing the gear-ratio, the normal speed will be denoted by 100. At the normal gear there is of course no additional friction. The type of two-speed gear used practically settles whether the normal gear is at high or low speed; but it seems best, other things being equal, to have the low speed the normal gear, as then the conditions are worst. If the high speed is at normal gear, then at low speed the chain gears up and the two-speed gear gears down; which is, to say the least, a roundabout transmission.

Fig. 13 is a sectional view of the Sunbeam two-speed gear which is arranged at the crank-axle, and clearly shows the relative disposition of the toothed wheel mechanism common to nearly all cycle speed gears. The chain-wheel is fixed to the annular wheel A; the planet carrier C is fixed to the crank; and when the sun-wheel D is held stationary, the chain-wheel is driven faster than the cranks. When the sun-wheel D is released, the planet carrier C drives the annular wheel A by the ratchet free-wheel clutch; the part thus revolves as a solid piece, and gives the normal or low speed. The gear-ratio is 133.3 : 100.

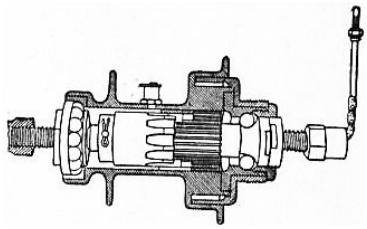
Fig. 14.

Fig. 14 is a sectional view of the "Hub" two-speed gear, the chain-wheel or free-wheel clutch being omitted. In this the annular wheel is the driver, and the planet carrier is part of the hub-shell. When the central pinion is held stationary the hub is driven at a less speed than the chain-wheel; the gear-ratio is 100 : 76.2.

In the Fagan two-speed gear, shown combined with the Eadie coaster hub in fig. 12, the sun-wheel B can be moved laterally by the striking gear, so as to engage with the chain-wheel centre C, giving normal gear, or with an internally toothed wheel A fixed to the spindle. The chain-wheel centre C carries the annular wheel, and the four planet pinions D are mounted on the driving cone H. Thus the gear gives a reduction of speed, the gear-ratio being 100 : 75. The Sturmey-Archer three-speed hub (fig. 15) has gear-ratios 125 : 100 : 80. In the high gear position the epicyclic toothed wheels are to the extreme left position. The chain-wheel is mounted by a free-wheel on a drive-ring, with which the ends of the spindles of the planet wheels engage at high gear. The sun-wheel, not shown in the figure, is held stationary, and the annular wheel engages with a ring screwed to the hub-shell, by means of keys engaging in notches. The hub is thus driven at a higher speed than the chain-wheel. For normal gear, the striking gear draws the internal mechanism of the hub towards a central position, compressing a spring, disengaging the sun-wheel and locking the drive-ring hub and annular wheel together. At low gear, the internal mechanism is drawn to the right-hand side, where the planet carrier engages with the end plate of the hub by means of claw-clutches. The annular wheel is still engaged with the drive-ring, and the sun-wheel is again locked to the spindle. The hub is thus driven at a lower speed.

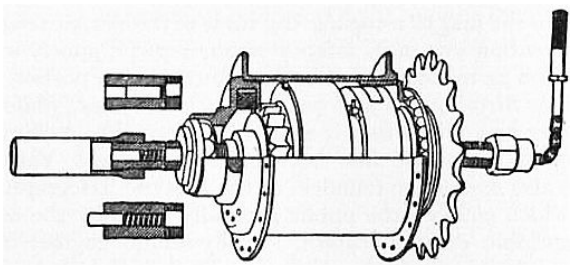
Fig. 15.

Tandem Bicycles.—The weight of a roadster tandem is about the same as, or a trifle less than, that of two single roadster bicycles, but the frictional resistance of the mechanism, the rolling resistance of the tires, and the air resistance at a given speed are much less than twice the values for a single bicycle. Consequently, much higher speeds are attained on the level, and free-wheeling down hill is much faster. On the other hand for riding up hill on a moderate gradient, the effort required is about the same as on a single, while on very steep gradients the tandem is at a slight disadvantage. For the full enjoyment of tandem riding, therefore, a two-speed gear is a necessity, while a three-speed gear is better. In the Raleigh tandem (fig. 16) the frame design is such that it can be ridden by two ladies, and the strength and rigidity is sufficient for two heavyweight riders. The steering and control of the brakes is done by the front rider. Connected steering is employed in some tandems, allowing the rear rider to steer if necessary. For two expert tandem riders, connected steering is slightly more pleasurable than fixed handle grips for the rear rider, but on the other hand, divided control may lead to disaster at a critical moment. Most passengers on a tandem with connected steering unconsciously give the steering a bias in one direction or the other, putting a nervous strain on the steersman which becomes almost intolerable towards the end of a long ride.

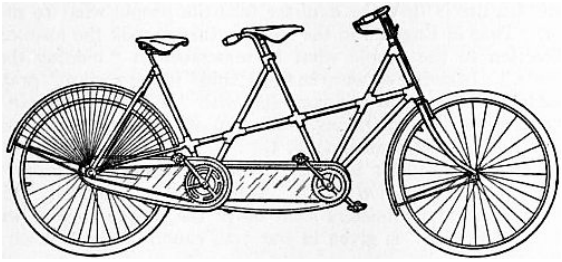

Fig. 16.

Motor Bicycles.—Fig. 17 shows a touring motor bicycle, fitted with luggage carrier and stand, the latter for supporting the bicycle while at rest. The average speed of a motor bicycle being much greater than that of a pedal bicycle the stresses on the frame due to moving over rough roads are greater. This necessitates greater strength and weight in all parts—frame, wheels and tires. To take this increased weight up steep gradients requires increased engine power. The weight of a touring motor bicycle may be from 150 to 200 lb. The drive is usually by a V belt of leather, or of canvas and rubber, the angle of the V being 28°. The engine speed at maximum power is from 1500 to 2000 revolutions a minute, and the belt gears down in a ratio varying between ⅓ and ⅙ according to the cylinder capacity of the engine. The possibility of the belt slipping slightly is conducive to smoothness of drive; chain-driving, except in combination with a slipping clutch, is too harsh. The principal defect of the belt drive is that the belt stretches, and on coming to a steep hill may have to be tightened before the bicycle can be driven up. The control of the speed and power of the engine is effected by the throttle, extra air valve and spark advance, the levers for which are all placed within convenient reach of the driver. As the engine is almost invariably air-cooled, the skilful manipulation of these three levers is essential for satisfactory results. On a good level road when the engine may be working at a small fraction of its maximum power, the proportion of air mixed with the petrol vapour from the carburettor may be great, giving a "weak" mixture, yet one rich enough to be ignited in the cylinder. The throttle valve may be fully open and the spark advanced for high speed; the throttle partially closed and spark retarded for slow speed. Under these conditions the engine will run for an indefinite period without overheating. Up a steep gradient, the mixture may have to be made "richer" by partial closing of the extra air opening, and as more heat is evolved, the cylinder walls may become overheated, unless the engine power is sufficient to keep the bicycle moving through the air at a good speed. As the engine cannot run steadily at low speed, pedalling is resorted to for starting and for riding slowly through traffic. For this purpose, an "exhaust valve lifter" is usually fitted, by means of which the exhaust can be kept permanently open, in order to relieve the resistance to pedalling which the compression stroke would otherwise offer.

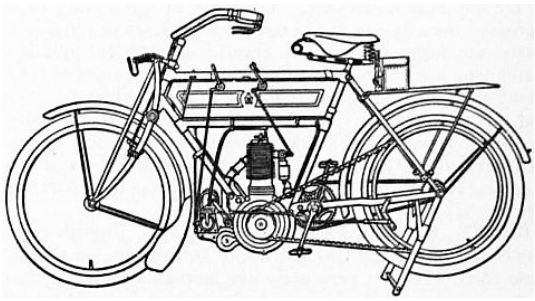

Fig. 17.

The nominal rating of the horse-power of a motor cycle engine is rather vague and indefinite. A 3-H.P. engine may have a cylinder of 76-80 mm. diameter and 76-80 mm. stroke. Twin-cylinder engines, with one crank, are largely used, and some excellent 4-cylinder motor bicycles are made with bevel gear transmission. The chief advantage of the multicylinder engine is the smoother drive obtained.

A "trailer" with two wheels for carrying a passenger can be attached to a motor bicycle, but the element of risk is increased. A side-car, with one additional wheel, forms a safer passenger carrier.

(A. Sp.)

BIDA, a town and administrative district in the British protectorate of Northern Nigeria. Bida town, situated in 9° 5′ N., 6° E., 25 m. N. by E. of Muraji on the Niger, is the capital of the province of Nupe. It was founded in 1859 when Fula rule was established in Nupe, is walled and of considerable size. In 1909 it was connected by railway with Baro, 40 m. S.S.E., the river terminus of the Northern Nigeria railway. The inhabitants, mostly Hausa, carry on an extensive trade and are especially noted for their embossed brass and copper work. The Bida goblets, in which brass and copper are beautifully blended, are of extremely elegant design. The town also boasts a glass factory. The preparation of indigo and the dyeing of cloths are other flourishing industries. The streets are planted with huge shade-trees, so that as Bida is approached it looks like a forest.

In 1897 there was a two-days' fight outside the walls of Bida between the forces of the emir of Nupe and those of the Royal Niger Company, ending in the defeat of the Fula army (mostly cavalry). The victory was not followed at the time by a British occupation, and the defeated king returned after the withdrawal of the company's troops and re-established himself upon the throne. In 1900 he allied himself with other hostile chiefs and adopted an openly antagonistic attitude to the British government. In 1901 it became necessary for British troops to march on Bida. The emir fled, without fighting, to Kano. Another emir was appointed in his place, and the province of Nupe was placed under British administrative control. Since that date the town has been peaceful and very prosperous. A mission school has been established, and is attended by the sons of the emir and of the principal chiefs, who are desirous of learning to read and write English. The administrative district of Bida includes the town and is the western division of the province of Nupe (*q.v.*). (See also Nigeria: *History.*)

BIDDEFORD, a city of York county, Maine, U.S.A., on the Saco river, opposite Saco, and on the Atlantic Ocean, 15 m. S.W. of Portland. Pop. (1890) 14,443; (1900) 16,145, of whom 7,149 were foreign-born (mostly French Canadians); (census, 1910) 17,079. Biddeford is served by the Boston & Maine railway, and is connected by electric lines with Portland and with Old Orchard Beach, a popular summer resort north of the Saco river. The climate and the scenery in and about Biddeford attract

summer visitors and there are two resorts, Biddeford Pool and Fortune Rocks within the municipal limits; but the city is chiefly a manufacturing centre (third in rank among the cities of the state in 1905)—good water-power being furnished by the river—and cotton goods, foundry and machine shop products and lumber are the principal products, the first being by far the most important. The value of the factory products increased from $5,472,254 in 1900 to $6,948,722 in 1905, or 27%. There are large quarries of granite of excellent quality. A permanent settlement was established on both sides of the river about 1630 under the leadership of Richard Vines (1585-1651) and was named Saco. In 1718 the present name was adopted. In 1762 that portion of Biddeford which lay east of the river was incorporated as the town of Pepperellborough, for which name Saco was substituted in 1805. Biddeford was incorporated as a city in 1855.

BIDDER, GEORGE PARKER (1806-1878), English engineer, was born at Moreton Hampstead, in Devonshire, on the 14th of June 1806. From a very early age he manifested an extraordinary natural aptitude for calculation, which induced his father, who was a stone-mason, to exhibit him as a "calculating boy." In this way his talent was turned to profitable account, but his general education was in danger of being completely neglected. Interest, however, was taken in him by some of those who happened to witness his performances, among them being Sir John Herschel, and it was arranged that he should be sent to school in Camberwell. There he did not remain long, being removed by his father, who wished to exhibit him again, but he was saved from this misfortune and enabled to attend classes at Edinburgh University, largely through the kindness of Sir Henry Jardine, to whom he subsequently showed his gratitude by founding a "Jardine Bursary" at the university. On leaving college in 1824 he received a post in the ordnance survey, but gradually drifted into engineering work. In 1834 Robert Stephenson, whose acquaintance he had made in Edinburgh, offered him an appointment on the London & Birmingham railway, and in the succeeding year or two he began to assist George Stephenson in his parliamentary work, which at that time included schemes for railways between London and Brighton and between Manchester and Rugby via the Potteries. In this way he was introduced to engineering and parliamentary practice at a period of great activity which saw the establishment of the main features and principles that have since governed English railway construction. He is said to have been the best witness that ever entered a committee-room. He was quick to discover and take advantage of the weak points in an opponent's case, and his powers of mental calculation frequently stood him in good stead, as when, for example, an apparently casual glance at the plans of a railway enabled him to point out errors in the engineering data that were sufficient to secure rejection of the scheme to which he was opposed. In consequence there was scarcely an engineering proposal of any importance brought before parliament in connexion with which his services were not secured by one party or the other.

On the constructive side of his profession he was also busily occupied. In 1837 he was engaged with R. Stephenson in building the Blackwall railway, and it was he who designed the peculiar method of disconnecting a carriage at each station while the rest of the train went on without stopping, which was employed in the early days of that line when it was worked by means of a cable. Another series of railways with which he had much to do were those in the eastern counties which afterwards became the Great Eastern system. He also advised on the construction of the Belgian railways; with R. Stephenson he made the first railway in Norway, from Christiania to Eidsvold; he was engineer-in-chief of the Danish railways; and he was largely concerned with railways in India, where he strongly and successfully opposed break of gauge on through-routes. But though he sometimes spoke of himself as a mere "railway-engineer," he was in reality very much more; there was indeed no branch of engineering in which he did not take an interest, as was shown by the assiduity with which for half a century he attended the weekly meetings of the Institution of Civil Engineers, of which he was elected president in 1860. He was one of the first to recognize the value of the electric telegraph. That invention was in its infancy when, in 1837, jointly with R. Stephenson he recommended its introduction on a portion of the London & Birmingham and on the Blackwall lines, while three years later he advised that it should be adopted to facilitate the working of the single line between Norwich and Yarmouth. He was also one of the founders of the Electric Telegraph Company, which enabled the public generally to enjoy the benefits of telegraphic communication. In hydraulic engineering, he was the designer of the Victoria Docks (London), being responsible not only for their construction, but also for what was regarded by some people at the time as the foolish idea of utilizing the Essex marshes for dock accommodation on a large scale. His advice was frequently sought by the government on points both of naval and military engineering. He died at Dartmouth on the 28th of September 1878.

His son, George Parker Bidder, Junr. (1836-1896), who inherited much of his father's calculating power, was a successful parliamentary counsel and an authority on cryptography.

BIDDERY, or Bidri (an Indian word, from Bedar or Bidar, a town in the Nizam's Dominions), an alloy of copper, lead, tin and zinc used in making various articles and ornaments which are inlaid with gold and silver.

BIDDING-PRAYER (O. Eng. *biddan*, to pray, cf. Ger. *beten*), the formula of prayer or exhortation to prayer said in England before the sermon in cathedrals, at university sermons, in the Inns of Court and elsewhere on special occasions. Such formulae are found in the ancient Greek liturgies, *e.g.* that of St Chrysostom, in the Gallican liturgy, and in the pre-Reformation liturgies of England. The form varies, but in all the characteristic feature is that the minister tells the people what to pray for. Thus in England in the 16th century it took the form of a direction to the people what to remember in "bidding their beads." In course of time the word "bid" in the sense of "pray" became obsolete and was confused with "bid" in the sense of "command" (from O. Eng. *beodan*, to offer, present, and hence to announce, or command; cf. Ger. *bieten*, to offer, *gebieten*, to command), and the bidding-prayer has come practically to mean the exhortation itself. A form of exhortation which "preachers and ministers shall move the people to join with them in prayer" is given in the 55th canon of the Church of England (1603).

BIDDLE, JOHN (1615-1662), frequently called the father of English Unitarianism, was born on the 14th of January 1615, at Wotton-under-Edge, in Gloucestershire. He was educated at the grammar school of his native town and at Magdalen Hall, Oxford. He graduated B.A. in 1638 and proceeded M.A. in 1641, and was then appointed to the mastership of the free school in the city of Gloucester, where "he was much esteemed for his diligence in his profession, serenity of manners and sanctity of life." He also diligently prosecuted theological studies, and the results he arrived at were of such a nature as to draw down upon him the reprobation of the civic authorities. A treacherous friend obtained the manuscript of his *Twelve Arguments drawn*

out of Scripture, wherein the commonly received opinion touching the deity of the Holy Spirit is clearly and fully refuted; and in December 1645 he was summoned before the parliamentary committee then sitting at Gloucester. By them he was committed to prison, though he was at the time labouring under a dangerous fever. He was released on bail after a short imprisonment, but was in July 1647 called before parliament, which desired to inquire into his views. After tedious proceedings, during which Sir Henry Vane befriended him, Biddle was committed to custody and his *Twelve Arguments*, which he had now published, was ordered by parliament to be seized and burned by the hangman. Notwithstanding this and the ordinance of the 2nd of May 1648, visiting denial of the doctrine of the Trinity with death, Biddle issued two tracts, one a *Confession of Faith touching the Holy Trinity*, and the other *The Testimonies of Irenaeus, &c., concerning the one God and the Persons of the Trinity* (1648). These were suppressed by government, and the Westminster assembly of divines eagerly pressed for the passing of an act by which heretics like Biddle could be put to death. This, however, was resisted by the army, and by many of the Independent parliamentarians; and after the death of the king, Biddle was allowed to reside in Staffordshire under surveillance. He engaged in preaching and in literary work, particularly an edition of the Septuagint, published by Roger Daniel. In February 1652 the general act of oblivion gave him complete freedom, and his adherents soon began to meet regularly for worship on Sundays. They were called Biddellians, or Socinians, or Unitarians, the name which has now become associated with their opinions. Biddle was not left long in peace. He translated some Socinian books, among others the *Life of Socinus*, and published two catechisms which excited a fury of indignation. He was summoned before the parliament in December 1654 and imprisoned. The dissolution of that body again set him at liberty for a short time, but he was presently brought up for some expressions used by him in a discussion with John Griffin, an illiterate Baptist pastor, who invoked the law against his superior opponent. He was put upon trial, and was only rescued by Cromwell, who sent him (October 1655) out of the way to one of the Scilly Islands, allowed him 100 crowns a year, and in 1658, on the solicitation of many friends, released him. For a few years he lived and taught quietly in the country, but returning to London he was in June 1662 again arrested, and fined £100. As he was unable to pay this sum, he was at once committed to prison, where fever, caused by the pestilential atmosphere, carried him off on the 22nd of September 1662.

BIDDLE, NICHOLAS (1786-1844), American financier, was born in Philadelphia on the 8th of January 1786. He was the nephew of a naval officer, Captain Nicholas Biddle (1750-1778), who lost his life while fighting on the American side, during the War of American Independence. After almost finishing the prescribed course at the university of Pennsylvania, the boy went to Princeton, where he graduated with high honours in 1801. During 1804-1807 he was the secretary, first of John Armstrong, minister to France, and then of James Monroe, minister to Great Britain. After his return to America he practised law for several years in Philadelphia, was an associate editor of Dennie's *Portfolio*, to which he contributed both prose and verse, and, with much literary skill, prepared for the press from the explorers' own journals a *History of the Expedition under the Command of Captains Lewis and Clark* (1814). He was a prominent member of the Pennsylvania House of Representatives in 1810-1811 and of the Senate in 1814-1817, and in 1819 became, by President Monroe's appointment, one of the five government directors of the Bank of the United States. In 1823 he replaced Langdon Cheves as its president. In general he followed a conservative policy and showed marked ability in the management of the bank, but during President Andrew Jackson's warfare upon that institution, his character and his policy were violently assailed by the president and his followers. The bank's national charter lapsed in 1836, but it was immediately chartered by Pennsylvania as the "Bank of the United States, of Pennsylvania"; and Biddle remained president until 1839, two years before the bank failed. As president of the board of trustees appointed for the purpose, he took a prominent part in the establishment of Girard College, in accordance with the will of Stephen Girard (*q.v.*). He died in Philadelphia on the 27th of February 1844.

His son, Charles John Biddle (1819-1873), served in the Mexican War as a captain of infantry, earning the brevet of major at Chapultepec; practised law in Philadelphia; was a representative in Congress in 1861-1863; was long editor-in-chief of the Philadelphia *Age*; and published "The Case of Major André, with a Review of the Statement of it in Lord Mahon's History of England," in the *Memoirs of the Historical Society of Pennsylvania* (1858).

The best account of Nicholas Biddle's administration of the bank may be found in an excellent work, by Ralph C.H. Catterall, *The Second Bank of the United States* (Chicago, 1903).

BIDEFORD, a seaport, market town and municipal borough in the Barnstaple parliamentary division of Devonshire, England, 8¼ m. S.W. of Barnstaple. Pop. (1901) 8754. It is served by the London & South-Western and the Bideford, Westward Ho & Appledore railways. It is picturesquely situated on two hills rising from the banks of the river Torridge, 3 m. above its junction with the estuary of the Taw. Many of the houses are built with timber framework in Elizabethan style, and the two parts of the town are united by a bridge of 24 arches, originally erected in the 14th century, when the revenue of certain lands was set apart for its upkeep. The church of St Mary, with the exception of the tower, is a modern reconstruction. A stone chancel screen and a Norman font are also preserved. Industries include the manufacture of earthenware, leather goods, sails, ropes and linen, and ironfounding. The small harbour has about 17 ft. of water at high tide, but is dry at low tide. Anthracite and a coarse potter's clay are found near the town. The borough is under a mayor, 4 aldermen and 12 councillors. Area, 3398 acres.

Bideford (Bedeford, Bydyford, Budeford, Bytheford) is not mentioned in pre-Conquest records, but according to Domesday it rendered geld for three hides to the king. From the time of the Conquest down to the 18th century, Bideford remained in the possession of the Grenville family, and it first appears as a borough in an undated charter (probably of the reign of Edward I.) from Richard de Grenville, confirming a charter from his grandfather, Richard de Grenville, fixing the rent and services due from the burgesses and granting them liberties similar to those in use at Breteuil and a market every Monday. Another charter, dated 1271, confirms to Richard de Grenville and his heirs a market every Monday and five days' fair yearly at the feast of St Margaret (20th of July). In 1573 Elizabeth granted a charter creating Bideford a free borough corporate, with a common council consisting of a mayor, 5 aldermen and 7 chief burgesses, together with a recorder, town-clerk and 2 serjeants-at-mace. This charter also granted the Tuesday market, which is still held, and three annual fairs in February, July and November, now discontinued. A later charter from James I. in 1610 added the right to have a town seal, 7 aldermen instead of 5, and 10 chief burgesses instead of 7, and continued in force until the Municipal Corporations Act of 1873, which established 4 aldermen and 12 common councillors. In the 16th century Sir Richard Grenville, the famous Virginian settler, did much to stimulate the commercial development of Bideford, which long maintained a very considerable trade with America, Spain and the Mediterranean ports, the import of tobacco from Maryland and Virginia being especially noteworthy. From the beginning of the 18th century this gradually declined and gave place to a coasting trade in timber and coal, chiefly with Wales and Ireland. The silk industry which flourished in the 17th century is extinct.

See John Watkins, *History of Bideford* (Exeter, 1792).

BIDPAI (or Pilpay), **FABLES OF**, the name given in the middle ages (from Sanskrit *Vidya-pati*, chief scholar) to a famous collection of Hindu stories. The origin of them is undoubtedly to be found in the *Pancha Tantra*, or Five Sections, an extensive body of early fables or apologues. A second collection, called the *Hitopadesa*, has become more widely known in Europe than the first, on which it is apparently founded. In the 6th century A.D., a translation into Pahlavi of a number of these old fables was made by a physician at the court of Chosroes I. Anushirvan, king of Persia. No traces of this Persian translation can now be found, but nearly two centuries later, Abdallah-ibn-Mokaffa translated the Persian into Arabic; and his version, which is known as the "Book of Kalilah and Dimna," from the two jackals in the first story, became the channel through which a knowledge of the fables was transmitted to Europe. It was translated into Greek by Simeon Sethus towards the close of the 11th century; his version, however, does not appear to have been retranslated into any other European language. But the Hebrew version of Rabbi Joel, made somewhat later, was translated in the 13th century into Latin by John of Capua, a converted Jew, in his *Directorium vitae humanae* (first published in 1480), and in that form became widely known. Since then the fables have been translated into nearly every European tongue. There are also versions of them in the modern Persian, Malay, Mongol and Afghan languages.

See Wilson's analysis of the Pancha Tantra, in the *Mem. of the Royal Asiat. Soc.* i.; Silvestre de Sacy's introduction to his edition of the *Kalilah and Dimna* (1816); articles by the same in *Notices et Extr. des MSS. de la Bib. du Roi*, vols. ix. and x.; German translation by Philipp Wolff, *Bidpai's Fabeln* (2 vols., 2nd ed., Stuttgart, 1839); the *Anvār-i Suheili*, Persian version of the Fables, translated by E.B. Eastwick (Hertford, 1854); Benfey, *Pantscha Tantra*, German translation with important introduction (2 vols., Leipzig, 1859); other editions, by L. Fritze (*ib.* 1884) and R. Schmidt (*ib.* 1901); Max Müller, *Essays* (Leipzig, 1872), vol. iii. pp. 303, &c.; J. Jacobs' edition of Sir T. North's *Morall Philosophie of Doni*, the earliest English version of the fables (London, 1888); J.G.N. Keith-Falconer, *Kalilah and Dimnah, or the Fables of Bidpai* (Cambridge, 1895), their history, with a translation of the later Syriac version and notes; Léopold Hervieux, *Les Fabulistes Latins*, &c. v. *Jean de Capoue et ses dérivés* (1899); E.G. Browne, *Persian Literat.* (1906), ii. 350.

BIEKKICH, a town of Germany, in the Prussian province of Hesse-Nassau, on the right bank of the Rhine, 3 m. S. from Wiesbaden, of which it is the river port, and on the main line of railway from Cologne to Frankfort-on-Main. Pop. (1900) 15,048; (1905) 20,137. The palace of the former dukes of Nassau occupies a fine position on the river bank, and the shady gardens and groves attract large numbers of visitors during the summer. It is an important steamboat station for both passenger and cargo traffic, and besides manufactures of cement, dyes and soap, has a considerable trade in the wines of the district.

BIEDERMANN, FRIEDRICH KARL (1812-1901), German publicist and historian, was born at Leipzig on the 25th of September 1812, and after studying at Leipzig and Heidelberg became professor in the university of his native town in 1838. His early writings show him as an ardent advocate of German unity, and he was a member of the national parliament which met at Frankfort in 1848. Becoming a member of the Upper House of the parliament of Saxony, he advocated union under the leadership of Prussia; and, subsequently losing his professorship, he retired to Weimar, where he edited the *Weimarische Zeitung*. Returning to Leipzig in 1863 he edited the *Deutsche Allgemeine Zeitung*, and regained his professorship in 1865. He was again a member of the Saxon Upper House, and from 1871 to 1874 a member of the German Reichstag. He died at Leipzig on the 5th of March 1901. Biedermann's chief works are: *Erinnerungen aus der Paulskirche* (Leipzig, 1849); *Deutschland im 18. Jahrhundert* (Leipzig, 1854-1880); *Friedrich der grosse und sein Verhältnis zur Entwickelung des deutschen Geisteslebens* (Brunswick, 1859); *Geschichte Deutschlands 1815-1871* (Berlin, 1891); *Deutsche Volks- und Kulturgeschichte* (Wiesbaden, 1901). He also wrote the dramas, *Kaiser Heinrich IV.* (Weimar, 1861); *Kaiser Otto III.* (Leipzig, 1862); and *Der letzte Bürgermeister von Strassburg* (Leipzig, 1870).

BIEL, GABRIEL (*c.* 1425-1495), scholastic philosopher, was born at Spires (Speier). He was the first professor of theology at the newly founded (1477) university of Tübingen, of which he was twice rector. Some years before his death he entered a religious fraternity. His work consists in the systematic development of the views of his master, William of Occam. His *Epitome et Collectorium ex Occamo super libros quatuor Sententiarum* (1508, 1512, and various dates) is a clear and consistent account of the nominalist doctrine, and presents the complete system of scholastic thought from that point of view. The empirical individualism of the work, tending necessarily to limit the province of reason and extend that of faith, together with scattered utterances on special points, which gained for Biel the title of *Papista Antipapista*, had considerable influence in giving form to the doctrines of Luther and Melanchthon. It is the best specimen of the final aspect of scholasticism. His other works also have been frequently reprinted. The title *Ultimus Scholasticorum* is often wrongly bestowed on Biel; scholasticism did not cease with him, even in Germany, and continued to flourish long after his time in the universities of Spain.

See Linsenmann, in *Theologischen Quartalschrift* (Tübingen, 1865); Stockl, *Phil. d. Mittelalt.* ii. § 269; H. Plitt, *Gabriel Biel als Prediger* (Erlangen, 1879); art. *s.v.* by P. Tschackert in Herzog-Hauck, *Realencyklopädie*, vol. iii. (1897); W. Roscher, *Ges. d. Nationalokonomik* (Munich. 1874), pp. 21-28; and works quoted under Scholasticism.

BIELEFELD, a town of Germany, in the Prussian province of Westphalia, 68 m. S.W. from Hanover on the main line to Cologne. Pop. (1885) 34,931; (1905) 71,797. It is situated at the foot of the Teutoburger Wald, and consists of two portions, separated by the river Lutter, which were first united into one town in 1520. Among its public buildings and institutions are the old town church, with a curious carved altar-piece, the town hall, the gymnasium and the provincial industrial school. On the height above the town is the old castle of Sparenburg, built in the 12th century by Bernhard, count of Lippe. It was for a long time employed as a prison, but was restored after its destruction by fire in 1877 and now contains a historical museum. Bielefeld is the centre of the Westphalian linen industry. It has also important plush, silk and hosiery manufactures, as well as extensive bleaching works, and does a very large export trade to all parts of the world in these branches. Engines, automobiles, biscuits, glass, pianos, furniture and paper are also manufactured.

Bielefeld is mentioned as early as the 9th century, as *Belanvelde*, but its first recorded mention as a town is in 1233. It belonged at this time to the counts of Ravensberg, who often resided in the Sparenburg. It joined the Hanseatic league in 1270, and about the same time began to engage in the linen manufacture, which was greatly extended during the 16th and 17th

centuries by a number of refugees from the Netherlands. In 1347 the town passed with the countship of Ravensberg to the duchy of Jülich, and in 1666 to that of Brandenburg.

BIELITZ (Czech *Bilsko*, Polish *Bielsko*), a town of Austria, in Silesia, 80 m. S.E. of Troppau by rail. Pop. (1900) 16,885, chiefly German. It is situated on the Biala river, just opposite the Galician town of Biala and possesses a fine castle belonging to the Sulkowsky family, in favour of whom the lordship of Bielitz was raised to a duchy in 1752. It has an important woollen and linen industry, and manufactures of jute and machinery, as well as an active trade, especially of woollens, to the East. The town was founded in the 13th century, and in the 15th and 16th was a fortified place.

BIELLA, a town and episcopal see of Piedmont, Italy, in the province of Novara, 55 m. N.E. of Turin by rail, and 38 m. direct, situated on the S. edge of the lower Alps. Pop. (1901) town, 3454; commune, 19,267. The old town (1558 ft.) lies on a hill above the new town, and is reached from it by a cable tramway. It has fine palaces with decorations in terra-cotta; and a modern bath establishment is situated here. The new town contains the 15th-century cathedral and the fine Renaissance church of S. Sebastiano; near the former is a baptistery of the 9th century. It is a considerable manufacturing centre for woollens, silks and cottons, electric power being furnished by the torrents descending from the mountains at the foot of which it lies. It is frequented as a tourist centre, and several hydropathic establishments and mountain resorts lie in the vicinity.

BIENNE, or Biel, an industrial town in the Swiss canton of Bern. It is built between the N.E. end of the lake of the same name and the point at which the river Suze or Scheuss (on the right bank of which it is situated) issues from a deep cleft (called the Taubenloch) in the Jura range. Bienne is 19 m. by rail N.E. of Neuchâtel, and 21 m. N.W. of Bern. Its industrial importance is shown by the fact that it is the site of the West Swiss technical institute, which has departments for instruction in watch-making, in electricity, in engraving and chasing, and in subjects relating to railway, postal and telegraph matters. Its chief industries are watch-making, chain-making, the manufacture of machines and other objects for use on railways, &c. Its rapidly increasing commercial activity accounts no doubt for the rapid rise in its population, which in 1850 was but 3589, rose in 1870 to 8165, and in 1900 was 22,016, mainly Protestant, and two-thirds German-speaking. The parish church of St Benedict dates 921
from 1451, but was restored in 1775—it has some fine 15th-century painted glass in the choir. In the town is the Schwab museum, which is chiefly notable for its fine collection of objects from the lake-dwellings. To the north-west of Bienne two funicular railways lead up to Évilard (or Leubringen) and Macolin (or Magglingen), both situated on the slope of the Jura.

First mentioned in the 12th century, Bienne continued for centuries to be under the jurisdiction of the prince-bishop of Basel. In 1279 (permanently in 1352) it made an alliance with Bern, in 1344 with Soleure, and in 1382 with Fribourg. But its attempts to be admitted into the Swiss Confederation were fruitless, though after it adopted the Reformation in 1525, it was closely associated with the Protestant cantons. In 1798 it was seized by the French, but in 1815, with the greater part of the bishopric of Basel, it became part of the canton of Bern.

See C.A. Bloesch, *Geschichte der Stadt Biel* (to 1854), (3 vols., Biel, 1855-1856).

(W. A. B. C.)

BIENNE, LAKE OF, or Bielersee, a lake in Switzerland, S.W. of the town of Bienne, and extending along the southern foot of the Jura range. It is 7½ m. in length, 2½ m. broad and 249 ft. in depth, while its surface is 1424 ft. above the sea-level, and its area 16 sq. m. In it is the Île de St Pierre, where Rousseau resided for a short time in 1765. Many traces of lake-dwellings have been discovered on the shores of the lake. It receives the river Suze or Scheuss at its north-east end, while the Hagneck canal leads the waters of the Aar into the lake, as that of Nidau conducts them out again. At the southwestern end the river Thièle or Zihl flows into this lake from that of Neuchâtel.

(W. A. B. C.)

BIERSTADT, ALBERT (1830-1902), American landscape painter, was born in Solingen, Westphalia, Germany, on the 7th of January 1830, and was taken to the United States when about a year old. In 1853-1856 he studied painting at Düsseldorf. His pictures of the western part of the United States, and particularly the Rocky Mountains, made him widely popular. His “Estes Park, Colorado,” is in the collection of the earl of Dunraven; his “Sierra Nevada” (1878) is in the Corcoran Gallery in Washington, and “The Valley of Yosemite” in the James Lenox collection in New York. He received many German and Austrian decorations, and was a chevalier of the French Legion of Honour. He rendered panoramic views with a certain ability, though his work was rather topographically correct and impressive than artistic in conception and execution. He was a member of the National Academy of Design of New York, and is represented by two historical paintings, “The Discovery of the Hudson River,” and “The Settlement of California,” in the Capitol in Washington, D.C. He died in New York City on the 18th of February 1902.

BIFROST, in Old Norse mythology, the rainbow, which was supposed to form the bridge by which the gods passed between heaven and earth. It was guarded by Heimdal, god of light.

BIGAMY (from Lat. *bis*, twice, and Gr. γάμος, marriage), in English law. according to the statute now in force (24 and 25 Vict. *c.* 100, § 57), the offence committed by a person who "being married shall marry any other person during the life of the former husband or wife." In the canon law the word had a rather wider meaning, and the marriage of a clerk in minor orders with a widow came within its scope. At the council of Lyons (A.D. 1274) bigamists were stripped of their privilege of clergy. This canon was adopted and explained by an English statute of 1276; and bigamy, therefore, became a usual counterplea to the claim of *benefit of clergy*. However, by an act of 1547 every person entitled to the benefit of clergy is to be allowed the same, "although he hath been divers times married to any single woman or single women, or to any widow or widows, or to two wives or more."

A bigamous marriage, by the ecclesiastical law of England, is simply void. By a statute of 1604 the offence was made a felony. This statute, after being repealed in 1828, was re-enacted and reproduced in the Offences against the Person Act 1861. It is immaterial whether the second marriage has taken place within England and Ireland or elsewhere, and the offence may be dealt with in any county or place where the defendant shall be apprehended or be in custody. The following clause embodies the necessary exceptions to the very general language used in the definition of the offence.—"Provided that nothing in this section contained shall extend to any second marriage contracted elsewhere than in England and Ireland by any other than a British subject, or to any person marrying a second time whose husband or wife shall have been continuously absent from such person for the space of seven years then last past, and shall not have been known by such person to be living within that time, or shall extend to any person who at the time of such second marriage shall have been divorced from the bond of the first marriage, or to any person whose former marriage shall have been declared void by any court of competent jurisdiction." The punishment is penal servitude for not more than seven nor less than five years, or imprisonment with or without hard labour, not exceeding two years.

A valid marriage must be proved in the first instance in order to support a charge of bigamy. A *voidable* marriage, such as were marriages between persons within the prohibited degrees before the Marriage Act 1836, will be sufficient, but a marriage which is absolutely *void* as all such marriages now are, will not. For example, if a woman marry B during the lifetime of her husband A, and after A's death marry C during the lifetime of B, her marriage with C is not bigamous, because her marriage with B was a nullity. In regard to the second marriage (which constitutes the offence) the English courts have held that it is immaterial whether, but for the bigamy, it would have been a valid marriage or not. An uncle, for example, cannot marry his niece; but if being already married he goes through the ceremony of marriage with her he is guilty of bigamy. In an Irish case, however, it has been held that to constitute the offence the second marriage must be one which, but for the existence of the former marriage, would have been valid. With reference to the case in which the parties to the first marriage have been divorced, it may be observed that no sentence or act of any foreign country dissolving *a vinculo* a marriage contracted in England by persons continuing to be domiciled in England, for grounds on which it is not liable to be dissolved *a vinculo* in England will be recognized as a divorce (*R.* v. *Lolley* 1812, R. & R. 237). Hence, a divorce *a vinculo* for adultery, in a Scottish court, of persons married in England, is not within the statute. But if a person charged with bigamy in England can prove that he has been legally divorced by the law of the country where the divorced parties were domiciled at the time (even though the ground on which the divorce was granted was not one that would justify a divorce in England) it will be good defence to the charge. Criminal jurisdiction is always regarded as purely territorial, but bigamy (together with homicide and treason) is an exception to this rule. A British subject committing bigamy in any country may be tried for the same in the United Kingdom (Earl Russell's case, 1901).

In Scotland, at the date of the only statute respecting bigamy, that of 1551, cap. 19, the offence seems to have been chiefly considered in a religious point of view, as a sort of perjury, or violation of the solemn vow or oath which was then used in contracting marriage; and, accordingly, it was ordained to be punished with the proper pains of perjury.

Bigamy was punished in England until the reign of William III. by death, then the penalty changed to life imprisonment and branding of the right hand. An act of George I. still in force lessened the penalty to deportation for seven years or imprisonment for two years with or without hard labour. The Offences against the Person Act 1861 changed deportation to penal servitude.

In the United States the law in regard to bigamy is practically founded on the English statute of 1604, with the exception that imprisonment and a fine, varying in the different states, were substituted instead of making the offence a felony. Congress has passed a statute declaring bigamy within the territories and places within the exclusive jurisdiction of the United States to be a misdemeanour (U.S. Rev. Stat. § 5352). By statute in some states, upon absence of one spouse from the state for five years without being heard of, the other may marry again without committing bigamy, in other states the period is seven years. In most of the states, prosecutions for bigamy are barred after the lapse of a certain number of years. The marriage wherever solemnized must be a valid marriage according to the law of the place of solemnization; if void there, no prosecution for bigamy can be founded upon it. In some jurisdictions, an honest belief that a prior divorce of one of the parties was valid would be a defence to a prosecution for bigamy, in others the contrary is held.

On the continent of Europe, bigamy is punishable in most countries with varying terms of imprisonment, with or without hard labour, according to the circumstances of the case.

See Stephen, *History of Criminal Law*; Dicey, *Conflict of Laws*; *Report of the Royal Commission on Marriage Laws* (1868).

BIGELOW, JOHN (1817-), American journalist and diplomat, was born at Malden, New York, on the 25th of November 1817. He graduated at Union College in 1835, practised law in New York for several years after 1839; took up journalistic work; was joint owner (with William Cullen Bryant) and managing editor of the New York *Evening Post* (1849-1861); was United States consul at Paris in 1861-1864, and was minister to France in 1864-1867. While consul, Bigelow wrote *Les États-Unis d'Amérique en 1863* in order to counteract the apparent desire of the French people for a dissolution of the American Union, by showing them the relative importance of the commerce of the northern and southern states. On discovering in 1863 that a French shipbuilder, with the connivance of Napoleon III., was constructing two formidable iron-clads and two corvettes for the use of the Confederacy, he devoted his energies to thwarting this scheme, and succeeded in preventing the delivery of all but one of these vessels to the Confederate agents. In his work entitled *France and the Confederate Navy* (New York, 1888) he gives an account of this episode. In 1865-1866, it devolved upon Bigelow, as minister to France, to represent his government in its delicate negotiations concerning the French occupation of Mexico, and he discharged this difficult task with credit. From 1875 to 1877 he served as secretary of state of New York. He wrote books of travel, of popular biography, or of historical or political discussion, &c., from time to time; but his principal literary achievements were editions, between 1868 and 1888, of Franklin's autobiography and autobiographical writings, copiously annotated; and of the complete works of Franklin, in ten octavo volumes (New York, 1887-1889). These editions were based in part upon the editor's personal investigations of manuscript sources in France and elsewhere, and supplanted the well-known, long serviceable, but less accurate edition of Jared Sparks (Boston, 1836-1840); they have in turn been supplanted by the edition of A.H. Smythe (10 vols., 1905-1907). Mr Bigelow was a close friend of Samuel J. Tilden, and became his literary executor, editing his speeches and other political writings (1885), publishing a biography in 1895, and editing a two-volume collection of Tilden's letters and literary memorials (1908). He also wrote a biography of William Cullen Bryant (1890). In 1897 he published a volume entitled *The Mystery of Sleep* (2nd ed., 1903). In 1909 he published *Retrospections of an Active Life*.

BIGGAR, a police burgh of Lanarkshire, Scotland. Pop. (1901) 1366. It is situated about 10 m. S.E. of Carstairs Junction (Caledonian railway), where the lines from Edinburgh and Glasgow connect. Lying on Biggar Water and near the Clyde, in a bracing, picturesque, upland country, Biggar enjoys great vogue as a health and holiday resort. It was the birthplace of Dr John Brown, author of *Rab and his Friends*, whose father was secession minister in the town. It was created a burgh of barony in 1451 and a police burgh in 1863. St Mary's church was founded in 1545 by Lord Fleming, the head of the ruling family in the district, whose seat, Boghall Castle, however, is now a ruin. John Gledstanes, great-grandfather of W.E. Gladstone, was a burgess of Biggar, and lies in the churchyard. Easter Gledstanes, the seat of the family from the 13th to the 17th century, and the estate of Arthurshiels, occupied by them for nearly a hundred years more, are situated about 3½ m. to the north-west of the burgh. On the top of Quothquan Law (1097 ft.), about 3 m. west is a rock called Wallace's Chair, from the tradition that he held a council there prior to the battle of Biggar in 1297. Lamington, nearly 6 m. south-west, is well situated on the Clyde. It is principally associated with the family of the Baillies, of whom the most notable were Cuthbert Baillie (d. 1514), lord high treasurer of Scotland, William Baillie, Lord Provand (d. 1593), the judge, and William Baillie (fl. 1648), the general whose strategy in opposition to the marquess of Montrose was so diligently stultified by the committee of estates. The ancient church of St Ninian's has a fine Norman doorway. Lamington Tower was reduced to its present fragmentary condition in the time of Edward I., when William Heselrig, the sheriff, laid siege to it. The defenders, Hugh de Bradfute and his son, were slain, and his daughter Marion—the betrothed, or, as some say, the wife of William Wallace—was conveyed to Lanark, where she was barbarously executed because she refused to reveal the whereabouts of her lover. Wallace exacted swift vengeance. He burnt out the English garrison and killed the sheriff.

BIGGLESWADE, a market town in the Biggleswade parliamentary division of Bedfordshire, England, 41 m. N. by W. of London by the Great Northern railway. Pop. of urban district (1901) 5120. It lies on the east bank of the Ivel, a tributary of the Ouse, in a flat plain in which vegetables are largely grown for the London markets. The town is a centre of this trade.

> Biggleswade (Bichelswade, Beckeleswade, Bickleswade) is an ancient borough by prescription which has never returned representatives to parliament. The borough court was held by the lord of the manor. At the time of Edward the Confessor, Archbishop Stigand owned the manor, which according to Domesday passed to Ralf de Insula. Henry I. granted it to the bishop of Lincoln, under whose protection the borough evidently grew up. In 1547 the bishop surrendered his rights to the king, and in the 17th century Biggleswade formed part of the jointure of the queens of England. Owing to its important position on the Roman road to the north the town became an agricultural centre for the surrounding district. In 1335 Edward III. renewed the bishop's licence to hold a Monday market, and annual fairs were held here from very early times. Those for horses are mentioned as famous by Camden. In addition to agriculture, Biggleswade was formerly engaged in straw-plaiting and lace manufacture.

BIGHT (O. Eng. *bight*, bend; cf. Ger. *Bucht*, a bay, and *beugen*, to bend), a nautical term for the loop or bent part of a rope, as distinguished from the ends; also a geographical term for a bay between two distant headlands, or with a shallow curve, *e.g.* the Bight of Benin, the Great Bight of Australia.

BIGNON, JÉRÔME (1589-1656), French lawyer, was born at Paris in 1589. He was uncommonly precocious, and under his father's tuition had acquired an immense mass of knowledge before he was ten years of age. In 1600 was published a work by him entitled *Chorographie, ou description de la Terre Sainte*. The great reputation gained by this book introduced the author to Henry IV., who placed him for some time as a companion to the duc de Vendôme, and made him tutor to the dauphin, afterwards Louis XIII. In 1604 he wrote his *Discours de la ville de Rome*, and in the following year his *Traité sommaire de l'élection du pape*. He then devoted himself to the study of law, wrote in 1610 a treatise on the precedency of the kings of France, which gave great satisfaction to Henry IV., and in 1613 edited, with learned notes, the *Formulae* of the jurist Marculfe. In 1620 he was made advocate-general to the grand council, and shortly afterwards a councillor of state, and in 1626 he became advocate-general to the parlement of Paris. In 1641 he resigned his official dignity, and in 1642 was appointed by Richelieu to the charge of the royal library. He died in 1656.

BIGNON, LOUIS PIERRE ÉDOUARD, Baron (1771-1841), French diplomatist and historian, born on the 3rd of January 1771, was the son of a dyer at Rouen. Though he had received a good education, he served throughout the early part of the revolutionary wars without rising above the rank of private. In 1797, however, the attention of Talleyrand, then minister of foreign affairs, was called to his exceptional abilities by General Huet, and he was attached to the diplomatic service. After serving in the legations in Switzerland and the Cisalpine republic, he was appointed in 1799 attaché to the French legation at Berlin, of which three years later he became chargé d'affaires. As minister-plenipotentiary at Cassel, between the years 1804 and 1806, he took a prominent share in the formation of the confederation of the Rhine; and after the battle of Jena he returned to Prussia as administrator of the public domains and finances. He filled a similar function in Austria after the battle of Wagram. At the end of 1810 he became French resident at Warsaw and was for a couple of years supreme in the affairs of the grand duchy.

The preparation of a constitution for Poland, on which he was engaged, was, however, interrupted by the events of 1812. Bignon, after a short imprisonment at the hands of the allies, returned to France in time to witness the downfall of Napoleon. During the Hundred Days he once more entered Napoleon's service, and, after Waterloo, as minister of foreign affairs under the executive commission, it was he who signed the convention of the 3rd of July 1815, by which Paris was handed over to the allies. Bignon did not re-enter public life until 1817, when he was elected to the chamber of deputies, in which he sat until 1830, consistent in his opposition to the reactionary policy of successive governments. His great reputation and his diplomatic experience gave a special weight to the attacks which he published on the policy of the continental allies, two of his works attracting special attention. *Du Congrès de Troppau ou Examen des prétentions des monarchies absolues à l'égard de la monarchie constitutionelle de Naples* (Paris, 1821), and *Les Cabinets el les peuples depuis 1815 jusqu'à la fin de 1822* (Paris, 1822).

The revolution of 1830, which brought his party into power, only led to a very temporary resumption of office by Bignon. He was for a few weeks minister of foreign affairs in the first government of Louis Philippe, and again for a few weeks minister of public instruction. But the idea of making him responsible for the foreign policy of France could not be realized owing to the necessity under which Louis Philippe lay of courting the goodwill of the powers, whom Bignon had offended by his outspoken writings. Elected deputy in 1831 and member of the chamber of peers in 1839, he withdrew for the most part from politics, to devote himself to his great work, the *Histoire de France sous Napoléon* (10 vols. 1829-1838, then 4 posthumous vols., 1847-1850). This history, while suffering from the limitations of all contemporaneous narratives, contains much that does not exist elsewhere, and is one of the best-known sources for the later histories of Napoleon's reign.

See Mignet, *Notice historique sur la vie et les ouvrages de M. Bignon* (1848).

BIGOD, HUGH (d. 1177), earl of Norfolk, was the second son of Roger Bigod (d. 1107), the founder of the English family of this name. Hugh inherited large estates in East Anglia on the death of his brother William in 1120, and enjoyed the favour of Henry I. At first a supporter of Stephen during this king's struggle with the empress Matilda, Hugh was rewarded with the earldom of Norfolk before 1141. After having fought for the king at the battle of Lincoln the earl deserted him, assumed a position of armed neutrality during the general anarchy, and then assisted Henry II. in his efforts to obtain the throne. This king confirmed him in the possession of his earldom; but becoming restless under the rule of law initiated by Henry, he participated in the revolt of 1173, which so far as England was concerned centred round his possessions. Though defeated and compelled to surrender his castles, Bigod kept his lands and his earldom, and lived at peace with Henry II. until his death, which probably took place in Palestine.

His son Roger (d. 1221), who succeeded to the earldom of Norfolk, was confirmed in his earldom and other honours by Richard I., after he had fallen under the displeasure of Henry II. He took part in the negotiations for the release of Richard from prison, and after the king's return to England became justiciar. The earl was one of the leaders of the baronial party which obtained John's assent to Magna Carta, and his name appears among the signatories to this document.

Roger was succeeded as 3rd earl by his son, Hugh, who died in 1225, leaving a son, Roger (d. 1270), who became 4th earl of Norfolk. Through his mother, Matilda, a daughter of William Marshal, earl of Pembroke, Roger obtained the office of marshal of England in 1246. He was prominent among the barons who wrested the control of the government from the hands of Henry III., and assisted Simon de Montfort. The earl married Isabella, daughter of William the Lion, king of Scotland, but left no sons.

Hugh, the 3rd earl, left a younger son, Hugh (d. 1266), who was chief justiciar of England from 1258 to 1260, and who fought for Henry III. at the battle of Lewes. The latter's son, Roger, succeeded his uncle Roger as 5th earl of Norfolk in 1270. This earl is the hero of a famous altercation with Edward I. in 1297, which arose out of the king's command that Bigod should serve against the king of France in Gascony, while he went to Flanders. The earl asserted that by the tenure of his lands he was only compelled to serve across the seas in the company of the king himself, whereupon Edward said, "By God, earl, you shall either go or hang," to which Bigod replied, "By the same oath, O king, I will neither go nor hang." The earl gained his point, and after Edward had left for France he and Humphrey Bohun, earl of Hereford, prevented the collection of an aid for the war and forced Edward to confirm the charters in this year and again in 1301. Stubbs says Bigod and Bohun "are but degenerate sons of mighty fathers; greater in their opportunities than in their patriotism." The earl died without issue in December 1306, when his title became extinct, and his estates reverted to the crown. The Bigods held the hereditary office of steward (*dapifer*) of the royal household, and their chief castle was at Framlingham in Suffolk.

See W. Stubbs, *Constitutional History*, vols. i. and ii. (1896-1897); J.R. Planche, "The Earls of East Anglia" (*Brit. Arch. Ass.*, vol. xxi., 1865); and G.E. C(okayne), *Complete Peerage*, vol. vi. (1895).

BIGOT, one obstinately and intolerantly holding particular religious opinions, who refuses to listen to reason and is ready to force others to agree with him; hence also applied to one who holds similar views on any subject. The early meaning of the word in English, at the end of the 16th century, was that of a religious hypocrite. The origin is obscure; it appears in French, in the forms *bigot* or *bigos*, in the 12th century romance of Girard of Roussillon, where it is applied to certain tribes of southern Gaul, and in the *Roman du Rou* of Wace (d. 1175?) as an abusive name given by the French to the Normans:

"Moult on Franchois Normans laidis
et de meffais et de mesdis.
Souvent lor dient reproviers,
et claiment Bigos et Draschiers."

To this use has been attached the absurd origin from "*ne se, bi god,*" the words in which, according to the 12th century chronicle, Rollo, duke of the Normans, refused to kiss the foot of Charles III., the Simple, king of the West Franks. The word may have some connexion with a corruption of Visigoth, a suggestion to which the use in the Girard romance lends colour. The meaning changed in French to that of "religious hypocrite" through the application, in the feminine *bigote*, to the members of the religious sisterhoods called Beguines (*q.v.*).

BIG RAPIDS, a city and the county-seat of Mecosta county, Michigan, U.S.A., on both sides of the Muskegon river, 56 m. N. by E. of Grand Rapids, in the west central portion of the lower peninsula. Pop. (1890) 5303; (1900) 4686, of whom 881 were foreign-born; (1910, U.S. census) 4519. It is served by the Père Marquette and the Grand Rapids & Indiana railways. Big Rapids is the seat of the Ferris Institute (opened 1884, incorporated 1894), a large private co-educational school, founded by W.N. Ferris. The river, which falls 16 ft. within the city limits, is dammed a short distance south of the city, and 16,000 horse-power is generated, part of which is transmitted to the city. The principal manufactures are lumber and furniture, and saw-filing and filing-room machinery. Big Rapids, named from the falls of the Muskegon here, was settled in 1854, was platted in 1859 and was chartered as a city in 1869.

BIGSBY, JOHN JEREMIAH (1792-1881), English geologist and physician, the son of Dr John Bigsby, was born at Nottingham on the 14th of August 1792. Educated at Edinburgh, where he took the degree of M.D., he joined the army medical service and was stationed at the Cape of Good Hope in 1817. About a year later he went to Canada as medical officer to a regiment, and having developed much interest in geology he was commissioned in 1819 to report on the geology of Upper Canada. In 1822 he was appointed British secretary and medical officer to the Boundary Commission, and for several years he made extensive and important geological researches, contributing papers to the *American Journal of Science* and other scientific journals; and later embodying an account of his travels in a book entitled *The Shoe and Canoe* (1850). Returning to England in 1827 he practised medicine at Newark until 1846 when he removed to London, where he remained until the end of his life. He now took an active interest in the Geological Society of London, of which he had been elected a fellow in 1823. In 1869 he was elected a fellow of the Royal Society, and in 1874 he was awarded the Murchison medal by the council of the Geological Society. During the last twenty years of his long life he was continually at work preparing, after the most painstaking research, tabulated lists of the fossils of the Palaeozoic rocks. His *Thesaurus Siluricus* was published with the aid of the Royal Society in 1868; and the *Thesaurus Devonico-Carboniferus* in 1878. In 1877 he founded the Bigsby medal to be awarded by the Geological Society of London, with the stipulation that the receiver should not be more than forty-five years old. He died in London on the 10th of February 1881.

BIHARI (properly *Bihārī*), the name of the most western of the four forms of speech which comprise the Eastern Group of modern Indo-Aryan Languages (*q.v.*). The other members are Bengali, Oriya and Assamese (see Bengali). The number of speakers of Bihari in 1901 was 34,579,844 in British India, out of a total of 90,242,167 for the whole group. It is also the language of the inhabitants of the neighbouring Tarai districts of Nepal. In the present article it is throughout assumed that the reader is in possession of the facts described under the heads of Indo-Aryan Languages and Prakrit. The article Bengali may also be studied with advantage.

"Bihārī" means the language of the province of "Bihār," and to a certain extent this is a true description. It is the direct descendant of the old Māgadhī Prakrit (see Prakrit), of which the headquarters were South Bihár, or the present districts of Patna and Gaya. It is, however, also spoken considerably beyond the limits of this province. To the west it extends over the province of Agra so far as the longitude of Benares, and to the south it covers nearly the whole of the province of Chota Nagpur. Allowing for the speakers in Nepal, its area extends over about 90,000 sq. m., and the total number of people who claim it as a vernacular is about the same as the population of France. Bihari has been looked upon as a separate language only during the past twenty-five years. Before that it was grouped with all the other languages spoken between Bengal and the Punjab, under the general term "Hindi."

The usual character employed for writing Bihari is that known as *Kaithī*, a cursive form of the well-known Nagari character of Upper India. The name of the character is derived from the *Kāyath* or *Kāyasth* caste, whose profession is that of scribes. Kaithi is widely spread, under various names, all over northern India, and is the official character of Gujarati. The Nagari character is commonly employed for printed books, while the Brahmans of Tirhut have a character of their own, akin to that used for writing Bengali and Assamese. In the south of the Bihari tract the Oriya character belonging to the neighbouring Orissa is also found.

Bihari has to its east Bengali, also a language of the Outer Band. To its west it has Eastern Hindi, a language of the Intermediate Band (see Indo-Aryan Languages). While it must decidedly be classed as an Outer language, it nevertheless shows, as might be expected, some points of contact with the Intermediate ones. Nothing is so characteristic of Bengali as its pronunciation of the vowel *a* and of the consonant *s*. The first is sounded like the *o* in "hot" (transliterated *o*). In Eastern Bihari the same vowel has a broad sound, but not so broad as in Bengali. As we go westwards this broad sound is gradually lost, till it entirely disappears in the most western dialect, Bhojpurī. As regards *s*, the Māgadhī Prakrit pronounced it as *ś*, like the *sh* in "shin." The Prakrits of the West preserved its dental sound, like that of the *s* in "sin." Here Bengali and Eastern Hindi exactly represent the ancient state of affairs. The former has the *ś*-sound and the latter the *s*-sound. At the present day Bihari has abandoned the practice of the old Māgadhī Prakrit in this respect, and pronounces its *s*'s as clearly as in the West. There are political reasons for this. The pronunciation of *s* is a literal shibboleth between Bengal and Upper India. For centuries Bihár has been connected politically with the West, and has in the course of generations rid itself of the typical pronunciation of the East. On the other hand, a witness as to the former pronunciation of the letter is present in the fact that, in the Kaithi character, *s* is always written *ś*. In the declension of nouns, Bihari follows Bengali more closely than it follows Eastern Hindi, and its conjugation is based on the same principles as those which obtain in the former language.

Language.

The age of Bihari as an independent language is unknown. We have songs written in it dating from the 15th century, and at that time it had received considerable literary culture. Bihari has three main dialects, which fall into two divisions, an eastern and a western. The eastern division includes *Maithilī* or *Tirhutiā* and *Magahī*. Magahi is the dialect of the country corresponding to the ancient Magadha, and may therefore be taken as the modern representative of the purest Māgadhī Prakrit. Its northern boundary is generally the river Ganges, and its western the river Son. To the south it has overflowed into the northern half of Chota Nagpur. It is nearly related to Maithili, but it is quite uncultivated and has no literature, although it is the vernacular of the birthplace of Buddhism. Nowadays it is often referred to by natives of other parts of the country as the typically boorish language of India. Maithili faces Magahi across the Ganges. It is the dialect of the old country of *Mithilā* or *Tirhut*, famous from ancient times for its learning. Historically and politically it has long been closely connected with Oudh, the home of the hero Rāma-candra, and its people are amongst the most conservative in India. Their language bears the national stamp. It has retained numerous antiquated forms, and parts of its grammar are extraordinarily complex. It has a small literature which has helped to preserve these peculiarities in full play, so that though Magahi shares them, it has lost many which are still extant in the everyday talk of Mithila. The western division consists of the Bhojpuri dialect, spoken on both sides of the Gangetic valley, from near Patna to Benares. It has extended south-east into the southern half of Chota Nagpur, and is spoken by at least twenty millions of people who are as free from prejudice as the inhabitants of Mithila are conservative. The Bhojpuris are a fighting race, and their language is a practical one, made for everyday use, as simple and straightforward as Maithili and Magahi are complex. In fact, it might almost be classed as a separate language, had it any literature worthy of the name.

(Abbreviations: Mth. = Maithili, Mg. = Magahi, Bh. = Bhojpuri, B. = Bihari, Bg. = Bengali. Skr. = Sanskrit, Pr. = Prakrit. Mg. Pr. = Magadhi Prakrit.)

Vocabulary.—The Bihari vocabulary calls for few remarks. *Tatsamas*, or words borrowed in modern times from Sanskrit (see Indo-Aryan Languages), are few in number, while all the dialects are replete with honest home-born *tadbhavas*, used (unlike Bengali) both in the literary and in the colloquial language. Very few words are borrowed from Persian, Arabic or other languages.

Phonetics.—The stress-accent of Bihari follows the usual rules of modern Indo-Aryan vernaculars. In words of more than one syllable it cannot fall on the last, whether the vowel of that syllable be long or short, pronounced, half-pronounced, or not pronounced. With this exception, the accent always falls on the last long syllable. If there are no long syllables in the word, the accent is thrown back as far as possible, but never farther than the syllable before the antepenultimate. Thus, *ki-sā-n*(*a*) (final *a* not pronounced); *pā-nī*, *há-m*^{a}*-rā*; *dé-kh*^{a}*-lå-h*^{ū}. In the last word there is a secondary accent on the penultimate, owing to the following imperfect vowel (see below). When the first syllable of a word has not the main stress-accent, it also takes a secondary one, as in *dè-kh*^{a}*-li-ai-nh*^{i}. When the letter a follows a syllable which has the accent (secondary or primary) it is only half pronounced, and is here denoted by a small ^{a} above the line. In Mth. (but not in Mg. or Bh.) a final short ^{i} or ^{u} is often similarly

very lightly pronounced, and is then represented by the same device. Before such an "imperfect" ^{i} or ^{u} the preceding syllable has a secondary accent, if it has not already got the main one.

When a word ends in *a* preceded by a single uncompounded consonant, the *a* is not pronounced; thus, *kisâna*, sounded *kisân*. This vowel is sometimes pronounced with a drawl, like the *a* in "ball," and is then transliterated *å*. When *a* has this sound it can end a word, and in this position is common in the second person of verbs; thus, *dēkhå*, see thou. This sound is very frequently heard in Bhojpuri, and gives a peculiar tone to the whole dialect, which at once strikes the casual hearer. The usual short form of the letter *ā* is *a*, but when this would lead to confusion it is shortened in Mth. and Mg. to a sound like that of *a* in the German *Mann*, and is then transliterated *å*. In Bh. it is always shortened to *a*. As an example, from *pānī*, water, is formed the word *paniyā*, but (in Mth. and Mg.) from the word *mārab*, to strike, we have Mth. *mårªlī*, Mg. *mårªlĭ*, I struck, because *marªlī* (*-lī*) would mean "I died." In Bh. *marªlī* actually has both these meanings. The letters *e* and *o* may be either long (*ē, ō*) or short (*e, o*). In Skr. the diphthongs *āi* and *āu* (here transliterated *āī, āū*) are much longer than the Bihari *ai* and *au*, which are contractions of only *a* + *i* and *a* + *u* respectively. We may compare the Sanskrit, or *tatsama*, *āī* with the English "aye," and the *tadbkava ai* with the English "I." In counting syllables in Bihari, *ai* and *au* count each as two syllables, not each as one long syllable. The Skr. *ṝ* appears only in *tatsamas*. Nasalization of vowels is extremely frequent. In this article it is represented by the sign ~ over the vowel, as in *mūh, mårªlĩ* and *dekhªlahᵘ̃*.

As regards consonants, *ḍ* and *ḍh*, when medial, are pronounced as strongly burred *ṛ* and *ṛh*, and are then transliterated as here shown. There is a constant tendency to change these to an ordinary dental *r* and *rh*; thus, *ghōḍā*, pronounced *ghōṛā* or *ghōrā*. The semivowels *y* and *v* are always pronounced like *j* and *b* respectively, unless they are simply euphonic letters put in to bridge the hiatus between two concurrent vowels; thus *yāūvana* pronounced *jāūban*, and *maliyā* for *mali-ā, ghoṛªwā* for *ghoṛª-ā*. The sibilants *ś* and *s* are both pronounced as a dental *s*, but (a relic of the old Mg. Pr.) are both invariably written as a palatal *ś* in the Kaithi character. Thus, the English word "session" (*seśun*) is written *śeśan* and pronounced *sesan*. The cerebral *ṣ*, when uncompounded, is pronounced *kh*. When compounded, it generally has its proper sound. Thus, *ṣaṣṭha*, sixth, is pronounced *khaṣṭh*. As a general statement we may say that Bihari spelling is not fixed, and that there are often many ways of writing, and sometimes two or three ways of pronouncing, the same word.

The main typical characteristics of Mg. Pr. are that western Pr. *s* becomes *ś*, and that western Pr. *r* becomes *l*. We have seen that the change of *s* to *ś* occurs in Bengali but not in Bihari, and have given reasons for the change back to *s* in the latter language, although the Mg. Pr. *ś* is retained in writing. In both Bengali and Bihari, a western *r* is not now represented by *l*, but is represented by *r*. This deviation from the Mg. Pr. rule is only apparent, and is due to the letter *r* representing two distinct sounds. In Skr., in the western Prakrits, and in the modern western languages, *r* is a cerebral letter, with a cerebral sound. In the modern eastern languages, *r* is a dental letter, with a dental sound. Everywhere, both in old times and at the present day, *l* was and is a dental letter. The meaning, therefore, of the change from western Pr. *r* to Mg. Pr. *l* was that the western *r* lost its cerebral sound, and became a dental letter, like *l*. That dental character is preserved in the *r* of the modern eastern languages. In fact, in Bihari *r* and *l* are frequently confounded together, or with *n*, another dental letter. Thus, we have *kālī* or *kārī*, black; *phar* or *phal*, fruit; Skr. *raǰju-*, B. *leju-rī* a string; *Lakhnaur*, the name of a town, quite commonly pronounced *Nakhlaul*; and the English names Kelly and Currie both pronounced indifferently *karī* or *kalī*. Compare Assamese *saril* for *Skr. śarīra-*.

The genius of the Bihari language is adverse to the existence of a long vowel in a *tadbhava* word, when it would occupy a position more than two syllables from the end. Thus, *ghōṛā*, but *ghoṛªwā*; *mārel*, but *mårªlī*. This is subject to various subsidiary rules which will be found in the grammars. The principle is a most important one, and, indeed, pervades all Indo-Aryan vernaculars of the present day, but it is carried out with the greatest thoroughness and consistency in Bihari. The whole system of declension and conjugation is subject to it. When *ā* preceding *i* or *e* is shortened, the two together become *ai*, and similarly a shortened *ā* + *u* or *o* become *au*.

Declension.—Bihari has a stronger sense of gender than the other languages of the Eastern Group. In the modern language the distinction is in the main confined no animate beings, but in the older poetry the system of grammatical, as distinct from sexual, gender is in full swing. Except in the case of the interrogative pronoun, there is no neuter gender—words which in Skr. and Pr. were neuter being generally, but not always, treated as masculine. The plural can everywhere be formed by the addition of some noun of multitude to the singular, and this is the universal rule in Mth., but in Mg. and Bh. it is generally made by adding *n* or (in Bh.) *nh* or *ni* to the singular, before all of which a final vowel is shortened. Thus *ghōṛā*, a horse, *ghōṛan*, horses.

As for cases, the Apabhraṁśa locative—*hi* (*-hĩ*) and the ablative *-hu* (see Prakrit) terminations have survived in poetry, proverbs and the like, and each of them can now be used for any oblique case; but in ordinary language and in literature *-hi* and *-hi* have become contracted to *e̊* and *ē*, the former of which is employed for the instrumental and the latter for the locative case. Thus, *ghar*, house; *gharе̊*, by a house; *gharē*, in a house. The old termination *-hu* has also survived in sporadic instances, under the form *o̊*, with an ablative sense. Cases are, however, usually formed, as elsewhere, by suffixing postpositions to a general oblique case (see Indo-Aryan Languages). The oblique case in Bihari is generally the same as the nominative, but nouns ending in *n, b, l* or *r*, and some others, form it by adding *ā* (a relic of the old Mg. Pr. genitive in *āha*). Thus, *maral*, the act of striking, obl. *mårªlā* (Mg. Pr. *mări-allāha*). Another set of verbal nouns forms the oblique case in *ai, e* or *å*, thus, Bh. *mār*, the ace of striking, *mārē-la*, for striking, to strike. In Mg. every noun ending in a consonant may have its oblique form in *e*; thus, *ghar*, a house, *ghar-ke* or *ghare-ke*, of a house. The *ai-* or *e-* termination is another relic of the Apabhrarhsa *-hi*, and the *å* is a survival of the Ap. *-hu*.

The usual genitive postposition is *k*, which has become a suffix, and now forms part of the word to which it is attached, a final preceding vowel being frequently shortened. Thus, *ghōṛā*, gen. *ghōṛāk*. Other genitive postpositions are *ke*, *kar* and *kēr*. These, and all other postpositions, are still separate words, and have not yet become suffixes. The more common postpositions are[1] Acc.-Dat. *ke*; Instr.-Abl. *så, sē*; Loc. *må., mē*. The genitive does not change to agree with the gender of the governing noun, as in Hindostani, but in Bh. (not in Mth. or Mg.), when the governing noun is not in the nominative singular, the genitive postposition takes the oblique form *kā*; thus, *rājā-ke mandir*, the palace of the king; but *rājā-kā mandir-mē*, in the palace of the king. In Mth. and Mg. pronouns have a similar oblique genitive in *ā*. There is no case of the agent, as in Hindostani; the subject of all tenses of all verbs being always in the nominative case.

Every noun can have three forms, a short, a long and a redundant. The short form is sometimes weak and sometimes strong. Occasionally both weak and strong forms occur for the same word; thus, short weak, *ghōṛ*; short strong, *ghōṛā*; long, *ghoṛªwā*; redundant, *ghoṛauwā*. This superfluity of forms is due to the existence of the pleonastic suffix *-ka-* in the Prakrit stage of the language (see Prakrit). In that stage the *k* of the suffix was already elided, so that we have the stages:—Skr. *ghōṭa-ka-s*, Pr. *ghōḍ-a-u*, B. *ghōṛā* (by contraction) or *ghoṛª-wā* (with insertion of a euphonic *w*). The redundant form is a result of the reduplication of the suffix, which was allowed in Pr. Thus. Skr. **ghōṭa-ka-ka-s*, Pr. *ghōḍa-a-a-u*, B. *ghoṛauwā* (contracted from *ghoṛª-wa-wa-a*). The long and redundant forms are mainly used in conversation. They are familiar and often contemptuous. Sometimes they give a definite force to the word, as *ghoṛªwā*, the horse. In the feminine they are much used to form diminutives.

As in other languages of the Eastern Group, the singulars of the personal pronouns have fallen into disuse. The plurals are used politely for the singulars, and new forms are made from these old plurals, to make new plurals. The old singulars survive in poetry and in the speech of villagers, but even here the nominative has disappeared and new nominatives have been formed from the oblique bases. All the pronouns have numerous optional forms. As a specimen of pronominal declension, we may give the most common forms of the first personal pronoun.

	Maithilī.	Magahī.	Bhojpurī.
Sing. Nom.	*ham*	*ham*	*ham*
Gen.	*hamār*	*hamār*	*hamār*
Obl.	*hamªrā*	*hamªrā*	*hamªrā*
Plur. Nom.	*hamªrā sabh*	*hamªranī*	*hamªnī-kā*
Gen.			

Obl.	*ham^{a}rā sabhak* *ham^{a}rā sabh*	*ham^{a}ranī-ke* *ham^{a}ranī*	*ham^{a}nī-ke* *ham^{a} nī*

The important point to note in the above is that the oblique form singular is formed from the genitive. It is the oblique form of that case which is also used when agreeing with another noun in an oblique case. Thus, *hamār ghar*, my house; *ham^{a}rā ghar-mẽ*, in my house; *ham^{a}rā-kē*, to me. In Mth. the nominative plural is also the oblique form of the genitive singular, and in Bh. and Mg. it is the oblique form of the genitive plural. In Bengali the nominative plural of nouns substantive is formed in the same way from the genitive singular (see Bengali). The usual forms of the pronouns are *ham*, I; *tŏ, tũ*, thou; Mth. *ap^{a}nah^{ī}*, Bh. *raurā*, Your Honour; *ī*, this; *ō*, that, he; *jē*, who; *sē*, he; *kē*, who? Mth. *kī*, Mg., Bh. *kā*, what? *keo, keu*, any one; Mth. *kicch^{u}*, Mg. *kuchu*, Bh. *kachu*, anything. The oblique forms of these vary greatly, and must be learned from the grammars.

Conjugation in Maithili and Magahi.—It is in the conjugation of the verb that the amazing complexity of the Mth. and Mg. grammars appears. The conjugation of the Bhojpuri verb is quite simple, and will be treated separately. In all three dialects the verb makes little or no distinction of number, but instead there is a distinction between non-honorific and honorific forms. In Mth. and Mg. this distinction applies not only to the subject but also to the object, so that for each person there are, in the first place, four groups of forms, viz.:—

I. Subject non-honorific, object non-honorific.
II. Subject honorific, object non-honorific.
III. Subject non-honorific, object honorific.
IV. Subject honorific, object honorific.

	Object: non-honorific						Object: honorific	
Person.	Short Form		Long Form		Redundant Form.		Group III. (Subject: non-honorific)	Group IV. (Subject: honorific)
	Group I. (Subject: non-honorific)	Group II. (Subject: honorific)	Group I. (Subject: non-honorific)	Group II. (Subject: honorific)	Group I. (Subject: non-honorific)	Group II. (Subject: honorific)		
1	*mår^{a}lī* or *mår^{a}lak^{ũ}*		*mår^{a}liai* Or (with object in 2nd person) *mår^{a}liau*		*mår^{a}liaik* Or (with object in 2nd person) *mar^{a}liauk*		*mår^{a}liainh^{i}*	
2	*mår^{a}lẽ*	Same as 1st person.	*mår^{a}låh*	Same as 1st person, but no forms for object in 2nd person.	*mår^{a}lahåk*	Same as 1st person, but no forms for object in 2nd person.	*mår^{a}lukūnh^{i}*	Same as 1st person.
3	*mår^{a}lak*	*mår^{a}lunh^{i}*	*mårал^{a}kai* Or (with object in 2nd person) *mårал^{a}kau*	Wanting	*mårал^{a}kaik* Or (with object in 2nd person) *mårал^{a}kauk*	Wanting	*mårал^{a}kainh^{i}*	*mårал^{a}thīnh^{i}*

In Mth. all the forms in which the object is honorific end in *-nh^{i}*. Mg. closely follows this, but the forms are more abraded.

Forms in which the object is non-honorific may be, as in the case of nouns, short, long or redundant. The long forms are made by adding *ai* (or in the second person *-åh*) to the short forms, and the redundant forms by adding *k* to the long forms. Again, if the *object* is in the second person, the *ai* of the long and redundant forms is changed to *au*. Finally, in the first person the non-honorific and honorific forms depending on the subject are the same, and are also identical with those forms of the second person in which the subject is honorific. We thus get the following paradigm of the Mth. past tense of the verb *mārab*, to strike. The Mg. forms are very similar. Besides the above there are numerous optional forms. Moreover, these are only masculine forms. The feminine gender of the subject introduces new complications. It is impossible here to go into all these *minutiae*, interesting as they are to philologists. They must be learnt from the regular grammars. On the present occasion we shall confine ourselves to describing the formation of the principal parts of the verb.

In Mth. the usual verb substantive and auxiliary verb is, as in Bengali, based on the root *ach* (Skr. *ṛcchati*), the initial vowel being generally dropped, as in *chī*, I am; *chalah^{ũ}*, I was; but *ach^{i}*, he is. In Mg. we have *hī* or *hikī*, I am; *halū*, I was. The finite verb has three verbal nouns or infinitives, viz. (from the root *mār*, strike), Mth. *mār^{i}* or Mg. *mār*; *mārab*; and *māral*. All three are fully declined as nouns, the oblique forms being *mārai* or *māre*, *mār^{a}bā*, and *mār^{a}la*, respectively. There are two participles, a present (Mth. *mårait* = Pr. *mārentu*) and a past (Mth. *māral* = Pr. *māri-allu*). The Mg. forms are very similar. The old Mg. Pr. present and imperative have survived, but all other tenses are made from verbal nouns or participles. The past tense (of which the conjugation for a Maithili transitive verb is given above) is formed by adding pronominal suffixes to the past participle. Thus, *māral* + *i*, struck + by-me, becomes *mår'lī*, I struck. In the case of intransitive verbs, the suffixes may represent the nominative and not the instrumental case of the pronoun, and hence the conjugation is somewhat different. The future is a mixed tense. Generally speaking, the first two persons are formed from the verbal noun in *b*, which is by origin a future passive participle, and the third person is formed from the present participle. Thus, *mārab* + *ah^{ũ}*, about-to-be-struck + by-me, becomes *mår^{a}bah^{ũ}*, I shall strike, and *mårait* + *åh*, striking + he, becomes *mår^{a}tåh*, he will strike (compare the English "he's going," for "he is on the point of going"). A past conditional is also formed by adding similar suffixes to the present participle, as in *måritah^{ũ}*, (if) I had struck. This use of the present participle already existed in the Pr. age (cf. Hēma-candra's *Grammar*, in. 180). In Mth. the present definite and the imperfect are formed by conjugating the present or past tense respectively of the auxiliary verb with the present participle; thus *marait chī*, I am striking. Mg. (like vulgar English) substitutes the oblique form of the verbal noun for the present participle, as in *māre hī*, I am a-striking. The perfect is usually formed by adding the word for "is" to the past; thus, Mth. *mår^{a}lī ach^{i}*, I have struck, lit. struck-by-me it-is. A pluperfect is similarly formed with the past tense of the auxiliary verb.

There are numerous irregular verbs. Most of the irregularities are due to the root ending in a vowel or in a weak consonant such as *b* (= Pr. *v*). Thus root *pāb*, obtain, past participle *pāol*, first singular, past tense, *paulī*. More definitely irregular are a few roots like *kar*, do, past participle *kail*. These last instances are cases in which the past participle is independently derived from a Skr. past participle, and is not formed as usual by adding the pleonastic suffix *-al* or *-il* (Skr., Pr., *-alla-*, *-illa-*, see Prakrit) to the Bihari root. Thus, Skr. *kṛta-s*, Pr. *kaa-u, ka-ill-u*, B. *kail*, instead of *kar-al*.

There is a long series of transitive verbs formed from intransitives and of causal verbs formed from transitives, generally by adding *āb* (Skr. *āpaya-*, Pr. *āvē-*). Compound verbs are numerous. Noteworthy is the desiderative compound formed by adding the root *cāh*, wish, to the dative of a verbal noun. Thus, *ham dēkhå-kē cahait-chī*, I am wishing for the seeing, I wish to see.

Conjugation in Bhojpuri.—The Bh. conjugation is as simple as that of Mth. and Mg. is complex. In the first and second persons the plural is generally employed for the singular, but there is no change in the verb corresponding to the person or honour of the object. The usual verb substantive and auxiliary verb is derived in the present from the root *bāṭ* or *bāṛ*, be, as in *bāṭẽ* or *bāṛẽ* (Skr. *vartatē*, Pr. *vaṭṭai*), he is. The past is derived from the root *rah* (Skr. *rahati*, Pr. *rahai*), as in *rah^{a}lī* or (contracted) *rahī*, I was. The verbal nouns and participles are nearly the same as in Mth.-Mg., the first verbal noun and the present participle being *mār* and *mārat*, as in Mg. The old present and imperative, derived from the Mg. Pr. forms, are also employed in Bh. Thus, *mārē* (Pr. *mārēi*), he strikes. This tense is often used as a present conditional. When it is wished to emphasize the sense of a present indicative, the syllable *-lā* is suffixed. The same suffix is employed in Rajasthani, Naipali and Marathi to form the future, and in Bh. it is often also used with a future sense. The past tense is formed, as in Mth.-Mg., by adding pronominal suffixes to the past participle; thus, *mar^{a}lī* (*māra* + *lī*), I struck, as explained above. Similarly, for the first and second persons of the future we have *mar^{a}bī*, I shall strike, and so on, but the third person is *mārī* (Pr. *mārēhī*), he will strike, *marihen* (Pr. *mārēhinti*), they will strike. The periphrastic tenses are formed on the same principles as in Mth. As an example of Bh. conjugation we give the present, past

and future tenses in all persons. There are a few additional optional forms, but nothing like the multiplicity of meanings which we find in Mth. and Mg.

	Present.	Past.	Future.
Sing. 1	Not used	Not used	Not used
2	*māre-lē*	*mar^{a}las*	*mar^{a}bē*
3	*māre-lā*	*mar^{a}lē*	*mārī*
Plur. 1	*mārī-lā*	*mar^{a}lî*	*mar^{a}bî*
2	*mārå-lå*	*mar^{a}lå*	*mar^{a}bå*
3	*māre-lē*	*mar^{a}len*	*marihen*

It will be observed that the termination of the present changes in sympathy with the old present to which it is attached. In some parts of the Bh. area, especially in the district of Sāran, *u* is substituted for *^{a}l* in the past. Thus, *maruî*, I struck. The *maru-* is merely the past participle without the pleonastic termination *-alla-* which is used in Bihari, as explained under the Mth.-Mg. conjugation.

Irregular verbs, the formation of transitive and causal verbs, and the treatment of compound verbs, are on the same lines as in Mth.

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Literature.

Bihari Literature.—In all three dialects there are numerous folk-epics transmitted by word of mouth. Several have been published at various times in the *Journal of the Asiatic Society of Bengal* and in the *Zeitschrift der deutschen morgenländischen Gesellschaft*. The only dialect which has any real literature is Maithili. The earliest writer of whom we have any record is Vidyapati Ṭhakkura (Bidyapati Thakur), who lived at the court of Rājā Śiva Siṁha of Sugaonā in Tirhut in the 15th century. He was a voluminous Sanskrit writer, but his fame rests chiefly on his dainty lyrics in Maithili dealing with the loves of Rādhā and Krishna. These have exercised an important influence on the religious history of eastern India. They were adopted and enthusiastically recited by the reformer Caitanya (16th century), and through him became the home-poetry of the Bengali-speaking Lower Provinces. Their language was transformed (we can hardly say translated) into Bengali, and in that shape they have had numerous imitators. A collection of poems by the old Master-singer in their Maithili dress has been published by the present writer in his *Chrestomathy* of that language. The most admired of Vidyapati's successors is Manbōdh Jhā, who died in 1788. He composed a *Haribans*, or poetical life of Krishna, which has great popularity. Many dramas have been composed in Mithila. The fashion is to write the body of the work in Sanskrit and Prakrit, but the songs in Maithili. Two dramas, the *Pārijāta-haraṇa* and the *Rukmiṇī-pariṇaya*, are attributed to Vidyāpati. Among modern writers in the dialect, we may mention Harṣanātha, an elegant lyric poet and author of a drama entitled *Uṣā-haraṇa*, and Candra Jhā, whose version of the Rāmayāṇa and translation of Vidyāpati's Sanskrit *Puruṣa-parīkṣā* are deservedly popular.

Authorities.—*The Linguistic Survey of India*, vol. v. part ii. (Calcutta, 1903), gives a complete conspectus of Bihari in all its dialects and sub-dialects. See also G.A. Grierson, *Seven Grammars of the Dialects and Sub-dialects of the Bihárí Language*, parts i. to viii. (Calcutta, 1883-1887—these deal with every form of Bihari except standard Maithili); and S.H. Kellogg, *A Grammar of the Hindí Language, in which are treated High Hindí ... also the Colloquial Dialects of ... Bhojpur, Magadha, Maithila, &c.* (2nd ed., London, 1893).

For Maithili, see G.A. Grierson, *An Introduction to the Maithilí Language of North Bihár, containing a Grammar, Chrestomathy and Vocabulary*; part i. *Grammar* (Calcutta, 1881; 2nd ed., 1909); part ii. *Chrestomathy and Vocabulary* (Calcutta, 1882). For Vidyāpati Ṭhakkura, see J. Beames, "The Early Vaishnava Poets of Bengal," in *Indian Antiquary*, ii. (1873), pp. 37 ff.; the same, "On the Age and Country of Vidyapati," *ibid.* iv. (1875), pp. 299 ff.; anon, article in the *Baṇga Darśana*, vol. iv. (1282 B.S.), pp. 75 ff.; Sāradācarana Maitra, Introduction to *Vidyāpatir Padāvalī* (2nd ed., Calcutta, 1285 B.S.); C.A. Grierson, *Chrestomathy*, as above; "Vidyāpati and his Contemporaries," *Indian Antiquary*, vol. xiv. (1885), pp. 182 ff.; "On some Mediaeval Kings of Mithilâ," *ibid.* vol. xxviii. (1899), pp. 57 ff.

For Bhojpuri, see J. Beames, "Notes on the Bhojpurí Dialect of Hindí spoken in Western Bihár," in *Journal of the Royal Asiatic Society*, vol. iii. N.S., 1868, pp. 483 ff.; A.F.R. Hoernle, *A Grammar of the Eastern Hindí compared with the other Gaudian Languages* (here "Eastern Hindí" means "Western Bhojpurī"), (London, 1880); J.R. Reid, *Report on the Settlement Operations in the District of Azamgarh* (Allahabad, 1881—contains in appendices full grammar and vocabulary of Western Bhojpurí).

No special works have been written about Magahi.

(G. A. Gr.)

1 The origin of the postpositions is discussed in the article Hindostani.

BIHĀRĪ-LĀL, a name famous in Hindustani literature as the author of the *Sat-saī*, a collection of approximately seven hundred distichs, which is perhaps the most celebrated Hindi work of poetic art, as distinguished from narrative and simpler styles. The language is the form of Hindi called *Braj-bhāshā*, spoken in the country about Mathura, where the poet lived. The couplets are inspired by the Krishna side of Vishnu-worship, and the majority of them take the shape of amorous utterances of Radha, the chief of the Gopis or cowherd maidens of Braj, and her divine lover, the son of Vasudeva. Each couplet is independent and complete in itself, and is a triumph of skill in compression of language, felicity of description, and rhetorical artifice. The distichs, in their collected form, are arranged, not in any sequence of narrative or dialogue, but according to the technical classification of the sentiments which they convey as set forth in the treatises on Indian rhetoric.

Little is known of the author beyond what he himself tells us. He was born in Gwalior, spent his boyhood in Bundēlkhand, and on his marriage settled in his father-in-law's household in Mathurā. His father was named Kēsab Rāy; he was a twiceborn (*Dwija*) by caste, which is generally understood to mean that he was a Brahman, though some assert that he belonged to the mixed caste, now called Rāy, sprung from the offspring of a Brahman father by a Kshatriya mother. A couplet in the *Sat-saī* states that it was completed in A.D. 1662. It is certain that his patron, whom he calls Jai Shāh, was the Rājā of Āmbēr or Jaipur, known as Mīrzā Jai Singh, who ruled from 1617 to 1667 during the reigns of the emperors Jahāngīr, Shāh Jahān and Aurangzēb. A couplet (No. 705) appears to refer to an event which occurred in 1665, and in which Rājā Jai Singh was concerned. For this prince the couplets were composed, and for each *dōhā* the poet is said to have received a gold piece worth sixteen rupees.

The collection very soon became celebrated. As the couplets are independent one of another, and were put together fortuitously as composed, many different recensions exist; but the standard is that settled by an assembly of poets under the direction of Prince A'zam Shāh, the third son of the emperor Aurangzēb (1653-1707), and hence called the A'zam-shāhī; it comprises 726 couplets. The estimation in which the work is held may be measured by the number of commentators who have devoted themselves to its elucidation, of whom Dr Grierson mentions seventeen. Two of them were Musalmans, and two other commentaries were composed for Musalman patrons. The collection has also twice been translated into Sanskrit.

The best-known commentary is that of Lallŭ-jī-Lāl, entitled the *Lāla-chandrikā*. The author was employed by Dr Gilchrist in the College of Fort William, where he finished his commentary in 1818. A critical edition of it has been published by Dr G.A. Grierson (Calcutta, government of India Press, 1896).

(C. J. L.)

BIJAPUR, an ancient city and modern district of British India in the southern division of Bombay. It is a station on the Southern Mahratta railway, 60 m. S. of Sholapur. The ancient city was supplied with water by an elaborate underground system of reservoirs and aqueducts, which has been restored in part as a famine relief work. The population in. 1901 was 23,811. The city used to be the extensive, splendid and opulent capital of an independent sovereignty of the same name, but now retains only the vestiges of its former grandeur. It is still, however, the most picturesque collection of ruins in India. The city of Bijapur owed its greatness to Yusuf Adil Shah, the founder of the independent state of Bijapur. It consists of three distinct portions—the citadel, the fort and the remains of the city. The citadel, built by Yusuf Adil Shah, a mile in circuit, is of great strength, well built of the most massive materials, and encompassed by a ditch 100 yds. wide, formerly supplied with water, but now nearly filled up with rubbish, so that its original depth cannot be discovered. Within the citadel are the remains of Hindu temples, which prove that Bijapur was an important town in pre-Mahommedan times. The fort, which was completed by Ali Adil Shah in 1566, is surrounded by a wall 6 m. in circumference. This wall is from 30 to 50 ft. high, and is strengthened with ninety-six massive bastions of various designs. In addition there are ten others at the various gateways. The width is about 25 ft.; from bastion to bastion runs a battlemented curtained wall about 10 ft. high. The whole is surrounded by a deep moat 30 to 40 ft. broad. Inside these walls the Bijapur kings bade defiance to all comers. Outside the walls are the remains of a vast city, now for the most part in ruins, but the innumerable tombs, mosques, caravanserais and other edifices, which have resisted the havoc of time, afford abundant evidence of the ancient splendour of the place. Among its many buildings three are specially worthy of mention. The Gol Gunbaz, or tomb of Sultan Mahommed Adil Shah, which was built 1626-1656, is one of the most interesting buildings in the world. It is a square building, 135 ft. each way, which is surmounted by a great circular dome 198 ft. high. The inside area (18,360 ft.) is greater than the Pantheon at Rome (15,833 sq. ft.). When first built the dome was covered by gold leaf, and the outer walls were adorned with stucco work picked out in gold and blue, but to-day there are very few traces of this ornamentation. Of late years this mosque has been thoroughly restored, and one portion is now used as a museum in which all objects of interest discovered in the surrounding country are exhibited. Next to this comes the Ibrahim Roza, or tomb and mosque of Ibrahim Adil Shah II., which was completed about 1620 and is supposed to be one of the most exquisite buildings in the world after the Taj at Agra. It is said to have cost £1,700,000 and to have occupied thirty-six years in its construction. The Gagan Mahal, or ancient audience hall, is now a mass of ruins, but when complete must have been a beautiful building. The archway remains. It is over 60 ft. span and about 90 ft. high. Through this arch Sikandar Adil Shah, the last king of Bijapur, was brought bound with silver chains, while on a raised platform sat Aurangzeb, the Mogul emperor, who had left Delhi three years previously to conquer the Deccan. This magnificent palace, where so many scenes historic in the Bijapur dynasty occurred, is now the abode of hundreds of pigeons. Their cooing is the only sound that breaks the silence of the old halls.

History.—The founder of the Bijapur dynasty, Yusuf Adil Shah, is said by Ferishta to have been a son of the Ottoman sultan Murad II. When on his accession Mahommed II. gave orders for the strangling of all his brothers, Yusuf was saved by a stratagem of his mother. He went to India, where he took service under the Bahmani king of the Deccan, and ultimately became a person of great importance at the court of Mahmud II. In 1489 he took advantage of the break-up of the Bahmani power to establish himself as an independent sultan at Bijapur, his dominions including Goa on the west coast. He died in 1511 (Goa had been taken by the Portuguese a few months before), and was succeeded by his son Ismail, who reigned prosperously till 1534. The next king worth mentioning is Ali Adil Shah I., who reigned from 1557 to 1579 and, besides the fort, built the Jama Masjid or great mosque, the aqueducts and other notable works in the city. His son Ibrahim (d. 1626) maintained the prosperity of the state; but under his successor, Mahommed Adil Shah (d. 1656), the rise of the Mahratta power under Sivaji began to make inroads upon it, and it was exposed to the yet more formidable ambition of Shah Jahan. On the death of Mahommed the succession passed to Ali Adil Shah II., and on his death in 1672 to his infant son, Sikandar Adil Shah, the last of the race. The kingdom had been for some time rapidly falling to ruin, and in 1686 the Mogul emperor Aurangzeb, who as Shah Jahan's general had unsuccessfully besieged the city under Mahommed Adil Shah, took Bijapur and annexed the kingdom to the Delhi empire. Among the curiosities of the capital is the celebrated monster gun (Malik-i-Maidan), stated to be the largest piece of cast bronze ordnance in the world. It was captured from the king of Ahmednagar by the king of Bijapur about the middle of the 17th century. An inscription on the gun recording that fact was erased by Aurangzeb, who substituted the present inscription stating that he conquered Bijapur in 1686. The city and territory of Bijapur remained annexed to Delhi till 1724, when the nizam established his independence in the Deccan, and included Bijapur within his dominions. His sway over this portion of his acquisitions, however, was of brief duration; for, being defeated by the Peshwa in 1760, he was compelled to purchase peace by its cession to the Mahrattas. Upon the fall of the Peshwa in 1818 Bijapur passed into the hands of the British, and was by them included in the territory assigned to the raja of Satara. In 1848 the territory of Satara was escheated through the failure of heirs. The city was made the administrative headquarters of the district in 1885.

The district of Bijapur, formerly called Kaladgi, occupies a barren plain, sloping eastward from a string of feudatory Mahratta states to the nizam's dominions. It contains an area of 5669 sq. m., and its population in 1901 was 735,435, showing a decrease of 8% compared with an increase of 27% in the preceding decade, and a decrease of 21% in the period between 1872 and 1881. These changes in population reveal the effects of famine, which was very severely felt in 1876-1878 and again in 1899-1000. There is very little irrigation in the district. The principal crops are millet, wheat, pulse, oil-seeds and cotton. There are considerable manufactures of cotton and silk goods and blankets, and several factories for ginning and pressing cotton. The East Deccan line of the Southern Mahratta railway traverses the district from north to south.

BIJAWAR, a native state of central India, in the Bundelkhand agency. Area, 973 sq. m.; pop. (1901) 110,500; revenue, £10,000. Forests cover nearly half the total area of the state, which is believed to be rich in minerals, but lack of transport facilities has hindered the development of its resources.

The state takes its name from the chief town, Bijawar (pop. in 1901, 5220), which was founded by Bijai Singh, one of the Gond chiefs of Garha Mandla, in the 17th century. It was conquered in the 18th century by Chhatarsal, the founder of Panna, a Rajput of the Bundela clan, by whose descendants it is still held. It was confirmed to Ratan Singh in 1811 by the British government for the usual deed of allegiance. In 1857 Bhan Pratap Singh rendered signal services to the British during the Mutiny, being rewarded with certain privileges and a hereditary salute of eleven guns. In 1866 he received the title of maharaja, and the prefix *sawai* in 1877. Bhan Pratap was succeeded on his death in 1899 by his adopted son, Sanwant Singh, a son of the maharaja of Orchha.

BIJNOR, or Bijnaur, a town and district of British India in the Bareilly division of the United Provinces. The town is about 3 m. from the left bank of the Ganges. The population in 1901 was 17,583. There is a large trade in sugar. The American Methodists have a mission, which maintains some aided schools, and there is an English high school for boys.

The District of Bijnor has an area of 1791 sq. m. The aspect of the country is generally a level plain, but the northern part of it rises towards the Himalayas, the greatest elevation being 1342 ft. above the sea-level. The Koh and Ramganga are the principal rivers that flow through the district, and the Ganges forms its western boundary. In 1901 the population was 779,451, showing a decrease of 2% in the decade. The country is watered in most parts by streams from the hills, but a series of small canals has been constructed. Sugar is largely exported. A line of the Oudh & Rohilkhand railway from Moradabad to Saharanpur runs through the district.

History.—Of the early history of Bijnor even after it passed under Mahommedan rule little is known with any certainty. The district was ravaged by Timur in 1399, and thenceforward nothing is heard of it till the time of Akbar, when it formed part of the Delhi empire and so continued undisturbed, save for occasional raids, so long as the power of the Moguls survived intact. In the early part of the 18th century, however, the Rohilla Pathans established their independence in the country called by them Rohilkhand; and about 1748 the Rohilla chief Ali Mahommed made his first annexations in Bijnor, the rest of which soon fell under the Rohilla domination. The northern districts were granted by Ali Mahommed to Najib Khan, who gradually extended his influence west of the Ganges and at Delhi, receiving the title of Najib-ud-daula and becoming paymaster of the royal forces. His success, however, raised up powerful enemies against him, and at their instigation the Mahrattas invaded Bijnor. This was the beginning of a feud which continued for years. Najib, indeed, held his own, and for the part played by him in the victory of Panipat was made vizier of the empire. After his death in 1770, however, his son Zabita Khan was defeated by the Mahrattas, who overran all Rohilkhand. In 1772 the nawab of Oudh made a treaty with the Rohillas, covenanting to expel the Mahrattas in return for a money payment. He carried out his part of the bargain; but the Rohilla chieftains refused to pay. In 1774 the nawab concluded with the government of Calcutta a treaty of alliance, and he now called upon the British, in accordance with its terms, to supply a brigade to assist him in enforcing his claims against the Rohillas. This was done; the Rohillas were driven beyond the Ganges, and Bijnor was incorporated in the territories of the nawab, who in 1801 ceded it to the East India Company. From this time the history of Bijnor is uneventful, until the Mutiny of 1857, when (on the 1st of June) it was occupied by the nawab of Najibabad a grandson of Zabita Khan. In spite of fighting between the Hindus and the Mahommedan Pathans the nawab succeeded in maintaining his position until the 21st of April 1858, when he was defeated by the British at Nagina; whereupon British authority was restored.

BIKANIR, a native state of India, in the Rajputana agency with an area of 23,311 sq. m. The natural aspect of the country is one desolate tract, without a single permanently running stream. Its surface is overspread with undulating sand-hills of from 20 to 100 ft. above the average level, and so loose that men and quadrupeds stepping off the beaten track sink as if in snow. Two streams, the Katli and Ghaggar, attempt to flow through this dismal region, but are lost in its sands. Water is very scarce, and is raised from wells of from 250 to 340 ft. in depth. A few shallow salt lakes are filled by rain water, but they dry up on the setting in of the hot weather, leaving a thick crust of salt on their beds, which is used for commercial and domestic purposes. The inhabitants are very poor. They live chiefly by pasturage—rearing camels, of which their chief agricultural stock consists, and horses of a fine breed, which fetch good prices. From the wool which their sheep yield they manufacture every article of native dress and good blankets. The other industries are leather work, sugar-refining, goldsmith's work, ivory carving, iron, brass, copper, stone masonry, tanning, weaving, dyeing and carpentry. The principal towns are Bikanir, the capital, Churu, Rajgarh, Ratangarh and Reni. In 1901 the population was 584,627, showing a decrease of 30% due to the results of famine. The revenue is £141,000. The military force consists of 500 men, besides the Imperial Service Corps of the same strength. The schools include a high school affiliated to the university of Allahabad, a school for the sons of nobles, and a girls' school called after Lady Elgin. The railway from Jodhpur has been extended towards Bhatinda in the Punjab; on the northern border, the Ghaggar canal in the Punjab irrigates about 5000 acres. Drought is of common occurrence. The famine of 1899-1900 was severely felt. The city of Bikanir has a railway station. The city is surrounded by a stone wall, 6 ft. thick, 15 to 30 ft. high and 3½ m. in circuit, with five gates and three sally-ports. The citadel is half a mile north-east of the city, and is surrounded by a rampart with bastions. The population in 1901 was 53,075. There are manufactures of fine blankets and sugar-candy.

History.—In the 15th century the territory which now forms the state of Bikanir was occupied by Rajput clans, partly Jats, partly Mahommedans. About 1465 Bika, a Rathor Rajput, sixth son of Rao Jodha, chief of Marwar, started out to conquer the country. By taking advantage of the rivalries of the clans he succeeded; in 1485 he built the small fort at the capital which still bears his name, and in 1488 began the building of the city itself. He died in 1504, and his successors gradually extended their possessions. In the reign of Akbar the chiefs of Bikanir were esteemed among the most loyal adherents of the Delhi empire, and in 1570 Akbar married a daughter of Kalyan Singh. Kalyan's son, Rai Singh, who succeeded him in 1571, was one of Akbar's most distinguished generals and the first raja of Bikanir; his daughter married Selim, afterwards the emperor Jahangir. Two other distinguished chiefs of the house were Karan Singh (1631-1669), who in the struggle of the sons of Shah Jahan for the throne threw in his lot with Aurangzeb, and his eldest son, Anup Singh (1669-1698), who fought with distinction in the Deccan, was conspicuous in the capture of Golconda, and earned the title of maharaja. From this time forward the history of Bikanir was mainly that of the wars with Jodhpur, which raged intermittently throughout the 18th century. In 1802, during one of these wars, Elphinstone passed through Bikanir on his way to Kabul; and the maharaja, Surat Singh (1788-1828), applied to him for British protection, which was, however, refused. In 1815 Surat Singh's tyranny led to a general rising of his *thakurs*, and in 1816 the maharaja again applied for British protection. On the 9th of May 1818 a treaty was concluded, and order was restored in the country by British troops. Ratan Singh, who succeeded his father in 1828, applied in vain in 1830 to the British government for aid against a fresh outbreak of his *thakurs*; but during the next five years dacoity became so rife on the borders that the government raised a special force to deal with it (the Shakhawati Brigade), and of this for seven years Bikanir contributed part of the cost. Henceforth the relations of the maharajas with the British government were increasingly cordial. In 1842 Ratan Singh supplied camels for the Afghan expedition; in 1844 he reduced the dues on goods passing through his country, and he gave assistance in both Sikh campaigns. His son, Sardar Singh (1851-1872), was rewarded for help given during the Mutiny by an increase of territory. In 1868 a rising of the *thakurs* against his extortions led to the despatch of a British political officer, by whom affairs were adjusted. Sardar Singh had no son, and on his death in 1872 his widow and principal ministers selected Dungar Singh as his successor, with the approval of the British government. The principal event of his reign was the rebellion of the *thakurs* in 1883, owing to an attempt to increase the dues payable in lieu of military service; this led to the permanent location at Bikanir of a British political agent. Dungar Singh died in 1887 without a son, but he had adopted his brother, Ganga Singh (b. 1880), who succeeded as 21st chief of Bikanir with the approval of the government. He was educated at the Mayo College at Ajmere, and was invested with full powers in 1898. He attended King Edward's coronation in 1902, and accompanied the British army in person in the Chinese campaign of 1901 in command of the Bikanir Camel Corps, which also did good service in Somaliland in 1904. The state owes to this ruler the opening up of new railways across the great desert, which was formerly passable only by camels, and the tapping of the valuable coal deposits that occur in the territory. For his conspicuous services he was given the Kaisar-i-Hind medal of the first class, made an honorary major in the Indian army, a G.C.I.E., a K.C.S.I., and A.D.C. to the prince of Wales.

BILASPUR, a town and district of British India in the Chhattisgarh division of the Central Provinces. The town is situated on

the right bank of the river Arpa. It is said to have been founded by a fisherwoman named Bilasa in the 17th century, and it still retains her name. The place, however, came into note only after 1741, the year of the Mahratta invasion (see below), when a Mahratta official took up his abode there and began to build a fort which was never completed. In 1862 it was made the headquarters of the district. The population in 1901 was 18,937. It is an important junction on the Bengal-Nagpur railway, where the two lines from the west meet on their way to Calcutta, 255 m. from Nagpur.

The District of Bilaspur has an area of 7602 sq. m. It forms the upper half of the basin of the river Mahanadi. It is almost enclosed on the north, west and east by ranges of hills, while its southern boundary is generally open and accessible, well cultivated, and closely dotted with villages embedded in groups of fruit trees. The principal hills are—(1) the Maikal range, situated in the north-western extremity of the district; (2) a chain of hills forming part of the Vindbyan range, on the north; (3) the Korba hills, an off-shoot of the Vindhyas, on the eastern boundary; and (4) the Sonakhan block of hills, in the vicinity of the Mahanadi river. The Mahanadi is the principal river of the district, and governs the whole drainage and river system of the surrounding country. It takes its rise in a mountainous region which is described as the wildest of all wild parts of the Central Provinces, crosses the Bilaspur boundary near Seorinarain, and after a course of 25 m. in the south-eastern extremity of the district enters Sambalpur district. Within Bilaspur the river is everywhere navigable for six months in the year. Minor rivers are the Sakri, Hamp, Tesua, Agar, Maniari, Arpa, Kharod, Lilagar, Jonk and Bareri. The most important affluents of the Mahanadi are the Seonath and Hasdu. Besides the natural water supply afforded by the rivers, Bilaspur abounds in tanks. There are large forest areas, those belonging to the government covering over 600 sq. m. Sal (*Shorea robusta*) is the chief timber tree.

Bilaspur, which was formerly a very isolated tract, is now traversed in three directions by lines of the Bengal-Nagpur railway. 930
It suffered severely from the famine of 1896-1897. In 1897 the general death-rate was as high as 90 per thousand, rising to 297 in Bilaspur town. It suffered no less severely in 1900, when in May the number of persons relieved rose to one-fourth of the total population.

In 1901 the population was 1,012,972, showing a decrease of 13%, compared with an increase of 14% in the preceding decade. In 1906, however, the new district of Drug was formed, which took away 739 sq. m. from Bilaspur; the population on this reduced area of Bilaspur in 1901 was 917,240.

Among the Hindu inhabitants of the district, the Chamars and Pankas deserve particular notice. The former, who form the shoemaker and leather-dealing caste of the Hindu community, had always been held in utter contempt by the other Hindu castes. But between 1820 and 1830 a religious movement, having for its object their freedom from the trammels of caste, was inaugurated by a member of the caste, named Ghasi Das, who preached the unity of God and the equality of men. Ghasi Das gave himself out as a messenger of God; he prohibited the adoration of idols, and enjoined the worship of the Supreme Being without any visible sign or representation. The followers of the new faith call themselves *Satnamis*, or the worshippers of *Satnam* or God. They do not keep the Hindu festivals and they defy the contempt of the Brahmans. Ghasi Das, the founder of the faith, was their first high priest. He died in 1850; his son succeeded him, but was assassinated (it was said by the Hindus), and the grandson succeeded him. The Pankas, who form about a sixth of the population, are all Kabirpanthis, or followers of Kabir, a religious reformer of the 15th century. There is no great difference between the Kabir Pankas and the Satnamis. They both abstain from meat and liquor, marry at the age of puberty, ordinarily celebrate their ceremonies through the agency of the elders of their own caste and bury their dead. The Pankas worship the Supreme Being under the name of *Kabir*, and the Chamars under the name of *Satnam*; while each community has a high priest to whom reverence is paid. At present the majority of the Pankas are cultivators, though formerly all were weavers. The Gonds are the most numerous among the aboriginal tribes, but so great an intermixture has taken place between them and the Hindu races that they have lost their language and most of their ethnical characteristics, such as the flat forehead, squat nose, prominent nostril, dark skin, &c., and are scarcely distinguishable from the other classes of the Hindu labouring population. In addition to some of the Hindu deities which they worship, the Gonds have their own gods—Bara Deva and Dula Deva. The Kanwars are the next largest section of the aboriginal population. The upper class among them claim to be Rajputs, and are divided into numerous septs. Although an aboriginal tribe, the census returns them as a Hindu caste. All the northern landholders of Bilaspur belong to this tribe, which consequently occupies an influential position.

The chief wealth of the district consists in its agricultural produce. Rice, wheat, pulses, millet, mustard, oil-seeds and cotton are the chief crops. Rice, the chief export, is sent to Bombay, Berar and northern India. The tussur silk industry is of considerable importance, and the silk is reputed the best in the Central Provinces. Sal and other timber is exported. Lac is sent in large quantities to Calcutta and Mirzapur. Coal and iron are the chief minerals; sandstone for building purposes is quarried near Bilaspur and Seorinarain. Among local industries the most important is the weaving trade.

The early history of the district is very obscure. From remote ages it was governed by kings of the Haihai dynasty of Ratanpur and Raipur, known as the Chhattisgarh rajas, on account of thirty-six forts (*garhs*), of which they were the lords. A genealogical list of kings of this dynasty was carefully kept up to the fifty-fifth representative in the year 1741, when the country was seized without a struggle by the Mahrattas of Nagpur. From 1818 to 1830 Bilaspur came under the management of the British government, the Mahratta chief of Nagpur being then a minor. In 1854 the country finally lapsed to the British government, the chief having died without issue. During the Sepoy mutiny a hill chief of the district gave some trouble, but he was speedily captured and executed.

BILBAO, formerly sometimes written Bilboa, the capital of the province of Biscay, in northern Spain; in 43° 15′ N. and 2° 45′ W.; on the river Nervion on Ansa (in Basque *Ibaizabal*), and about 8 m. inland from the Bay of Biscay. Pop. (1900) 83,306. Bilbao is one of the principal seaports of Spain, and the greatest of Basque towns. It occupies a small but fertile and beautiful valley, shut in by mountains on every side except towards the sea, and containing the fortified haven of Portugalete, the industrial town of Baracaldo (*q.v.*), and the villages of Santurce and Las Arenas, where the Nervion broadens to form the Bay of Bilbao at its mouth. Bilbao comprises two distinct parts, ancient and modern. The new town lies on the left bank, while the old town rises on the right in terraces. Communication across the river is afforded by five bridges, of which the oldest, San Antonio, is of stone, and dates from the 14th century. The houses in the principal streets are built of hewn stone, and are several storeys high, with projecting eaves that give shelter from both sun and rain. Many of the streets in the old town are very narrow, and have an appearance of cleanliness and quiet. For a long time no carts or carriages were permitted to enter the city for fear of polluting and injuring the pavement, and the transport of goods was carried on in hand-carts. But after 1876 entirely new districts were mapped out on the left bank of the Nervion. Fine broad streets, splendid squares and public gardens, hotels, villas, palatial new public buildings and numerous schools came into existence. The part of the town on the right bank is, however, still the great centre of business, the narrow streets containing the best shops. There, too, are the banks, the town hall, the theatre, the principal clubs, and the principal churches, including that of Santiago, which dates from the 14th century. In and around Bilbao there are more than thirty convents and monasteries, and at Olaveaga, about a mile off, is the Jesuit university, attended by 850 students. Public education is not, however, entirely in the hands of the priesthood and nuns; there are an institute, a normal school to train teachers, a school of arts and handicrafts, a nautical school and numerous public primary schools for both sexes.

Few Spanish cities grew so rapidly in size, importance and wealth as Bilbao in the latter half of the 19th century. Its first bank was founded in 1857; its first railway (Bilbao-Tudela) opened in 1863. Thenceforward, despite the check it received from the Carlist rebellion of 1870-1876, and the contemporaneous decline of its wool and shipbuilding industries, its prosperity

increased steadily. The population, 17,649 in 1870, rose to 50,734 in 1887, 74,076 in 1897, and 83,306 in 1900. This development was due principally to the growth of the mining and metallurgical industries. From a very early period, as the Old English word *bilbo*, "a sword," attests, Bilbao was celebrated for the excellent quality of its steel blades; in modern times it was the natural headquarters of the important steel and iron trades of the Basque Provinces. Hence it became the centre of a network of railway lines unsurpassed in Spain. The harbour works board, constituted in 1877, improved the river channel and the bar; made wharves and embankments; lighted the lower reaches of the river by electricity, so as to allow vessels to enter by night; and constructed a breakwater and counter-mole outside the bar of the river Nervion, between Santurce, Portugalete and the opposite headland at the village of Algorta, so as to secure deep anchorage and easy access to the river. The first dry dock was constructed in 1896; in 1905 it was supplemented by another, the largest in Spain. The exports are chiefly iron; the imports coal; large quantities of wine from Navarre and the Ebro valley are also sent abroad, and the importation of timber of all kinds from Scandinavia and Finland, and coastwise from Asturias, is of great importance. In the coasting trade the exports are mostly pig-iron, codfish and some products of local industries and agriculture. The shipping at Bilbao is mainly Spanish, owing to the multitude of small vessels employed in the coasting trade; but from 1880 onwards the majority of foreign ships were British. In 1904, 3319 vessels of 2,267,957 tons were accommodated at Bilbao; more than 2000 were Spanish and nearly 700 British. In the same year new harbour works and lighting arrangements were undertaken on a large scale, and a movement was initiated for the revival of shipbuilding. Besides the mining and metallurgic industries, Bilbao has breweries, tanneries, flour mills, glass works, brandy distilleries, and paper, soap, cotton and mosaic factories.

Bilbao, or Belvao, as it was often called, was founded by Don Pedro Lopez de Haro about 1300, and soon rose into importance. It was occupied by the French in 1795, and from 1808 to 1813; and in 1835 and 1874 it was unavailingly besieged by the Carlists.

BILBEIS, or Belbes, a town of lower Egypt, on the eastern arm of the Nile, 36 m. N.N.E. of Cairo by rail. Pop. (1907) 13,485. The Coptic name, Phelbes, seems to have been derived from Egyptian, but nothing is known of the place before medieval times. Considered the bulwark of the kingdom on that side, Bilbeis was by the Moslems defended with strong fortifications. In 1163-1164 it was besieged for three months by the crusaders under Amalric, and in 1168 was captured and pillaged by another army of crusaders. Napoleon in 1798 ordered the restoration of the fortifications, but they have again fallen into decay. Bilbeis was the first halting-place of the English cavalry in their march on Cairo after the fight at Tel-el-Kebir on the 13th of September 1882.

BILBERRY, Blaeberry or Whortleberry, known botanically as *Vaccinium myrtillus* (natural order Ericaceae), a low-growing shrub, found in woods, copses and on heaths, chiefly in hilly districts. The stiff stems, from half a foot to two feet long, bear small ovate leaves with a serrate margin, and small, globose, rosy flowers tinged with green. The berries are dark blue, with a waxy bloom, and about one-third of an inch in diameter; they are used for tarts, preserves, &c. The plant is widely distributed throughout the north temperate and extends into the arctic zone. Cowberry is a closely allied species, *V. Vitis-Idaea*, growing in similar situations, but not found in the south-eastern portion of England, distinguished by its evergreen leaves and red acid berry.

BILBO (from the Spanish town Bilbao, formerly called in England "Bilboa," and famous, like Toledo, for its sword-blades), in the earliest English use, a sword, especially one of superior temper. In the plural form (as in Shakespeare's phrase "methought I lay worse than the mutines in the bilboes") it meant the irons into which offenders were put on board ship.

BILDERDIJK, WILLEM (1756-1831), Dutch poet, the son of an Amsterdam physician, was born on the 7th of September 1756. When he was six years old an accident to his foot incapacitated him for ten years, and he developed habits of continuous and concentrated study. His parents were ardent partisans of the house of Orange, and Bilderdijk grew up with strong monarchical and Calvinistic convictions. He was, says Da Costa, "anti-revolutionary, anti-Barneveldtian, anti-Loevesteinish, anti-liberal." After studying at Leiden University, he obtained his doctorate in law in 1782, and began to practise as an advocate at the Hague. Three years later he contracted an unhappy marriage with Rebecca Woesthoven. He refused in 1795 to take the oath to the new administration, and was consequently obliged to leave Holland. He went to Hamburg, and then to London, where his great learning procured him consideration. There he had as a pupil Katharina Wilhelmina Schweickhardt (1776-1830), the daughter of a Dutch painter and herself a poet. When he left London in June 1797 for Braunschweig, this lady followed him, and after he had formally divorced his first wife (1802) they were married. In 1806 he was persuaded by his friends to return to Holland. He was kindly received by Louis Napoleon, who made him his librarian, and a member and eventually president (1809-1811) of the Royal Institute. After the abdication of Louis Napoleon he suffered great poverty; on the accession of William of Orange in 1813 he hoped to be made a professor, but was disappointed and became a history tutor at Leiden. He continued his vigorous campaign against liberal ideas to his death, which took place at Haarlem on the 18th of December 1831.

A picture of the Bilderdijk household is given in the letters (vol. v., 1850) of Robert Southey, who stayed some time with Bilderdijk in 1825. Madame Bilderdijk had translated *Roderick* into Dutch (1823-1824). For his work as a poet see Dutch Literature. His many-sided activity showed itself also in historical criticism—*Geschiedenis des Vaderlands* (1832-1851, 13 vols.), a conservative commentary on Wagenaar's *Vaderlandsche Historie*; in translations from Sophocles (1779 and 1789), of part of the *Iliad*, of the hymns and epigrams of Callimachus, and from the Latin poets; in philology—*Taal en Dichtkundige Verscheidenheden* (1820-1825, 4 vols.); and in drama—the tragedies, *Floris de Vijfde* (1808), *Willem I. van Holland* (1808), and others. His most important poetical works are the didactic poem, *De Ziekte der geleerden* ("The Disease of the Learned"), 2 vols., 1807; a descriptive poem in the manner of Delille in *Het Buitenleven* (1803); and his fragmentary epic, *De Ondergang der eerste wereld* (1820). Other volumes were *Mijne Verlustigung* (Leiden, 1781), *Bloemtjens* (1785), *Mengel-poezij* (1799, 2 vols.), *Poezij* (1803-1807, 4 vols.), *Mengelingen* (1804-1808, 4 vols.), *Nieuwe Mengelingen* (1806, 2 vols.), *Hollands Verlossing* (1813-1814, 2 vols.), *Vaderlandsche Uitboezemingen* (Leiden, 1815), *Winterbloemen* (1811, 2 vols.), &c., in some of which his wife collaborated.

His poetical works were collected by I. da Costa (Haarlem, 1856-1859, 16 vols.), with a biography of the poet. See also "Mijne Levensbeschrijving" in *Mengelingen en Fragmenten* ... (1834); his *Brieven* (ed. 1836-1837) by I. da Costa and W. Messchert; Dr R.A. Kollewijn, *Bilderdijk, Zijn Leven en werken* ... (2 vols., 1891).

BILEJIK (Byzantine *Belocome*), chief town of the Ertoghrul sanjak of the Brusa vilayet in Asia Minor, altitude 1900 ft., situated on a hill 2½ m. from its station on the Ismid-Angora railway. Pop. 10,500 (Moslems, 7200; Christians, 3300). It is an important centre of the silk industry, and has several silk-spinning factories.

BILFINGER (Bülffinger), **GEORG BERNHARD** (1693-1750), German philosopher, mathematician and statesman, son of a Lutheran minister, was born on the 23rd of January 1693, at Kanstatt in Württemberg. As a boy he showed great aptitude for study, and at first devoted himself to theology, but under the influence of Wolff's writings he took up mathematics and philosophy on the lines of Wolff and Leibnitz. Returning to theology, he attempted to connect it with philosophy in a treatise, *Dilucidationes philosophicae, de deo, anima humana, mundo* (Tübingen, 1725, 1746, 1768). This work, containing nothing original, but giving a clear representation of Wolff's philosophy, met with great success, and the author was appointed to the office of preacher at the castle of Tübingen and of reader in the school of theology. In 1721, after two years' study under Wolff, he became professor of philosophy at Halle, and in 1724 professor of mathematics. His friends at Tübingen disapproved his new views, and in 1725, on Wolff's recommendation, he was invited by Peter the Great to lecture in St Petersburg, where he was well received. His success in winning the prize of a thousand crowns offered for a dissertation on the cause of gravity by the Academy of Sciences of Paris secured his return to his native land in 1731. In 1735, largely on account of his knowledge of military engineering, Duke Charles Alexander (1733-1737) made him a privy councillor, but his hands were tied owing to the frivolous atmosphere of the court. On the death of the duke, however, he became a member of the Regency Council, and devoted himself with energy and success to the reorganization of the state. In the departments of education, state-religion, agriculture and commerce, his administration was uniformly successful, and he became in a real sense the head of the state. He died at Stuttgart on the 18th of February 1750. After his return from Russia, he won the highest respect at home and abroad, and Frederick the Great is recorded to have said of him, "He was a great man whom I shall ever remember with admiration."

Beside the *Dilucidationes*, he wrote:—*De harmonia animi et corporis humani commentatio* (Frankfort and Leipzig, 1735; Tübingen, 1741); *De origine et permissione mali* (1724), an account of the Leibnitzian theodicy.

For his life and times see Tafinger, *Leichenrede* (Stuttgart, 1750); Prof. Abel in Moser's *Patriot. Archiv.*, 1788, 9, p. 369; Spittler, *Verm. Schriften*, 13, p. 421; G. Schwab in *Morgenblatt* (1830). For his philosophy, see R. Wahl, "Bilfinger's *Monadologie*" (*Zeitschrift für Philos.* vol. 85, pp. 66-92, 202-231 (Leipzig, 1884), E. Zeller, *Geschichte d. deutsch. Philos. seit Leibnitz*, pp. 283 foll., 294).

BILGE (a corruption of bulge, from Fr. *bouge*, Lat. *bulga*, a bag, deriving probably from an original Celtic word), the "belly" or widest part of a cask; the broad horizontal part of a ship's bottom above the keel; also the lowest interior part of the hull; hence "bilge-water," the foul water which collects in the bilge. "Bilge-keels" are pieces of timber fastened to the bottom of a ship to reduce rolling (see Shipbuilding).

BILHARZIOSIS. In various parts of Africa the inhabitants are liable to suffer from a form of endemic haematuria caused by the presence of a parasite in the mucous membrane of the urinary passages. This parasite was discovered in 1852 by Bilharz, and hence is generally known as Bilharzia, though it has been more scientifically named Schistosoma haematobium. The condition to which it gives rise is that of bilharziosis. (For description and life history of the parasite see Trematodes.) In man the parasites and ova have been found in the minute veins of the bladder, ureter and pelvis of the kidney (more rarely in other organs), where they infest the mucous and submucous tissues. In an affected bladder the mucous membrane presents swollen vascular patches of varying size, or warty prominences on which the urinary salts may be deposited. The ova often serve as a nucleus for urinary calculi. Similar changes may take place in the ureter, and the consequent swelling lead to obstruction to the passage of urine, and if left untreated to pyelitis and pyonephrosis. If the rectum be affected the mucous membrane becomes thickened, polypoid growths form and large submucous haemorrhages may take place.

As to the mode of entrance of this parasite opinion is divided. Some authorities favour the view that the entrance is through the skin, urethra or rectum, the result of bathing in infected water; others that it is taken by the mouth in water or uncooked fish. The symptoms to which it gives rise are haematuria, pain in the perineal region and a greater or less degree of anaemia through loss of blood. If the disease continue, cystitis and its consequent train of symptoms ensue (see Bladder and Prostate Diseases). If the rectum be affected there is considerable discharge of mucus, and later prolapsus ani may be the result. But the symptoms vary to a remarkable extent, from the slightest producing but little discomfort, to the most severe resulting in death. The liquid extract of male fern is the only drug used with much success. The symptoms caused by the parasite must be treated as they arise. Polypoid growths of the rectum must be surgically treated.

BILIN (Czech *Bilina*), a town of Bohemia, Austria, 90 m. N. of Prague by rail. Pop. (1900) 7871, chiefly German. It is a very old town situated on the Biela, and contains a 17th-century castle, belonging to Prince Lobkowitz. In the vicinity of the towns are extensive lignite mines. Bilin is famous for its mineral springs, the *Biliner Sauerbrunnen*. They have a temperature of 45.6° F., and contain a large proportion of bicarbonate of soda. About 4,000,000 bottles of water are exported annually, and another article of export is the salt recovered from the water by evaporation. About 5 m. to the S. of the Sauerbrunnen lies the Boren or Biliner Stein (1763 ft.), a large mass of phonolite or clinkstone, with rare flora and fine view. The town is indeed surrounded by

basaltic rocks, the largest of them being the Radelstein (2460 ft.), from which a fine view is obtained.

BILL. There are three words in English with distinct meanings and derivations. (1) A written, originally sealed, document. The word is derived from the Early English *bille*, Anglo-Latin *billa*, from Latin *bulla*, in the medieval sense of "seal." It is a doublet, therefore, of "bull." (2) A common Teutonic word for a long-handled cutting weapon (O. Eng. *bil, billes*, sword or falchion, O. Sax. *bill*, M.H.G. *Bil*, Mod. Ger. *Bille*, a pickaxe; no connexion with Ger. *Beil*, an axe), of which the name and shape is preserved in the hedging-bills used for pruning hedges and lopping the branches of trees. For an account of the weapon see (2) below. (3) The beak of a bird. This may be connected with (2), but it does not appear in any Teutonic language other than English.

(1) In the sense of a document the word is used in various connexions in law and commerce.

In the English parliament, and similar legislative bodies, a bill is a form of statute (*q.v.*) submitted to either house, which when finally passed becomes an act. The modern system of legislating by means of bill and statute appears to have been introduced in the reign of Henry VI., superseding the older mode of proceeding by petitions from the Commons, assented to by the king, and afterwards enrolled by the judges. A bill consists of a preamble, reciting the necessity for legislation, and clauses which contain the enactments. (For procedure see PARLIAMENT.)

A *Bill in Chancery*, in former days, in English law, was a written statement of the plaintiff's case whereby he complained of the wrong upon which the suit was based and prayed for relief. By the Judicature Acts 1873 and 1875 its place was taken by a writ and statement of claim (see PLEADING).

A *Bill of Indictment* is a presentment against a prisoner, charging him with an offence, and presented at quarter sessions or assizes to the grand jury (see INDICTMENT).

A *Bill of Costs* is an account setting forth the charges and disbursements incurred by a solicitor in the conduct of his client's business. The delivery of a bill of costs is by statute a condition necessary before the solicitor can sue upon it (see COSTS).

A *Bill of Exceptions* was formerly a statement in writing of objections to the ruling of a judge, who, at the trial, had mistaken the law, either in directing the jury, or in refusing or admitting evidence or otherwise. The bill of exceptions was tendered at any time before the verdict by counsel of the dissatisfied party, who required the judge to seal it. The case proceeded to the jury, and judgment being given, the point raised was brought before a court of error. Bills of exceptions were confined to civil cases. They were abolished by the Judicature Act 1875, and a "motion for a new trial" substituted (see TRIAL).

A *Bill of Health* is a document given to the master of a ship by the consul or other proper authority of the port from which he clears, describing the sanitary state of the place. A bill of health may be either "clean," "suspected" or "touched," or "foul." A "clean" bill imports that at the time the ship sailed, no disease of an infectious or contagious kind is known to exist, a "suspected" or "touched" bill, that no such disease has as yet appeared, but that there is reason to fear it; a "foul" bill, that such a disease actually exists at the time of the ship's departure. Bills of health are necessary where the destination of the ship is a country whose laws require the production of such a bill before the ship is allowed into port, and where, in default of such production, the ship is subjected to quarantine.

A *Bill of Mortality* in England was a weekly return issued under the supervision of the company of parish clerks showing the number of deaths in a parish. During the Tudor period England suffered much from plague, and various precautionary measures became necessary. Quarantine or isolation was the most important, but to carry it out successfully it was necessary to have early warning of the existence of plague in each parish or house. For this purpose searchers—usually women—were appointed, who reported to the clerk the cause of each death in the parish. He, in turn, sent a report to the parish clerks' hall, from whence was issued weekly a return of all the deaths from plague and other causes in the various parishes, as well as a list of those parishes which were free from plague. Bills of mortality are usually said to date from 1538, when parish registers were established by Cromwell (Lord Essex), but there is extant a bill which dates from August 1535, and one which is possibly even earlier than this. It is certain that they first began to be compiled in a recognized manner in December 1603, and they were continued regularly from that date down to 1842, when under the Births and Deaths Registration Act 1836 they were superseded by the registrar-general's returns. It was not till 1728, when the *ages* of the dead were first introduced, that bills of mortality acquired any considerable statistical value. It was on the data thus furnished that the science of life insurance was founded.

A *Bill of Particulars* was, in law, a statement in writing, informing each party to a suit the precise nature of the case they had to meet. It contained the plaintiff's cause of action or the defendant's set-off. Particulars are now usually indorsed on the pleadings (see PLEADING).

A *Bill of Peace* is, in equity, a suit brought by a person to establish and perpetuate a right which he claims, and which from its nature may be controverted by different persons at different times and by different actions; or where several attempts have already been unsuccessfully made to overthrow the same right, and justice requires that the party should be quieted in the right if it is already sufficiently established. Bills of this nature were usually filed where there was one general right to be established against a great number of persons, or where one person claimed or defended a right against many, or where many claimed or defended a right against one. Thus, a bill might be filed by a parson for tithes against his parishioners; by parishioners against a parson to establish a *modus*; by a lord against tenants for an encroachment under colour of a common right; or by tenants against a lord for disturbance of a common right. Bills were also filed in cases where the plaintiff had, after repeated and satisfactory trials, established his right at law, and yet was in danger of further litigation and obstruction to his right from new attempts to controvert it. Actions in the nature of bills of peace are still maintainable.

A *Bill of Sight* is a document furnished to a collector of customs or other proper officer by an importer of goods in England, who, being unable for want of full information to make a perfect entry of goods consigned to him, describes the same to the best of his knowledge and information. The goods may then be provisionally landed, but perfect entry must be made within three days by indorsing on the bill of sight the necessary particulars. In default of perfect entry within three days the goods are taken to the king's warehouse, and if perfect entry is not made within one month and all duties and charges paid, they are sold for payment thereof. See the Customs Consolidation Act 1876.

A *Bill of Store* is a license granted by the custom-house to re-import British goods into the United Kingdom. All British goods re-imported into the United Kingdom are entered as foreign, unless re-imported within ten years after their exportation and unless the property in the goods continues and remains in the person by whom they were exported. But in such case they may be entered as British goods, by bill of store, with the exception of corn, grain, meal, flour and hops.

A *Bill of Victualling* or *Victualling Bill*, in its original meaning, is a list of all stores for shipment, but now an order from an export officer of the customs for the shipment from a bonded warehouse or for drawback of such stores as may be required and allowed with reference to the number of the crew and passengers on board a ship proceeding on an oversea voyage. It is made out by the master and countersigned by the collector of customs. Its object is to prevent frauds on the revenue. No such stores are supplied for the use of any ship nor any articles taken on board deemed to be stores unless they are borne upon the victualling bill, and any such stores relanded at any place in the United Kingdom without the sanction of the proper officers of the customs will be forfeited and the master and owner will each be liable to a penalty of treble the value of the stores or £100.

A victualling bill serves as a certificate of clearance when there is nothing but stores on board the ship.

See also Adventure, Attainder, Indemnity, Letter of Credit, Bill of Exchange, Bill of Rights and Bill of Sale; for a *bill of lading* see Affreightment.

(T. A. I.)

(2) In the sense of a weapon, the primitive forms of a bill suggest short scythe-blades or hedgers' bill-hooks mounted on tall staves. In such shape it is found in the hands of the English before the Conquest. English medieval documents make much confusion between the bill and the halbert and other forms of staved weapons with cutting heads. Before the 15th century the bill had been reinforced with a pike head above the curved blade and another jutting at a right angle from the blade's back. In this form it became a popular English weapon, the "brown bill" of many ballads. Billmen are not found in the king's host at Crécy and Calais, the bowmen carrying malls or short swords, and Henry VII.'s contracts for troops do not name the bill, which may be regarded rather as the private man's weapon. But when, in the middle of the 15th century, Walter Strickland, a Westmorland squire, contracts to raise armed men, it is noticeable that more than half his horsemen carry the bill as their chief arm, while seventy-one bowmen are to march on foot with seventy-six billmen. In the 16th century the bill, with the halbert, fell out of use among regular troops, the pike taking their place on account of the longer staff, which made it a better defence against cavalry. It remained during the 17th century as a watchman or constable's weapon, although rudely-fashioned bills were seen in Sedgemoor fight.

(O. Ba.)

BILLAUD-VARENNE, JACQUES NICOLAS (1756-1819), French revolutionist, was the son of an *avocat* at the parlement of Paris. He was badly brought up by a feeble father, a mother who combined immorality with religion, and a libertine abbé. At nineteen he donned the robe of an Oratorian, but did not take the vows, and busied himself with literature rather than with religion. In 1785 he left the Oratorian college where he was prefect of studies, came to Paris, married and bought a position as *avocat* in the parlement. Early in 1789 he published at Amsterdam a three-volume work on the *Despotisme des ministres de la France*, and he adopted with enthusiasm the principles of the Revolution.

At the Jacobin club he became from 1790 one of the most violent of the anti-royalist orators. After the flight of Louis XVI. to Varennes, he published a pamphlet, *L'Acéphocratie*, in which he demanded the establishment of a federal republic. On the 1st of July, in a speech at the Jacobin club he spoke of a republic, and the reference called out the stormy derision of the partisans of the constitutional monarchy; but repeating his demand for a republic on the 15th of the same month, the speech was ordered to be printed and to be sent to the branch societies throughout France. In the night of the 10th of August 1792 he was elected one of the "deputy-commissioners" of the sections who shortly afterwards became the general council of the commune. He was accused, though proof is lacking, of having been an accomplice in the massacres in the prison of the Abbaye. Elected a deputy of Paris to the National Convention, he at once spoke in favour of the immediate abolition of the monarchy, and the next day demanded that all acts be dated from the year 1 of the republic. At the trial of Louis XVI. he added new charges to the accusation, proposed to refuse counsel to the king, and voted for death "within 24 hours." On the 2nd of June 1793 he proposed a decree of accusation against the Girondists; on the 9th, at the Jacobin club, he outlined a programme which the Convention was destined gradually to realize: the expulsion of all foreigners not naturalized, the establishment of an impost on the rich, the deprivation of the rights of citizenship of all "anti-social" men, the creation of a revolutionary army, the licensing of all officers *ci-devant* nobles, the death penalty for unsuccessful generals. On the 15th of July he made a violent speech in the Convention in accusation of the Girondists. Sent in August as "representative on mission" to the departments of the Nord and of Pas-de-Calais, he showed himself inexorable to all suspects. On his return he was added to the Committee of Public Safety, which had decreed the arrest *en masse* of all suspects and the establishment of a revolutionary army, caused the extraordinary criminal tribunal to be named officially "Revolutionary Tribunal" (on the 29th of October 1793), demanded the execution of Marie Antoinette and then attacked Hébert and Danton. Meanwhile he published a book, *Les Éléments du républicanisme*, in which he demanded a division of property, if not equally, at least proportionally among the citizens. But he became uneasy for his own safety and turned against Robespierre, whom he attacked on the 8th Thermidor as a "moderate" and a Dantonist. Surprised and menaced by the Thermidorian reaction, he denounced its partisans to the Jacobin club. He was then attacked himself in the Convention for his cruelty, and a commission was appointed to examine his conduct and that of some other members of the former Committee of Public Safety. He was arrested, and as a result of the insurrection of the 12th Germinal of the year 3 (the 1st of April 1795), the Convention decreed his immediate deportation to French Guiana. After the 18th Brumaire he refused the pardon offered by the First Consul. In 1816 he left Guiana and took refuge in Port-au-Prince (Haiti), where he died of dysentery.

In 1821 were published the *Mémoires de Billaud-Varenne écrits à Port-au-Prince* (Paris, 2 vols.), but they are probably forgeries. An interesting autobiographical sketch of his youth, *Tableau du premier âge*, composed in 1786, was published in 1888 in the review, *La Révolution française*. The facts of such a life need no comment. See, in addition to histories of the Revolution, F.A. Aulard, *Les Orateurs de la législative et de la convention* (2nd ed., 1906).

(R. A.*)

BILLET, (1) (Like the Fr. *billet*, a diminutive of *bille*, a writing), a small paper or "note," commonly used in the 18th and early 19th centuries as a "billet of invitation." A particular use of the word in this sense is to denote an order issued to a soldier entitling him to quarters with a certain person (see Billeting). From meaning the official order, the word billet came to be loosely used of the quarters thus obtained, giving rise to such colloquial expressions as "a good billet." Hence arises the sense of "billet" as the destination allotted to anything, for example in the saying of William III. "every bullet has its billet." Another special sense of the word is that of a voting-paper, found in the 17th century, especially with reference to the Act of Billets passed by the Scottish parliament in 1662.

(2) (From the diminutive *billette* or *billot* of the Fr. *bille*, the trunk of a tree), a piece of wood roughly cylindrical, cut for use as fuel. In medieval England it was used of the club or bludgeon which was the weapon proper to the serf (Du Cange, s. *Billus*). The name has been transferred to various objects of a similar shape: to ingots of gold, for example, or bars of iron; and in heraldry, to a bearing of rectangular shape. The term is applied in architecture to a form of ornamental moulding much used in Norman and sometimes in Early English work. It bears a resemblance to small billets of wood arranged at regular intervals in a sunk moulding. In French architecture it is found in early work and there, sometimes, forms the decoration of a string-course under the gutter, with two or three rows of billets.

BILLETING, the providing of quarters (*i.e.* board and lodgings) for soldiers (see Billet, 1). Troops have at all times made use

of the shelter and local resources afforded by the villages on or near their line of march. The historical interest of billeting in England begins with the repeated petitions against it in the reigns of Elizabeth, James I. and Charles I., which culminated in the Petition of Right. The billeting of troops was superintended by a civil magistrate of the district to which the troops were sent or through which they passed. The magistrate, who acted under an order from the king, too often spared his friends at the expense of his political or personal opponents. Owing to the abuses to which the system led, it was declared illegal by the Petition of Right 1628, and again by an act of 1679. During the reign of James II., however, orders were frequently issued for billeting, and one of the grievances in the Bill of Rights was the quartering of soldiers contrary to law. On the organization of a standing army after the revolution it was necessary to make legal provision for billeting owing to the deficiency of barrack accommodation, which sufficed only for 5000 men. Accordingly, the Mutiny Act 1689 authorized billeting among the various innkeepers and victuallers throughout the kingdom. This statute was renewed annually from 1689 to 1879, when the Army Discipline Act, consolidating the provisions of the Mutiny Act, was passed. This statute was replaced by the Army Act 1881 (renewed annually by a "commencement" act), which contains the provisions by which billeting is now regulated. But modern conditions have practically dispensed with the necessity for billeting; there is extensive barrack accommodation in most parts of the United Kingdom, and, moreover, troops are entrained or sent by sea when the distance to be covered is more than one day's march. In Scotland the provisions as to billeting were assimilated to those in England in 1857, and in Ireland in 1879. The Army (Annual) Act 1909 provided for the billeting of the Territorial forces in case of national emergency, on occupiers of any kind of house at the discretion of the chief officer of police.

BILLIARDS, an indoor game of skill, played on a rectangular table,[1] and consisting in the driving of small balls with a stick called a cue either against one another or into pockets according to the methods and rules described below. The name probably originated in the Fr. *bille* (connected with Eng. "billet") signifying a stick. Of the origin of the game comparatively little is known—Spain, Italy, France and Germany all being regarded as its original home by various authorities. In an American text-book, *Modern Billiards*, it is stated that Catkire More (Conn Cetchathach), king of Ireland in the 2nd century, left behind him "fifty-five billiard balls, of brass, with the pools and cues of the same materials." The same writer refers to the travels of Anacharsis through Greece, 400 B.C., during which he saw a game analogous to billiards. French writers differ as to whether their country can claim its origin, though the name suggests this. While it is generally asserted that Henrique Devigne, an artist, who lived in the reign of Charles IX., gave form and rule to the pastime, the *Dictionnaire universel* and the *Académie des jeux* ascribe its invention to the English. Bouillet in the first work says: "Billiards appear to be derived from the game of bowls. It was anciently known in England, where, perhaps, it was invented. It was brought into France by Louis XIV., whose physician recommended this exercise." In the other work mentioned we read: "It would seem that the game was invented in England." It was certainly known and played in France in the time of Louis XI. (1423-1483). Strutt, a rather doubtful authority, notwithstanding the reputation attained by his *Sports and Pastimes of the People of England*, considers it probable that it was the ancient game of Paille-maille (Pall Mall) on a table instead of on the ground or floor—an improvement, he says, "which answered two good purposes: it precluded the necessity of the player to kneel or stoop exceedingly when he struck the bowl, and accommodated the game to the limits of a chamber." Whatever its origin, and whatever the manner in which it was originally played, it is certain that it was known in the time of Shakespeare, who makes Cleopatra, in the absence of Anthony, invite her attendant to join in the pastime—

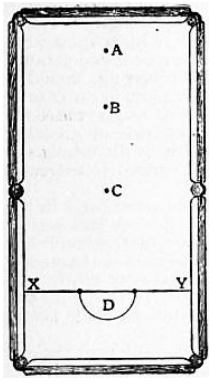
"Let us to billiards: come, Charmian."
Ant. and Cleo. Act ii. sc. 5.

In Cotton's *Compleat Gamester*, published in 1674, we are told that this "most gentile, cleanly and ingenious game" was first played in Italy, though in another page he mentions Spain as its birthplace. At that date billiards must have been well enough known, for we are told that "for the excellency of the recreation, it is much approved of and played by most nations of Europe, especially in England, there being few towns of note therein which hath not a public billiard table, neither are they wanting in many noble and private families in the country."

The game was at one time played on a lawn, like modern croquet.[1] Some authorities consider that in this form it was 935
introduced into Europe from the Orient by the Crusaders. The ball was rolled or struck with a mallet or cue (with the latter, if Strutt's allusion to "inconveniences" is correct) through hoops or rings, and these were reproduced for indoor purposes on a billiard-table, as well as a "king" or pin which had to be struck. In the original tables, which were square, there was one pocket, a hole in the centre of the table, as on a bagatelle board, the hoop or ring being retained. Then came similar pockets along one of the side cushions sunk in the bed of the table; and eventually the modern table was evolved, a true oblong or double-square, with pockets opening in the cushions at each corner and in the middle of each long side. The English tables are of this type, small bags of netting being attached to the pockets. The French and American game of billiards is played on a pocketless table. We shall deal first with the English game.

English Billiards

The English table consists of a framework of mahogany or other hard wood, with six legs, and strong enough to bear the weight of five slabs of slate, each 2⅖ ft. wide by 6 ft. 1½ in., and about 2 in. thick. These having been fitted together with the utmost accuracy to form a level surface, and a green cloth of the finest texture having been tightly strained over it, the cushions are screwed on, and the pockets, for which provision has been made in the slates, are adjusted. As the inside edge of the cushion is not perpendicular to the bed of the table, but is bevelled away so that the top overhangs the base by about ¾ of an in., the actual playing area of the table is 6 ft. wide but is 1½ in. short of 12 ft. long. The height of the table is 2 ft. 8 in. measured from the floor to the cloth. The cloth is in the shape shown in the diagram.



The three spots are on the centre line of the table, and are usually marked by small circular pieces of black tissue paper or court plaster; sometimes they are specially marked for the occasion in chalk. The *baulk* line and the D are marked either with chalk, tailors' pipeclay, or an ordinary lead pencil; no other marks appear on the table. Smaller tables provide plenty of practice and amusement, provided that the relation of the length to the breadth be observed. On these tables full-sized balls may be used, the pockets being made slightly smaller than in the full-size table.

In the early part of the 19th century the bed of the table was made of wood, occasionally of marble or stone; green baize was used to cover both the bed and the cushions, the latter made of layers of list. Then as now the cushions proper were glued to a wooden framework which is screwed on to the bed of the table. The old list cushions possessed so little resilience that about 1835 india-rubber was substituted, the value of the improvement being somewhat modified by the fact that in cold weather the rubber became hard and never recovered its elasticity. Vulcanite resisted the cold, but was not "fast" enough, *i.e.* did not permit the ball to rebound quickly; but eventually a substance was invented, practically proof against cold and sufficiently elastic for all purposes. Late in the 19th century pneumatic cushions were tried, tubes into which air could be pumped, but they did not become popular, though the so-called " vacuum "cushions give good results. The shape of the face of the cushion has gone through many modifications, owing to the difficulty experienced in the accurate

striking of the ball when resting against the cushion with only a small fraction of it's surface offered to the cue; but low cushions are now made which expose nearly half of the upper part of the ball.

On the size and shape of the pockets depends the ease with which the players score. The mouth of the pocket, known as the "fall" or "drop," is part of the arc of a circle, the circle being larger in the case of the corner pockets than in that of the middle pockets; the cushions are cut away to admit the passage of the ball. The corner pockets are measured by the length of the tangent drawn at the outside point of the arc to the cushion on either side. The middle pockets are measured at the points where the arc terminates in the cushions. The fall of the middle pockets, *i.e.* the outside point of the arc, is on the line of the outside face of the cushion; that of the corner pockets is half way down the passage cut in the cushions.

A. The billiard spot measured from the nearest point of the face of the cushion. B. Pyramid spot.
C. Centre spot.
XY. Baulk line.
D. Semicircle of 11½ in. radius, known as the D.

From 1870 to 1885 matches for the championship were played on "Championship Tables," the pockets measuring only 3 in. at the "fall." The tables in ordinary use have 3⅝-in. or 3¾-in. pockets, but in the "Standard Association Tables," introduced by the Billiard Association at the end of the 19th century, the 3⅝-in. pocket was adopted for all matches, while the fall of the middle pocket was withdrawn slightly from the cushion-line. Further, as the shape of the shoulders of the cushion at the pockets affects the facility of scoring, the Association adopted a much rounder shoulder than that used in ordinary tables, thereby requiring greater accuracy on the part of the player. In the championship tables the baulk line was only 28 in. from the cushion, and the radius of the D was reduced to 9½ and afterwards to 10 in., the spot being 12½ in. from the top cushion.

The principal games are three in number,—*billiards proper, pyramids* and *pool*; and from these spring a variety of others. The object of the player in each game, however, is either to drive one or other of the balls into one or other of the pockets, or (only in billiards proper) to cause the striker's ball to come into successive contact with two other balls. The former stroke is known as a *hazard* (a term derived from the fact that the pockets used to be called hazards in old days), the latter as a *cannon*. When the ball is forced into a pocket the stroke is called a winning hazard; when the striker's ball falls into a pocket after contact with the object ball, the stroke is a losing hazard; "red hazards" mean that the red ball is the object-ball, "white hazards" the white.

Three balls are used in billiards proper, two white and one red. One of the white balls has a black spot at each end of an imaginary diameter, to distinguish it from the other, the white balls being known as spot-white (or "spot") and "plain." They should be theoretically perfect spheres, of identical size and weight, and of equal durability in all parts. The size that is generally used in matches has a diameter of 2 1/16 in., and the weight about 4⅔ oz. It is exceedingly difficult to get three such ivory balls (the best substance for elasticity) except by cutting up many tusks, and when procured the halls soon lose their perfection, partly because ivory is softer in one part than another, partly because it is very susceptible to changes of weather and temperature, and unequally susceptible in different parts; it is also liable to slight injury in the ordinary course of play. Various substitutes have, therefore, been tried for ivory (*q.v.*), such as crystalate, or bonzoline (a celluloid compound), and even hollow steel; but their elasticity is inferior to that of ivory, so that the ball rebounds at a wider angle when it strikes. The price of a first-rate set of ivory balls is from four to six guineas; the composition balls cost about half a guinea apiece.

The cue is a rounded rod of seasoned ash about 4 ft. 9 in. in length, tapering from the butt, which is about 1½ in. in diameter, to the tip, which varies in size according to the fancy of the player. The average tip is, however, ½ in. in diameter. The cue weighs generally between 14 and 18 oz. The tip of the cue is usually a leather cap or pad, which, being liable to slip along the surface of the ball in striking, is kept covered with chalk. To the leather tip, the invention of a Frenchman named Mingin (about 1820), and to the control which it gives the player over the ball, the science of modern play is entirely due. The butt of the cue is generally spliced with ebony or some other heavy wood, since a shaft of plain ash is too light for its purpose, and is furthermore liable to warp. At one time it was lawful to use the butt of the cue or even a special instrument with a squared spoon-shaped end called a mace (or mast), in making strokes or giving misses, but now all strokes must be made with the point. The cue is held in one hand, and with the other the player makes a "bridge" by placing wrist and finger-tips on the table, and extending his thumb so as to make a passage along which to slide his cue and to strike the ball. As it is not always possible to reach the ball in this way, longer cues (the "half-butt" and "long butt") are required; they are used with a "rest," a shaft of wood at the end of which, perpendicular to the axis, is fastened an × of wood or metal, the cue being rested on the upper half while the lower is on the cloth. A "long rest," about 6 ft. long, is used with the long cues, the "short rest" (or "jigger") about 4 ft. long, with the ordinary cue. A marking-board and stands or racks for rests and butts, with iron and brush for the table, and a cover for the table when not in use, complete the billiard "furniture" of the room, apart from its seating accommodation.

The game of *billiards proper* consists of the making of winning and losing hazards and cannons. It is usually played between two opponents (or four, two against two) for 100 or more points, three being scored for each red hazard, two for each white hazard and two for each cannon. Certain forfeitures on the other hand score to the opponent: running your ball off the table or into a pocket without having hit another ball, 3 (a coup); ordinary misses (not hitting an object-ball), 1. All these forfeits involve the termination of the turn. There are also "foul strokes" which score nothing to the opponent, and only involve the termination of the turn: such as playing with the wrong ball, forcing a ball off the table, hitting a ball twice, &c. When the red ball is pocketed it is replaced on the billiard-spot; if that is occupied, on the pyramid-spot; if that too, on the centre-spot; but if the opponent's white ball is pocketed it remains out of play till his turn comes. Public matches between adepts are played for higher points, but the rules which govern them are the same. The players have alternate turns, each being "in play" and continuing his "break" until he fails to score.

The game commences by stringing for the lead and choice of balls. The players standing behind the baulk line, strike each a ball from the semicircle up to the top cushion, and he whose ball on its return stops nearest the bottom cushion has the choice of lead and balls. The red ball is placed on the spot at the commencement of the game, and the first player must "break the balls." The balls are said to be "broken" when the first player has struck the red or given a miss; and the opponent's ball when off the table is said to be "in hand." Breaking the balls thus takes place whenever the position, as at the beginning of the game, recurs. The first player (or the player at any stage of the game when he plays after being "in hand") must place his own ball in any part of the D, or on the lines that form the D, and must play into the part of the table outside the baulk line, for he may not hit direct any ball that is "in baulk," *i.e.* on or behind the baulk-line; if he wishes to play at it he must first strike a cushion out of baulk (or, as it is called, *bricole*). If a player fails to score, the adversary plays, as soon as all the balls are at rest, either from baulk (if "in hand") or from the place where his own ball has stopped. If by the same stroke a player makes two scores, *i.e.* a cannon and a hazard for instance, or a winning and a losing hazard, he scores for each of them. Thus if he pockets the red ball and the cue-ball, he scores six, or if he makes a cannon and holes the red ball, five. In the case of a cannon and a losing hazard, made by the same stroke, the value of the hazard depends on the ball first struck. Thus if the cue-ball strikes the red, cannons on to the white, and runs into a pocket, the stroke counts five points, but only one cannon can be made by the same stroke, even if the cue-ball strikes each of the others twice. If both object-balls are struck simultaneously it is considered that the red is struck first. Ten points are the most that can be scored by a single stroke with the cue, namely by striking the red ball first and then the white, and holing all three. If the white ball be struck first and the same series occurs, the value of the stroke is nine points. When the cue-ball and object-ball are *touching*, whatever the position, the red ball is spotted, the white object-ball put on the centre-spot, and the player plays from baulk.

There are various subtleties in the art of striking, which may be indicated, though only practice can really teach them; the simple stroke being one delivered slightly above the centre of the ball.

The *side-stroke* is made by striking the object-ball on the side with the point of the cue. The effect of such a mode of striking the ball is to make it travel to the right or to the left, according as it is struck, with a winding or slightly circular motion; and its purpose is to cause the ball to proceed in a direction more or less slanting than is usual, or ordinary, when the ball is struck in or about the centre of its circumference. Many hazards and cannons, quite impossible to be made with the central stroke, are accomplished with ease and certainty by the side-stroke. It was the invention of the leather tip which made *side* possible. The *screw*, or twist, is made by striking the ball low down, with a sharp, sudden blow. According as the ball is struck nearer and nearer to the cushion, it stops dead at the point of concussion with the object-ball, or recoils by a series of reverse revolutions,

in the manner familiar to the schoolboy in throwing forward a hoop, and causing it to return to his hand by the twist given to its first impetus.

The *follow* is made by striking the ball high, with a flowing or following motion of the cue. Just as the low stroke impedes the motion of the ball, the follow expedites it.

In the *drag* the ball is struck low without the sudden jerk of the screw, and with less than the onward push of the follow.

The *spot-stroke* is a series of winning hazards made by pocketing the red ball in one of the corners from the spot. The great art is, first, to make sure of the hazard, and next, to leave the striking ball in such a position as to enable the player to make a similar stroke in one or other of the corner pockets. To such perfection was the spot-stroke brought, that at the end of the 19th century it was necessary to bar it out of the professional matches, and the "spot-barred" game became consequently the rule for all players. The leading English professionals so completely mastered the difficulties of the stroke and made such long successions of hazards that they practically killed all public interest in billiards, the game being little more than a monotonous series of spot-strokes. In 1888 W.J. Peall made 633 "spots" in succession, and in 1890 in a break of 3304—the longest record—no less than 3183 of the points were scored through spot-stroke breaks. J.G. Sala, by use of the screw-back, made 186 successive hazards in one pocket, but C. Memmott is said to have made as many as 423 such strokes in succession. The spot-stroke was known and used in 1825, when a run of twenty-two "spots" caused quite a sensation. The player, whose name was Carr, offered to play any man in England, but though challenged by Edwin Kentfield never met him, so the latter became champion. Kentfield, however, did not regard the spot-stroke as genuine billiards, rarely played it himself, and had the pocket of his tables reduced to 3 in., and the billiard-spot moved nearer to the top of the table, so as to make the stroke exceedingly difficult. John Roberts, sen., who succeeded Kentfield as champion in 1849, worked hard at the stroke, but never made, in public, a longer run than 104 in succession. But W. Cook, John Roberts, jun., and others, assisted by the improvements made in the implements of the game, soon outdid Roberts, sen., only to be themselves outdone by W. Peall and W. Mitchell, who made such huge breaks by means of the stroke that it was finally barred, the Association rules providing that only two "spots" may be made in succession unless a cannon is combined with a hazard, and that after the second hazard the red ball be placed on the centre-spot.

Top-of-the-Table Play.—When the spot-stroke was dying, many leading players, headed by John Roberts, jun., assiduously cultivated another form of rapid scoring, known as "top-of-the-table-play," the first principle of which is to collect the three balls at the top of the table near the spot. The balls are then manipulated by means of red winning hazards and cannons, the winning hazard not being made till the object-white can be left close to the spot.

The Push-stroke.—Long series of cannons were also made along the edge of the cushion, mainly by means of the "push-stroke," and with great rapidity, but eventually the push-stroke too was barred as unfair. It was usually employed when cue-ball and object-ball were very close together and the third ball was in a line, or nearly in a line with them; then by placing the tip of the cue very close to the cue-ball and pushing gently and carefully, not striking, the object-ball could be pushed aside and the cue-ball directed on ball 3.

Balls Jammed in Pockets.—If the two object-balls get jammed, either by accident or design, in the jaws of a corner pocket, an almost interminable series of cannons may be made by a skilful player. T. Taylor made as many as 729 cannons in 1891, but the American champion, Frank C. Ives, in a match with John Roberts, jun., easily beat this in 1893, by making 1267 cannons, before he deliberately broke up the balls. In Ives's case the balls, however, were just outside the jaws, which were skilfully used to keep the balls close together; but in this game, which was a compromise between English and American billiards, 2¼-in. balls and 3¼-in. pockets were used. Under the aegis of the Billiard Association a tacit understanding was arrived at that the position must be broken up, should it occur. A similar position came into discredit in 1907, in the case of the "cradle-double-kiss" or "anchor" cannon, where the balls were not actually jammed, but so close on each side of a pocket that a long series of cannons could be made without disturbing the position—a stroke introduced by Lovejoy and carried to extremes by him, T. Reece and others (see below).

The Quill or Feather Stroke.—This stroke was barred early in the game's history. It could only be made when the cue-ball was in hand and the object-ball just outside that part of the baulk-line that helps to form the D. The cue-ball was set so close to the object-ball as only not to touch it, and was then pushed very gently into the pocket, grazing the other so slightly as just to shake it, and no more. A number of similar strokes could thus be made before the object-ball was out of position.

A *jenny* is a losing hazard into one of the (generally top) pockets when the object-ball is close to the cushion along which the pocket lies: it requires to be played with the side required to turn the ball into the pocket. Long jennies to the top pockets are a difficult and pretty stroke: short jennies are into the middle pockets.

Massé and Piqué.—A *massé* is a difficult stroke made by striking downwards on the upper surface of the cue-ball, the cue being held nearly at right angles to the table, and the point not being directed towards the centre of the ball. It is generally used to effect a cannon when the three balls are more or less in a line, the cue-ball and the object-ball being close together. The term *massé* is often used irregularly for *piqué*, made when the object-ball is as close to the cue-ball as the latter to the cushion, or the third ball, or to make screwing impossible; the cue is then raised to an angle of almost 45° or 50° and its axis directed to the centre of the cue-ball, so that backward rotation is set up. Vignaux, the French player, says, "*Le massé est un piqué.*" *Massé* is in fact *piqué* combined with side.

The perfection of billiards is to be found in the nice combination of the various strokes, in such fashion as to leave the balls in a favourable position after each individual hazard and cannon; and this perfection can only be attained by the most constant and unremitting practice. When the cue-ball is so played that its centre is aimed at the extreme edge of the object-ball, the cue-ball's course is diverted at what is called the "*natural*" or "*half-ball*" angle. If the balls were flat discs instead of spheres the edge of one ball would touch the centre of the other. The object-ball is struck at "three-quarter ball" or "quarter-ball" according as the edge of the cue-ball appears to strike mid-way between the half-ball point and the centre or edge respectively of the object-ball. The half-ball angle is regarded as the standard angle for billiards, other angles being sometimes termed rather vaguely as "rather more or less than half-ball." The angle of the cue-ball's new course would be about 45°, were the object-ball fixed, but as the object-ball moves immediately it is struck, the cue-ball is not actually diverted more than 33° from the prolongation of its original course, it being conventional among players to regard the prolongation of the course and not the original track when calculating the angle. The natural angle, and all angles, may be modified by side and screw; the use of strength also makes the ball go off at a wider angle.

Development in Billiard Play.—The modern development of English billiards is due mainly to the skill of such leading players as John Roberts, sen., and his son of the same name. Indeed, their careers form the history of modern billiards from 1849 when the elder Roberts challenged Kentfield (who declined to play) for the championship. No useful comparison can be made between the last-named men, and the change of cushions from list to india-rubber further complicates the question. Kentfield represented the best of the old style of play, and was a most skilful performer; but Roberts had a genius for the game, combined with great nerve and physical power. This capacity for endurance enabled him to practise single strokes till they became certainties, when weaker men would have failed from sheer fatigue; and that process applied to the acquisition of the spot-stroke was what placed him decisively in front of the players of his day until a younger generation taught by him came forward. In 1869 the younger generation had caught him up, and soon afterwards surpassed him at this stroke; both W. Cook and J. Roberts, jun., carried it to greater perfection, but they were in turn put entirely in the shade by W. Mitchell and W.J. Peall. It is curious to realize that John Roberts, sen., developed the game chiefly by means of spot-play, whereas his son continued the process by abandoning it. The public, however, liked quick scoring and long breaks, and therefore a substitute had to be devised. This was provided chiefly by the younger Roberts, whose fertility of resource and manual dexterity eventually placed him by a very long way at the head of his profession. In exhibition matches he barred the spot-stroke and gave his attention chiefly to top-of-the-table play.

The next development was borrowed from the French game (see below), which consists entirely of cannons. Both French and American professors, giving undivided attention to cannons and not being permitted to use the *push-stroke*, arrived at a

perfection in controlling or "*nursing*" the balls to which English players could not pretend; yet the principles involved in making a long series of cannons were applied, and leading professionals soon acquired the necessary delicacy of touch. The plan is to get the three balls close to each other, say within a space which a hand can cover, and not more than from 4 to 8 in. from a cushion. The striker's ball should be behind the other two, one of which is nearer the cushion, the other a little farther off and farther forward. The striker's ball is tapped quietly on the one next the cushion, and hits the third ball so as to drive it an inch or two in a line parallel to the cushion. The ball first struck rebounds from the cushion, and at the close of the stroke all three balls are at rest in a position exactly similar to that at starting, which is called by the French *position mère*. Thus each stroke is a repetition of the previous one, the positions of the balls being relatively the same, but actually forming a series of short advances along the cushion. With the push-stroke a great number of these cannons could be quickly made, say 50 in 3½ minutes; and, as that means 100 points, scoring was rapid. Most of the great spot-barred breaks contained long series of these cannons, and their value as records is correspondingly diminished, for in such hair's-breadth distances very often no one but the player, and sometimes not even he, could tell whether a stroke was made or missed or was foul. Push-barred, the cannons are played nearly as fast; but with most men the series is shorter, *massé* strokes being used when the cannon cannot be directly played.

Championship.—When Kentfield declined to play in 1849, John Roberts, sen., assumed the title, and held the position till 1870, when he was defeated by his pupil W. Cook. The following table gives particulars of championship matches up to 1885:—

Points.	Date.	Players.	Won by.
1200	Feb. 11, 1870	Cook *b.* Roberts, sen.	117
1000	April 14, 1870	Roberts, jun., *b.* Cook	478
1000	May 30, 1870	Roberts, jun., *b.* Bowles	246
1000	Nov. 28, 1870	Jos. Bennett *b.* Roberts, jun.	95
1000	Jan. 30, 1871	Roberts, jun., *b.* Bennett	363
1000	May 25, 1871	Cook *b.* Roberts, jun.	15
1000	Nov. 21, 1871	Cook *b.* Jos. Bennett	58
1000	March 4, 1872	Cook *b.* Roberts, jun.	201
1000	Feb. 4, 1874	Cook *b.* Roberts, jun.	216
1000	May 24, 1875	Roberts, jun., *b.* Cook	163
1000	Dec. 20, 1875	Roberts, jun., *b.* Cook	135
1000	May 28, 1877	Roberts, jun., *b.* Cook	223
1000	Nov. 8, 1880	Jos. Bennett *b.* Cook	51
1000	Jan. 12, 13, 1881	Jos. Bennett *b.* Taylor	90
3000	March 30, 31, and April 1, 1885	Roberts, jun., *b.* Cook	92
3000	June 1, 2, 3, 4, 1885	Roberts, jun., *b.* Jos. Bennett	1640

These games were played on three-inch-pocket tables, and John Roberts, jun., fairly contended that he remained champion till beaten on such a table under the rules in force when he won the title or under a new code to which he was a consenting party. A match was played for the championship between Roberts and Dawson, in 1899 of 18,000 up, level. The main departure from a championship game lay in the table, which had ordinary, though not easy pockets, instead of three-inch pockets. The match excited much interest, because Dawson, who had already beaten North for the Billiard Association championship, was the first man for many years to play Roberts even; but Roberts secured the game by 1814 points. After this Dawson improved materially, and in 1899, for the second time, he won the Billiard Association championship. His position was challenged by Diggle and Stevenson, who contested a game of 9000 points. Stevenson won by 2900, but lost to Dawson by 2225 points; he beat him in January 1901, and though Dawson won a match before the close of the spring, Stevenson continued to establish his superiority, and at the beginning of 1907 was incontestably the English champion.

Records.—Record scores at billiards have greatly altered since W. Cook's break of 936, which included 292 spots, and was made in 1873. Big breaks are in some degree a measure of development; but too much weight must not be given to them, for tables vary considerably between easy and difficult ones, and comparisons are apt to mislead. Peall's break of 3304 (1890) is the largest "all-in" score on record; and in the modern spot-barred and push-barred game with a championship table, H.W. Stevenson in April 1904 made 788 against C. Dawson. In January 1905 John Roberts, however, made 821 in fifty minutes, in a match with J. Duncan, champion of Ireland; but this was not strictly a "record," since the table had not been measured officially by the Billiard Association. A break of 985 was made by Diggle in 1895 against Roberts, on a "standard table" (before the reduction in size of the pockets). On the 5th of March 1907 T. Reece began beating records by means of the "anchor" stroke, making 1269 (521 cannons), and he made an unfinished 4593 with the same stroke (2268 cannons) on the 23rd of March. Further large breaks followed, including 23,769 by Dawson on the 20th of April 1907, and even more by Reece; and towards the end of the year the Billiard Association ruled the stroke out.

Handicapping.—The obvious way of handicapping unequal players is for the stronger player to allow his opponent an agreed number of points by way of start. Or he may "owe" points, *i.e.* not begin to reckon his score till he has scored a certain number. A good plan is for the better player to agree to count no breaks that are below a certain figure. The giver of points scores all forfeits for misses, &c. If A can give B 20 points, and B can give C 25 points, the number of points that A can give C is calculated on the following formula,

$$20 + 25 - \frac{20 \times 25}{100} = 40.$$

The handicap of "barring" one or more pockets to the better player, he having only four or five sockets to play into, has been abolished in company with other methods that tended to make the game tedious.

Pyramids is played by two or four persons—in the latter case in sides, two and two. It is played with fifteen balls, placed close together by means of a frame in the form of a triangle or pyramid, with the apex towards the player, and a white striking ball. The centre of the apex ball covers the second or pyramid spot, and the balls forming the pyramid should lie in a compact mass, the base in a straight line with the cushion.

Pyramids is a game entirely of winning hazards, and he who succeeds in pocketing the greatest number of balls wins. Usually the pyramid is made of fifteen red or coloured balls, with the striking ball white. This white ball is common to both players. Having decided on the lead, the first player, placing his ball in the baulk-semicircle, strikes it up to the pyramid, with a view either to lodge a ball in a pocket or to get the white safely back into baulk. Should he fail to pocket a red ball, the other player goes on and strikes the white ball from the place at which it stopped. When either succeeds in making a winning hazard, he plays at any other ball he chooses, and continues his break till he ceases to score; and so the game is continued by alternate breaks until the last red ball is pocketed. The game is commonly played for a stake upon the whole, and a proportionate sum upon each ball or life—as, for instance, 3s. game and 1s. balls. The player wins a life by pocketing a red ball or forcing it over the table; and loses a life by running his own, the white, ball into a pocket, missing the red balls, or intentionally giving a miss. In this game the baulk is no protection; that is to say, the player can pocket any ball wherever it lies, either within or without the baulk line, and whether the white be in hand or not. This liberty is a great and certain advantage under many circumstances, especially in the hands of a good player. It is not a very uncommon occurrence for an adept to pocket six or eight balls in a single break. Both Cook and Roberts have been known, indeed, to pocket the whole fifteen. If four persons play at pyramids, the rotation is decided by chance, and each plays alternately—partners, as in billiards, being allowed to advise each other, each going on and continuing to play as long as he can, and ceasing when he misses a hazard. Foul strokes are reckoned as in billiards, except as regards balls touching each other. If two balls touch, the player proceeds with his game and scores a point for every winning hazard. When all the red balls but one are pocketed, he who made the last hazard plays with

the white and his opponent with the red; and so on alternately, till the game terminates by the holing of one or other ball. The pyramid balls are usually a little smaller than the billiard balls; the former are about 2 in. in diameter, the latter 2$\frac{1}{16}$ in. to 2$\frac{1}{8}$ in.

Losing Pyramids, seldom played, is the reverse of the last-named game, and consists of losing hazards, each player using the same striking ball, and taking a ball from the pyramid for every losing hazard. As in the other game, the baulk is no protection. Another variety of pyramids is known as *Shell-out*, a game at which any number of persons may play. The pyramid is formed as before, and the company play in rotation. For each winning hazard the striker receives from each player a small stake, and for each losing hazard he pays a like sum, till the game is concluded, by pocketing the white or the last coloured ball.

Pool, a game which may be played by two or more persons, consists entirely of winning hazards. Each player subscribes a certain stake to form the pool, and at starting has three chances or lives. He is then provided with a coloured or numbered ball, and the game commences thus:—The white ball is placed on the spot and the red is played at it from the baulk semicircle. If the player pocket the white he receives the price of a life from the owner of the white; but if he fail, the next player, the yellow, plays on the red; and so on alternately till all have played, or till a ball be pocketed. When a ball is pocketed the striker plays on the ball nearest his own, and goes on playing as long as he can score.

The order of play is usually as follows:—The white ball is spotted; red plays upon white; yellow upon red; then blue, brown, green, black, and spot-white follow in the order of succession named, white playing on spot-white. The order is similar for a larger number, but it is not common for more than seven or eight to join in a pool. The player *wins* a life for every ball pocketed, and receives the sum agreed on for each life from the owner of that ball. He *loses* a life to the owner of the ball he plays on and misses; or by making a losing hazard after striking such ball; by playing at the wrong ball, by running a coup; or by forcing his ball over the table. Rules governing the game provide for many other incidents. A ball in baulk may be played at by the striker whose ball is in hand. If the striker's ball be angled—that is, so placed in the jaws of the pocket as not to allow him to strike the previously-played ball—he may have all the balls except his own and the object ball removed from the table to allow him to try bricole from the cushion. In some clubs and public rooms an angled ball is allowed to be moved an inch or two from the corner; but with a ball so removed the player must not take a life. When the striker loses a life, the next in rotation plays at the ball nearest his own; but if the player's ball happen to be in hand, he plays at the ball nearest to the centre spot on the baulk line, whether it be in or out of baulk. In such a case the striker can play from any part of the semicircle. Any ball lying in the way of the striker's ball, and preventing him from taking fair aim and reaching the object-ball, must be removed, and replaced after the stroke. If there be any doubt as to the nearest ball, the distance must be measured by the marker or umpire; and if the distance be equal, the ball to be played upon must be decided by chance. If the striker first pocket the ball he plays on and then runs his own into a pocket, he loses a life to the player whose ball he pocketed, which ball is then to be considered in hand. The first player who loses all his three lives can "star"; that is, by paying into the pool a sum equal to his original stake, he is entitled to as many lives as the lowest number on the marking board. Thus if the lowest number be 2, he stars 2; if 1, he stars 1. Only one star is allowed in a pool; and when there are only two players left in, no star can be purchased. The price of each life must be paid by the player losing it, immediately after the stroke is made; and the stake or pool is finally won by the player who remains longest in the game. In the event, however, of the two players last left in the pool having an equal number of lives, they may either play for the whole or divide the stake. The latter, the usual course, is followed except when the combatants agree to play out the game. When three players are left, each with one life, and the striker makes a miss, the two remaining divide the pool without a stroke—this rule being intended to meet the possible case of two players combining to take advantage of a third. When the striker has to play, he may ask which ball he has to play at, and if being wrongly informed he play at the wrong ball, he does not lose a life. In clubs and public rooms it is usual for the marker to call the order and rotation of play: "Red upon white, and yellow's your player"; and when a ball has been pocketed the fact is notified—"Brown upon blue, and green's your player, in hand"; and so on till there are only two or three players left in the pool.

There are some varieties of the game which need brief mention.

Single Pool is the white winning hazard game, played for a stake and so much for each of three or more lives. Each person has a ball, usually white and spot-white. The white is spotted, and the other plays on it from the baulk-semicircle; and then each plays alternately, spotting this ball after making a hazard. For each winning hazard the striker receives a life; for each losing hazard he pays a life; and the taker of the three lives wins the game. No star is allowed in single pool. The rules regulating pool are observed.

Nearest-Ball Pool is played by any number of persons with the ordinary coloured balls, and in the same order of succession. All the rules of pool are followed, except that the baulk *is* a protection. The white is spotted, and the red plays on it; after that each striker plays upon the ball nearest the upper or outer side of the baulk-line; but if the balls lie within the baulk-line, and the striker's ball be in hand, he must play up to the top cushion, or place his ball on the spot. If his ball be not in hand, he plays at the nearest ball, wherever it may lie.

Black Pool.—In this game, which lasts for half-an-hour, there are no lives, the player whose ball is pocketed paying the stake to the pocketer. Each player receives a coloured ball and plays in order as in "Following Pool," the white ball being spotted; there is, in addition, however, a black ball, which is spotted on the centre-spot. When a player has taken a life he may—in some rooms and clubs *must*—play on the black ball. If he pockets it he receives a stake from each player, paying a stake all round if he misses it, or commits any of the errors for which he would have to pay at "Following Pool." The black ball cannot be taken in consecutive strokes. Sometimes a pink ball, spotted on the pyramid spot, is added and a single stake is paid all round to the man who pockets it, and a double stake on the black; it is also permitted in some rooms to take blacks and pinks alternately without pocketing a coloured ball between the strokes. Again it is the custom in certain rooms to let a player, after the first round, play on any ball. The game is more amusing when as much freedom is allowed as possible, so that the taking of lives may be frequent. At the end of the half-hour the marker announces at the beginning of the round that it is the last round. White, who lost a stroke at the beginning by being spotted, has the last stroke. If a player wishes to enter the game during its progress his ball is put on the billiard-spot just before white plays, and he takes his first stroke at the end of the round.

Snooker Pool.—This is a game of many and elaborate rules. In principle it is a combination of pyramids and pool. The white ball is the cue-ball for all players. The pyramid balls, set up as in pyramids, count one point each, the yellow ball two points, green ball three, and so on. The black is put on the billiard-spot, the pink on the centre-spot, blue below the apex ball of the pyramid; brown, green and yellow on the diameter of the semicircle, brown on the middle spot, green on the right corner spot of the D, yellow on the left. The players, having decided the order of play, generally by distributing the pool balls from the basket, and playing in the order of colours as shown on the marking board, are obliged to strike a red ball first. If it is pocketed, the player scores one and is at liberty to play on any of the coloured balls; though in some clubs he is compelled to play on the yellow. If he pockets a coloured ball he scores the number of points which that ball is worth, and plays again on a red ball, the coloured ball being replaced on its spot, and so on; but a red ball must always be pocketed before a more valuable ball can be played at. When all the red balls have been pocketed—none are put back on the table as at pyramids—the remaining balls *must* be pocketed in the pool order and are not replaced. The penalties for missing a ball, running into a pocket, &c., are deducted from the player's score; they correspond to the values of the balls, one point if the red be missed, two if the yellow be missed, &c. If, before hitting the proper ball, the player hits one of a higher value, the value of that ball is deducted from his score, but there is no further penalty. A player is "snookered" if his ball is so placed that he cannot hit a ball on which he is compelled to play. In this case he is allowed in some rooms to give a miss, but in such a way that the next player is not snookered; in others he must make a *bona fide* attempt to hit the proper ball off the cushion, being liable to the usual penalty if in so doing he hits a ball of higher value. In some rooms it is considered fair and part of the game to snooker an opponent deliberately; in others the practice is condemned. The rules are so variable in different places that even the printed rules are not of much value, owing to local by-laws.

Among other games of minor importance, being played in a less serious spirit than those mentioned, are *Selling Pool, Nearest Ball Pool, Cork Pool* and *Skittle Pool*. The directions for playing them may be found in *Billiards* (Badminton Library series).

French and American Billiards.—French and American billiards is played on a pocketless table, the only kind of table that is

used in France, though the English table with six pockets is also occasionally to be found in America. For match purposes the table used measures 10 ft. by 5 ft., but in private houses and clubs 9 ft. by 4¼ ft. is the usual size, while tables 8 ft. by 4 ft. are not uncommon. The balls, three in number as in English billiards, measure from 2¼ to 2⅜ in., the latter being "match" size. Since they are both larger and heavier than the English balls, the cues are somewhat heavier and more powerful, so that better effects can be produced by means of "side," masses, &c. Only cannons (called in America "caroms," in French *caramboles*) are played, each counting one point.

The three-ball carom game is the recognized form of American billiards. The table is marked with a centre-spot, "red" spot and "white" spot. The first is on the centre of an imaginary line dividing the table longitudinally into halves; the red (for the red ball) and white spots are on the same line, half-way between the centre-spot and the end cushions, the white spot being on the string-line (corresponding to the English baulk-line). The right to play first is decided, as in England, by "stringing." The opponent's white ball and the red ball being spotted, the player plays from within the imaginary baulk-line. Each carom counts one point; a miss counts one to the opponent. A ball is re-spotted on its proper spot if it has been forced off the table. Should red be forced off the table and the red spot be occupied, it is placed on the white spot. White under similar conditions is set on the red spot. The centre spot is only used when, a ball having been forced off the table, both spots are occupied. If a carom be made, and the ball afterwards jumps off the table, it is spotted and the count allowed. If the striker moves a ball not his own before he strikes, he cannot count but may play for safety. If he does so after making a carom the carom does not count, he forfeits one, and his break is ended. If he touches his own ball before he plays, he forfeits a point, and cannot play the stroke. Should he, however, touch his ball a second time, the opponent has the option of having the balls replaced as exactly as possible, or of playing on them as they are left. It is a foul stroke to play with the wrong ball, but if the offence is not detected before a second stroke has been made, the player may continue.

Such long runs of caroms, chiefly "on the rail" along the cushion, have been made by professional players (H. Kerkau, the German champion, making 7156 caroms in 1901 at Zürich), that various schemes have been devised to make the game more difficult. One of these is known as the "continuous baulk-line." Lines are drawn, 8, 14, 18 or even 22 in. from the rails, parallel to the side of the table, forming with them eight compartments. Of these 14 and 18 are the most general. Only one, two or three caroms, as previously arranged, are allowed to be made in every space, unless one at least of the object-balls is driven over a line. In the space left in the middle of the table any number of caroms may be made without restriction. In the case of the *Triangular Baulk-line*, lines are drawn at the four corners from the second "sight" on the side-rails to the first sight on the end-rails, forming four triangles within which only a limited number of caroms may be made, unless one object-ball at least be driven outside one of the lines. The *Anchor Baulk-lines* were devised to checkmate the "anchor" shot, which consisted in getting the object-balls on the rail, one on either side of a baulk-line, and delicately manipulating them so as to make long series of caroms; each ball being in a different compartment, neither had to be driven over a line. The "anchor baulk-lines" form a tiny compartment, 6 in. by 3, and are drawn at the end of a baulk-line where it touches the rail and so divides the compartment into two squares. Only one shot is allowed in this "anchor-space," unless a ball be driven out of it. By these methods, "crotching" (getting them jammed in a corner) the balls, and long series of rail-caroms were abolished. The push-stroke is strictly forbidden.

The *Cushion Carom* game is a variety of the ordinary three-ball game, in which no carom counts unless the cue-ball touches a cushion before the carom is completed. There is also *Three-Cushion Carom*, which is explained by its title, and the *Bank-Shot* game, in which the cue-ball must touch a cushion before it strikes either ball. The cushion carom games are often used in handicapping, other methods of which are for the better player to make a certain number of caroms "or no count," and for the weaker to receive a number of points in the game.

In France billiards was played exclusively by the aristocracy and the richer middle class until the first part of the 17th century, when the privilege of keeping billiard-rooms was accorded to the *billardiers paulmiers*, and billiards became the principal betting game and remained so until the time of Louis Philippe. The most prominent French player of late years is Maurice Vignaux. The French game became the accepted one in the United States about 1870, and the best American players have proved themselves superior to the French masters with the exception of Vignaux. The best-known American masters have been M. Daly, Shaafer, Slosson, Carter, Sexton and Frank C. Ives, doubtless the most brilliant player who ever lived. His record for the 18-in. baulk-line game was an average of 50, with a high run of 290 points. In cushion-caroms he scored a run of 85.

The four-ball game, the original form of American billiards, is practically obsolete. It was formerly played on an English six-pocket table, with a dark-red and a light-red ball and two white ones. At present when played an ordinary table is used, the rules being identical with those of the three-ball game.

Pool is played in America on a six-pocket table with fifteen balls, each bearing a number. There are several varieties of the game, the most popular being *Continuous Pool*, an expanded form of *Fifteen-Ball Pool*, in which the balls are set up as in English pyramids, the game being won by the player pocketing the majority of the fifteen balls, each ball counting one point, the numbers being used only to distinguish them, as a player must always name, or "call," the ball he intends to pocket and the pocket into which he will drive it. The player who "breaks" (plays first) must send at least two balls to the cushion or forfeit three points. The usual method is to strike a corner ball just hard enough to do this but not hard enough to break up the balls, as in that case the second player would have too great an advantage. Balls pocketed by chance in the same play in which a called ball has been legitimately put down are counted; all others pocketed by accident are replaced on the table. In Fifteen-Ball Pool each frame (fifteen balls) constitutes a game. In Continuous Pool the game is for a series of points, generally 100, the balls being set up again after each frame and the player pocketing the last ball having the choice whether to break or cause his opponent to do so.

The balls in Fifteen-Ball Pool are generally all of one colour, usually red. In *Pyramid Pool* they are parti-coloured as well as numbered, and the game, which usually consists of a single frame, is won by the player who, when all fifteen balls have been pocketed, has scored the greatest aggregate of the numbers on the balls. In *Chicago Pool* each frame constitutes a game and is won by the player scoring the highest aggregate of numbers on the balls, which are set up round the cushion opposite the diamond sights, the 1 being placed in the middle of the top cushion, opposite the player, with the odd-numbered balls on the player's left and those with even numbers on his right. The arrangement of the balls, however, varies and is not important. Each player must strike the lowest-numbered ball still on the table, forfeiting the number of points represented by the ball should his ball first hit any other ball, or should he pocket his own ball. If he pockets the proper ball all others that fall into pockets on that play count for him also. Missing the ball played at forfeits three points (sometimes the number on the ball played at), as well as fouls of all kinds. *Bottle Pool* is played with a cue-ball, the 1 and 2 pool-balls and the leather pool-bottle, which is stood upon its mouth in the middle of the table. A carom on two balls counts 2 points; pocketing the 1-ball counts 1; pocketing the 2-ball counts 2; upsetting bottle from carom counts 5; upsetting bottle to standing position counts 10, or, in many clubs, the game is won when this occurs. Otherwise the game is for 31 points, which number must be scored exactly, a player scoring more than that number being "burst," and having to begin over again. There are many penalties of one point, such as missing the object-ball, foul strokes, forcing a ball or the bottle off the table, pocketing one's own ball and upsetting the bottle without hitting a ball. The game of *Thirty-Four* is played without a bottle, the scoring being by caroms or pocketing the two object-balls. Exactly 34 must be scored or the player is "burst."

High-Low-Jack-Game is played with a set of pyramid balls by any number of players, the order of starting being determined by distributing the small balls from the pool-bottle. The 15-ball is High, the 1 Low, the 9 Jack, and the highest aggregate of numbers is the game, each of these four counting one point, the game consisting of seven points, and therefore lasting at least for two frames. The balls are set up with the three counting balls in the centre and broken as in pyramids, although balls accidentally falling into pockets count for the player, on which account the balls are sometimes broken as violently as possible. When two or more players have the same score the High ball wins before the Low, &c., as in the card game of the same title.

Pin Pool is played with two white balls, one red and five small pins set up in diamond form in the centre of the table with the pin counting 5 (the king-pin) in the middle, the pins being 3 in. apart. Each player is given a small ball from the bottle and this he keeps secret until he is able to announce that his points, added to the number on his small ball, amount to exactly 31. If he "bursts" he must begin again. Points are made only by knocking down pins, which are numbered 1 to 5. Should a player knock down with one stroke all four outside pins, leaving the 5-pin-standing, it is a "natural" and he wins the game.

Besides these common varieties of pool there are many others which are played in different parts of America, many of them local in character.

Bibliography.—The scientific features of billiards have been discussed at more or less length in several of the following older works:—E. White, *Practical Treatise on the Game of Billiards* (1807), this was partly a translation of a French treatise, published in 1805, and partly a compilation from the article in the *Académie universelle des jeux*, issued in the same year, and since frequently re-edited and reprinted; *Le Musée des jeux* (Paris, 1820); Monsieur Mingaud, *The Noble Game of Billiards* (Paris, 1834); a translation of the same, by John Thurston (London, 1835); Kentfield, *On Billiards* (London, 1839), founded principally on the foregoing works: Edward Russell Mardon, *Billiards, Game 500 up* (London, 1849); Turner, *On Billiards*, a series of diagrams with instructions (Nottingham, 1849); Captain Crawley, *The Billiard Book* (London, 1866-1875); Roberts, *On Billiards* (1868); Fred. Hardy, *Practical Billiards*, edited by W. Dufton (1867); Joseph Bennett (ex-champion), *Billiards* (1873). These older books, however, are largely superseded by such modern authorities as the following:—J. Roberts, *The Game of Billiards* (London, 1898); W. Cook, *Billiards* (Burroughes & Watts); J.P. Buchanan, *Hints on Billiards* (Bell & Sons); *Modern Billiards* (The Brunswick—Balke—Collender Co., New York); Broadfoot, *Billiards*, Badminton Library (Longmans); Locock, *Side and Screw* (Longmans); M. Vignaux, *Le Billiard* (Paris, 1889); A. Howard Cady, *Billiards and Pool* (Spalding's Home Library, New York); Thatcher, *Championship Billiards, Old and New* (Chicago, 1898). For those interested in the purely mathematical aspect of the game, Hemming, *Billiards Mathematically Treated*, (Macmillan).

1 In 1907 an oval table was introduced in England by way of a change, but this variety is not here considered.

2 A later form of "lawn-billiards" again enjoyed a brief popularity during the latter half of the 19th century. It was played on a lawn, in the centre of which was a metal ring about 5½ in. in diameter, planted upright in such a manner as to turn freely on its axis on a level with the ground. The players, two or more, were provided with implements resembling cues about 4 ft. long and ending in wire loops somewhat smaller in diameter than the wooden balls (one for each player), which were of such a size as barely to pass through the ring. In modern times such games as billiards have afforded scope for various imitations and modifications of this sort.

BILLINGTON, ELIZABETH (1768?-1818), British opera-singer, was born in London, her father being a German musician named Weichsel, and her mother a popular vocalist. She was trained in music, and at fourteen sang at a concert in Oxford. In 1783 she married James Billington, a double-bass player. She had a voice of unusual compass, and as Rosetta in *Love in a Village* she had a great success at Covent Garden in 1786, being engaged for the season at a salary of £1000, a large sum for those days. Her position as a singer in London was now assured. In 1794 she and her husband went to Italy, and Mrs Billington appeared at Naples (where she was the heroine of a new opera, *Inez di Castro*, written for her by F. Bianchi), at Florence, at Venice and at Milan. Her husband died suddenly during the tour, and in 1799 she married a Frenchman named Felissent, whom, however, she left in 1801. Returning to England she appeared alternately at Covent Garden and Drury Lane, her professional income during 1801 amounting to between £10,000 and £15,000. Henceforward she sang in Italian opera till the end of 1810, when ill-health forced her to abandon her profession. In 1817 she was reconciled to her husband, and went with him to live near Venice, where she died on the 25th of August 1818.

BILLITON (Dutch *Blitoeng*), an island of the Dutch East Indies, between Banka and Borneo, from which it is separated respectively by Caspar and Karimata straits. Politically it is under an assistant resident. It is roughly circular in form, its extreme measurements being 55 m. by 43, and its area 1773 sq. m. In physical structure and in products it resembles Banka; its coasts are sandy or marshy; in the interior an extreme elevation of 1670 ft. is found. The geological formation is Devonian and granitic, with laterites. The mean annual rainfall is heavy, 102 to 126 in. The day temperature varies from 80° to 87° Fahr. The nights are very cool. Like Banka, Billiton is chiefly noted for its production of tin, the island forming the southern limit of the occurrence of this metal in this locality. There are upwards of 80 mines, which employ some 7500 workmen, and have produced more than 6500 tons of tin in a year. Iron is also worked. On the rocks along the coast are found tortoises, trepang and edible birds' nests, which are articles of export. The forests supply wood of different kinds for boat-building, in which the inhabitants are expert; and also provide trade in cocoa-nuts, sago, gum and other produce. The population is about 42,000, of whom some 12,000 are Chinese. The natives belong to two classes, the *Orang Darat*, the aborigines, thought to be akin to the Battas and other branches of the pre-Malayan or Indonesian race; and the *Orang Sekah*, people of Malayan stock who live in boats. The coast is as a rule difficult of access, being beset with rocks and coral banks, and the best harbour is that at the chief town of Tanjong Pandan on the west coast. The island was formerly under the sultan of Palembang, by whom it was ceded to the British in 1812. As no mention was made of it in the treaty between the British and Dutch in 1814, the former at first refused to renounce their possession, and only recognized the Dutch claim in 1824. Till 1852 Billiton was dependent on Banka.

BILL OF EXCHANGE, a form of negotiable instrument, defined below, the history of which, though somewhat obscure, was ably summed up by Lord Chief Justice Cockburn in his judgment in *Goodwinn* v. *Robarts* (1875), L.R. 10 Ex. pp. 346-358. Bills of exchange were probably invented by Florentine Jews. They were well known in England in the middle ages, though there is no reported decision on a bill of exchange before the year 1603. At first their use seems to have been confined to foreign bills between English and foreign merchants. It was afterwards extended to domestic bills between traders, and finally to bills of all persons, whether traders or not. But for some time after they had come into general employment, bills were always alleged in legal proceedings to be drawn *secundum usum et consuetudinem mercatorum*. The foundations of modern English law were laid by Lord Mansfield with the aid of juries of London merchants. No better tribunal of commerce could have been devised. Subsequent judicial decisions have developed and systematized the principles thus laid down. Promissory notes are of more modern origin than bills of exchange, and their validity as negotiable instruments was doubtful until it was confirmed by a statute of Anne (1704). Cheques are the creation of the modern system of banking.

Before 1882 the English law was to be found in 17 statutes dealing with isolated points, and about 2600 cases scattered over some 300 volumes of reports. The Bills of Exchange Act 1882 codifies for the United Kingdom the law relating to bills of exchange, promissory notes and cheques. One peculiar Scottish rule is preserved, but in other respects uniform rules are laid down for England, Scotland and Ireland. After glancing briefly at the history of these instruments, it will probably be convenient to discuss the subject in the order followed by the act, namely, first, to treat of a bill of exchange, which is the original and typical negotiable instrument, and then to refer to the special provisions which apply to promissory notes and cheques. Two salient characteristics distinguish negotiable instruments from other engagements to pay money. In the first place, the assignee of a negotiable instrument, to whom it is transferred by indorsement or delivery according to its tenor, can sue thereon in his own name; and, secondly, he holds it by an independent title. If he takes it in good faith and for value, he takes it free from "all

equities," that is to say, all defects of title or grounds of defence which may have attached to it in the hands of any previous party. These characteristic privileges were conferred by the law merchant, which is part of the common law, and are now confirmed by statute.

Definition.—By § 3 of the act a bill of exchange is defined to be "an unconditional order in writing, addressed by one person to another, signed by the person giving it, requiring the person to whom it is addressed to pay on demand or at a fixed or determinable future time a sum certain in money to or to the order of a specified person, or to bearer."[1] The person who gives the order is called the drawer. The person thereby required to pay is called the drawee. If he assents to the order, he is then called the acceptor. An acceptance must be in writing and must be signed by the drawee. The mere signature of the drawee is sufficient (§17). The person to whom the money is payable is called the payee. The person to whom a bill is transferred by indorsement is called the indorsee. The generic term "holder" includes any person in possession of a bill who holds it either as payee, indorsee or bearer. A bill which in its origin is payable to order becomes payable to bearer if it is indorsed in blank. If the payee is a fictitious person the bill may be treated as payable to bearer (§7). 941

The following is a specimen of an ordinary form of a bill of exchange:—

London, 1*st January* 1901.

£100

Three months after date pay to the order of Mr J. Jones the sum of one hundred pounds for value received.

Brown & Co.

To Messrs. Smith & Sons, Liverpool.

The scope of the definition given above may be realized by comparing it with the definition given by Sir John Comyns' *Digest* in the early part of the 18th century:—"A bill of exchange is when a man takes money in one country or city upon exchange, and draws a bill whereby he directs another person in another country or city to pay so much to A, or order, for value received of B, and subscribes it." Comyns' definition illustrates the original theory of a bill of exchange. A bill in its origin was a device to avoid the transmission of cash from place to place to settle trade debts. Now a bill of exchange is a substitute for money. It is immaterial whether it is payable in the place where it is drawn or not. It is immaterial whether it is stated to be given for value received or not, for the law itself raises a presumption that it was given for value. But though bills are a substitute for cash payment, and though they constitute the commercial currency of the country, they must not be confounded with money. No man is bound to take a bill in payment of debt unless he has agreed to do so. If he does take a bill, the instrument ordinarily operates as conditional, and not as absolute payment. If the bill is dishonoured the debt revives. Under the laws of some continental countries, a creditor, as such, is entitled to draw on his debtor for the amount of his debt, but in England the obligation to accept or pay a bill rests solely on actual agreement. A bill of exchange must be an unconditional order to pay. If an instrument is made payable on a contingency, or out of a particular fund, so that its payment is dependent on the continued existence of that fund, it is invalid as a bill, though it may, of course, avail as an agreement or equitable assignment. In Scotland it has long been the law that a bill may operate as an assignment of funds in the hands of the drawee, and § 53 of the act preserves this rule.

Stamp.—Bills of exchange must be stamped, but the act of 1882 does not regulate the stamp. It merely saves the operation of the stamp laws, which necessarily vary from time to time according to the fluctuating needs and policy of the exchequer. Under the Stamp Act 1891, bills payable on demand are subject to a fixed stamp duty of one penny, and by the Finance Act 1899, a similar privilege is extended to bills expressed to be payable not more than three days after sight or date. The stamp may be impressed or adhesive. All other bills are liable to an *ad valorem* duty. Inland bills must be drawn on stamped paper, but foreign bills, of course, can be stamped with adhesive stamps. As a matter of policy, English law does not concern itself with foreign revenue laws. For English purposes, therefore, it is immaterial whether a bill drawn abroad is stamped in accordance with the law of its place of origin or not. On arrival in England it has to conform to the English stamp laws.

Maturity.—A bill of exchange is payable on demand when it is expressed to be payable on demand, or at sight, or on presentation or when notice for payment is expressed. In calculating the maturity of bills payable at a future time, three days, called days of grace, must be added to the nominal due date of the bill. For instance, if a bill payable one month after sight is accepted on the 1st of January, it is really payable on the 4th of February, and not on the 1st of February as its tenor indicates. On the continent generally days of grace have been abolished as anomalous and misleading. Their abolition has been proposed in England, but it has been opposed on the ground that it would curtail the credit of small traders who are accustomed to bills drawn at certain fixed periods of currency. When the last day of grace is a non-business day some complicated rules come into play (§ 14). Speaking generally, when the last day of grace falls on Sunday or a common law holiday the bill is payable on the preceding day, but when it falls on a bank holiday the bill is payable on the succeeding day. Complications arise when Sunday is preceded by a bank holiday; and, to add to the confusion, Christmas day is a bank holiday in Scotland, but a common law holiday in England. When the code was in committee an attempt was made to remove these anomalies, but it was successfully resisted by the bankers on alleged grounds of practical convenience.

Acceptance.—By the acceptance of a bill the drawee becomes the principal debtor on the instrument and the party primarily liable to pay it. The acceptor of a bill "by accepting it engages that he will pay it according to the tenor of his acceptance," and is precluded from denying the drawer's right to draw or the genuineness of his signature (§ 54). The acceptance may be either general or qualified. As a qualified acceptance is so far a disregard of the drawer's order, the holder is not obliged to take it; and if he chooses to take it he must give notice to antecedent parties, acting at his own risk if they dissent (§§ 19 and 44). The drawer and indorsers of a bill are in the nature of sureties. They engage that the bill shall be duly accepted and paid according to its tenor, and that if it is dishonoured by non-acceptance or non-payment, as the case may be, they will compensate the holder provided that the requisite proceedings on dishonour are duly taken. Any indorser who is compelled to pay the bill has the like remedy as the holder against any antecedent party (§55). A person who is not the holder of a bill, but who backs it with his signature, thereby incurs the liability of an indorser to a holder in due course (§ 56). An indorser may by express term either restrict or charge his ordinary liability as stated above. Prima facie every signature to a bill is presumed to have been given for valuable consideration. But sometimes this is not the case. For friendship, or other reasons, a man may be willing to lend his name and credit to another in a bill transaction. Hence arise what are called *accommodation bills*. Ordinarily the acceptor gives his acceptance to accommodate the drawer. But occasionally both drawer and acceptor sign to accommodate the payee, or even a person who is not a party to the bill at all. The criterion of an accommodation bill is the fact that the principal debtor according to the instrument has lent his name and is in substance a surety for some one else. The holder for value of an accommodation bill may enforce it exactly as if it was an ordinary bill, for that is the presumable intention of the parties. But if the bill is dishonoured the law takes cognizance of the true relations of the parties, and many of the rules relating to principal and surety come into play. Suppose a bill is accepted for the accommodation of the drawer. It is the drawer's duty to provide the acceptor with funds to meet the bill at maturity. If he fails to do so, he cannot rely on the defence that the bill was not duly presented for payment or that he did not receive due notice of dishonour. If the holder, with notice of the real state of the facts, agrees to give time to the drawer to pay, he may thereby discharge the acceptor.

Holder in due Course.—The holder of a bill has special rights and special duties. He is the mercantile owner of the bill, but in order to establish his ownership he must show a mercantile title. The bill must be negotiated to him, that is to say, it must be transferred to him according to the forms prescribed by mercantile law. If the bill is payable to order, he must not only get possession of the bill, but he must also obtain the indorsement of the previous holder. If the bill is payable to bearer it is transferable by mere delivery. A bill is payable to bearer which is expressed to be so payable, or on which the only or last indorsement is an indorsement in blank. If a man lawfully obtains possession of a bill payable to order without the necessary indorsement, he may obtain some common law rights in respect of it, but he is not the mercantile owner, and he is not 942

technically the holder or bearer. But to get the full advantages of mercantile ownership the holder must be a "holder in due course"—that is to say, he must satisfy three business conditions. First, he must have given value, or claim through some holder who has given value. Secondly, when he takes the bill, it must be regular on the face of it. In particular, the bill must not be overdue or known to be dishonoured. An overdue bill, or a bill which has been dishonoured, is still negotiable, but in a restricted sense. The transferee cannot acquire a better title than the party from whom he took it had (§ 36). Thirdly, he must take the bill honestly and without notice of any defect in the title of the transferor,—as, for instance, that the bill or acceptance had been obtained by fraud, or threats or for an illegal consideration. If he satisfies these conditions he obtains an indefeasible title, and can enforce the bill against all parties thereto. The act substitutes the expression "holder in due course" for the somewhat cumbrous older expression "bona fide holder for value without notice." The statutory term has the advantage of being positive instead of negative. The French equivalent "tiers porteur de bonne foi" is expressive. Forgery, of course, stands on a different footing from a mere defect of title. A forged signature, as a general rule, is a nullity. A person who claims through a forged signature has no title himself, and cannot give a title to any one else (§ 24). Two exceptions to this general rule require to be noted. First, a banker who in the ordinary course of business pays a demand draft held under a forged indorsement is protected (§ 60). Secondly, if a bill be issued with material blanks in it, any person in possession of it has prima facie authority to fill them up, and if the instrument when complete gets into the hands of a holder in due course the presumption becomes absolute. As between the immediate parties the transaction may amount to forgery, but the holder in due course is protected (§ 20).

Dishonour.—The holder of a bill has special duties which he must fulfil in order to preserve his rights against the drawers and indorsers. They are not absolute duties; they are duties to use reasonable diligence. When a bill is payable after sight, presentment for acceptance is necessary in order to fix the maturity of the bill. Accordingly the bill must be presented for acceptance within a reasonable time. When a bill is payable on demand it must be presented for payment within a reasonable time. When it is payable at a future time it must be presented on the day that it is due. If the bill is dishonoured the holder must notify promptly the fact of dishonour to any drawer and indorser he wishes to charge. If, for example, the holder only gives notice of dishonour to the last indorser, he could not sue the drawer unless the last indorser or some other party liable has duly sent notice to the drawer. When a foreign bill is dishonoured the holder must cause it to be protested by a notary public. The bill must be noted for protest on the day of its dishonour. If this be duly done, the protest, *i.e.* the formal notarial certificate attesting the dishonour, can be drawn up at any time as of the date of the noting. A dishonoured inland bill may be noted, and the holder can recover the expenses of noting, but no legal consequences attach thereto. In practice, however, noting is usually accepted as showing that a bill has been duly presented and has been dishonoured. Sometimes the drawer or indorser has reason to expect that the bill may be dishonoured by the drawee. In that case he may insert the name of a "referee in case of need." But whether he does so or not, when a bill has been duly noted for protest, any person may, with the consent of the holder, intervene for the honour of any party liable on the bill. If the bill has been dishonoured by non-acceptance it may be "accepted for honour *supra protest*." If it has been dishonoured by non-payment it may be paid *supra protest*. When a bill is thus paid and the proper formalities are complied with, the person who pays becomes invested with the rights and duties of the holder so far as regards the party for whose honour he has paid the bill, and all parties antecedent to him (§§ 65 to 68).

Discharge.—Normally a bill is discharged by payment in due course, that is to say, by payment by the drawee or acceptor to the holder at or after maturity. But it may also be discharged in other ways, as for example by coincidence of right and liability (§ 61), voluntary renunciation (§ 62), cancellation (§ 63), or material alteration (§ 64).

Conflict of Laws.—A bill of exchange is the most cosmopolitan of all contracts. It may be drawn in one country, payable in another, and indorsed on its journey to its destination in two or three more. The laws of all these countries may differ. Provision for this conflict of laws is made by § 72, which lays down rules for determining by what law the rights and duties of the various parties are to be measured and regulated. Speaking broadly, these rules follow the maxim *Locus regit actum*. A man must be expected to know and follow the law of the place where he conducts his business, but no man can be expected to know the laws of every country through which a bill may travel. For safety of transmission from country to country bills are often made out in sets. The set usually consists of three counterparts, each part being numbered and containing a reference to the other parts. The whole set then constitutes one bill, and the drawee must be careful only to accept one part, otherwise if different accepted parts get into the hands of different holders, he may be liable to pay the bill twice (§ 71). Foreign bills circulating through different countries have given rise to many intricate questions of law. But the subject is perhaps one of diminishing importance, as in many trades the system of "cable transfers" is superseding the use of bills of exchange.

Cheques.

A cheque "is a bill of exchange drawn on a banker payable on demand" (§ 73). For the most part the rules of law applicable to bills payable on demand apply in their entirety to cheques. But there are certain peculiar rules relating to the latter which arise from the fact that the relationship of banker and customer subsists between the drawer and drawee of a cheque. For example, when a person has an account at a bank he is, as an inference of law, entitled to draw on it by means of cheques. A right to overdraw, can, of course, only arise from agreement. The drawer of a cheque is not absolutely discharged by the holder's omission to present it for payment within a reasonable time. He is only discharged to the extent of any actual damage he may have suffered through the delay (§ 74). Apart from any question of delay, a banker's authority to pay his customer's cheques is determined by countermand of payment or by notice of the customer's death (§ 75). Of recent years the use of cheques has enormously increased, and they have now become the normal machinery by which all but the smallest debts are discharged. To guard against fraud, and to facilitate the safe transmission of cheques by post, a system of crossing has been devised which makes crossed cheques payable only through certain channels. The first act which gave legislative recognition to the practice of crossing was the 19 and 20 Vict. *c.* 95. That act was amended in 1858, and a consolidating and amending act was passed in 1876. The act of 1876 is now repealed, and its provisions are re-enacted with slight modifications by §§ 76 to 82 of the Bills of Exchange Act 1883. A cheque may be crossed either "generally" or "specially." A cheque is crossed generally by drawing across it two parallel lines and writing between them the words "& Co." When a cheque is crossed generally it cannot be paid over the counter. It must be presented for payment by a banker. A cheque is crossed specially by adding the name of the banker, and then it can only be presented through that particular banker. A cheque, whether crossed generally or specially, may further be crossed with the words "not negotiable." A cheque crossed "not negotiable" is still transferable, but its negotiable quality is restricted. It is put on pretty much the same footing as an overdue bill. The person who takes it does not get, and cannot give a better title to it, than that which the person from whom he took it had. These provisions are supplemented by provisions for the protection of paying and collecting bankers who act in good faith and without negligence. Suppose that a cheque payable to bearer, which is crossed generally and with the words "not negotiable," is stolen. The thief then gets a tradesman to cash it for him, and the tradesman gets the cheque paid on presentment through his banker. The banker who pays and the banker who receives the money for the tradesman are protected, but the tradesman would be liable to refund the money to the true owner. Again, assuming payment of the cheque to have been stopped, the tradesman could not maintain an action against the drawer.

Promissory notes.

A promissory note is defined by section 83 of the act to be an "unconditional promise in writing made by one person to another, signed by the maker, engaging to pay on demand, or at a fixed or determinable future time, a sum certain in money to or to the order of a specified person or to bearer." A promissory note may be made by two or more makers, and they may be liable either jointly, or jointly and severally, according to its tenor (§ 85). For the most part, rules of law applicable to a bill of exchange apply also to a promissory note, but they require adaptation. A note differs from a bill in this: it is a direct promise to pay, and not an order to pay. When it issues it bears on it the engagement of the principal debtor who is primarily liable thereon. The formula for applying to notes the rules as to bills is that "the maker of a note shall be deemed to correspond with the acceptor of a bill, and the first indorser of a note shall be deemed to correspond with the drawer of a bill payable to drawer's order" (§ 89). Rules relating to presentment for acceptance, acceptance, acceptance *supra* protest, and bills in a set, have no application to a note. Moreover, when a foreign note is dishonoured it is not necessary, for English purposes, to protest it. All promissory notes are, under the Stamp Act 1891, subject

to an *ad valorem* stamp duty. Inland notes must be on impressed stamp paper. Foreign notes are stamped with adhesive stamps. For ordinary legal purposes a bank note may be regarded as a promissory note made by a banker payable to bearer on demand. It is, however, subject to special stamp regulations. It is not discharged by payment, but may be re-issued again and again. In the interests of the currency the issue of bank notes is subject to various statutory restrictions. A bank, other than the Bank of England, may not issue notes in England unless it had a lawful note issue in 1844. On the other hand, Bank of England notes are legal tender except by the bank itself.

Foreign laws.

In fundamental principles there is general agreement between the laws of all commercial nations regarding negotiable instruments. As Mr Justice Story, the great American lawyer, says: "The law respecting negotiable instruments may be truly declared, in the language of Cicero, to be in a great measure not the law of a single country only, but of the whole commercial world. *Non erit lex alia Romae, alia Athenis, alia nunc alia posthac, sed et apud omnes gentes et omni tempore, una eademque lex obtinebit*" (*Swift* v. *Tyson*, 16 Peters i). But in matters of detail each nation has impressed its individuality on its own system. The English law has been summarized above. Perhaps its special characteristics may be best brought out by comparing it with the French code and noting some salient divergences. English law has been developed gradually by judicial decision founded on trade custom. French law was codified in the 17th century by the "Ordonnance de 1673." The existing "Code de Commerce" amplifies but substantially adopts the provisions of the "Ordonnance." The growth of French law was thus arrested at an early period of its development. The result is instructive. A reference to Marius' treatise on bills of exchange, published about 1670, or Beawes' *Lex Mercatoria*, published about 1740, shows that the law, or rather the practice, as to bills of exchange was even then fairly well defined. Comparing the practice of that time with the law as it now stands, it will be seen that it has been modified in some important respects. For the most part, where English law differs from French law, the latter is in strict accordance with the rules laid down by Beawes. The fact is that, when Beawes wrote, the law or practice of both nations on this subject was nearly uniform. But English law has gone on growing while French law has stood still. A bill of exchange in its origin was an instrument by which a trade debt due in one place was transferred to another place. This theory French law rigidly keeps in view. In England bills have developed into a paper currency of perfect flexibility. In France a bill represents a trade transaction; in England it is merely an instrument of credit. English law affords full play to the system of accommodation paper; French law endeavours to stamp it out. A comparison of some of the main points of difference between English and French law will show how the two theories work. In England it is no longer necessary to express on a bill that value has been given for it, for the law raises a presumption to that effect. In France the nature of the consideration must be stated, and a false statement of value avoids the bill in the hands of all parties with notice. In England a bill may be drawn and payable in the same place. In France the place where a bill is drawn should be so far distant from the place where it is payable that there may be a possible rate of exchange between the two. This so-called rule of *distantia loci* is said to be disregarded now in practice, but the code is unaltered. As French lawyers put it, a bill of exchange necessarily presupposes a contract of exchange. In England since 1765 a bill may be drawn payable to bearer, though formerly it was otherwise. In France it must be payable to order; if it were not so it is clear that the rule requiring the consideration to be truly stated would be a nullity. In England a bill originally payable to order becomes payable to bearer when indorsed in blank. In France an indorsement in blank merely operates as a procuration. An indorsement, to operate as a negotiation, must be to order, and must state the consideration; in short, it must conform to the conditions of an original draft. In England, if a bill is dishonoured by non-acceptance, a right of action at once accrues to the holder. In France no cause of action arises unless the bill is again dishonoured at maturity; the holder in the meantime is only entitled to demand security from the drawer and indorsers. In England a sharp distinction is drawn between current and overdue bills. In France no such distinction is drawn. In England no protest is required in the case of the dishonour of an inland bill, notice of dishonour being sufficient. In France every dishonoured bill must be protested. Opinions may differ whether the English or the French system is better calculated to serve sound commerce and promote a healthy commercial morality. But an argument in favour of the English system may be derived from the fact that as the various continental codes are from time to time revised and re-enacted, they tend to depart from the French model and to approximate to the English rule. The effect upon English law of its codification has yet to be proved. A common objection to codification in England is that it deprives the law of its elastic character. But when principles are once settled common law has very little elasticity. On the other hand no code is final. Modern parliaments legislate very freely, and it is a much simpler task to alter statute law than to alter common law. Moreover, legislation is cheaper than litigation. One consequence of the codification of the English law relating to bills is clear gain. Nearly all the British colonies have adopted the act, and where countries are so closely connected as England and her colonies, it is an obvious advantage that their mercantile transactions should be governed by one and the same law expressed in the same words.

The ordinary text-books on the law of bills of exchange are constantly re-edited and brought up to date. The following among others may be consulted:—Byles, *Bills of Exchange*; Chalmers, *Bills of Exchange*; Daniel, *Law of Negotiable Instruments* (United States); Nouguier, *Des lettres de change et des effets de commerce* (France); Thorburn, *Bills of Exchange Act* 1882 (Scotland); Story, *Bills of Exchange* (United States); Hodgins, *Bills of Exchange Act* 1890 (Canada).

(M. D. Ch.)

1 This is also the definition given in the United States, by § 126 of the general act relating to negotiable instruments, prepared by the conference of state commissioners on uniform legislation, and it has been adopted in the leading states.

BILL OF RIGHTS, an important statute in English constitutional history. On the 13th of February 1689 the Declaration of Right, a document drawn up by a committee of the commons, and embodying the fundamental principles of the constitution, was delivered by the lords and commons to the prince and princess of Orange, afterwards William III. and Mary. In December 1689 the rights claimed by the declaration were enacted with some alterations by the Bill of Rights, next to Magna Carta the greatest landmark in the constitutional history of England and the nearest approach to the written constitutions of other countries. The act (the full name of which is An Act declaring the Rights and Liberties of the Subject, and settling the Succession of the Crown), after reciting the unconstitutional proceedings of James II., the abdication of that king, the consequent vacancy of the crown, and the summons of the convention parliament, declared, on the part of the lords and commons, "for the vindicating and asserting their ancient rights and liberties"—

"(1) That the pretended power of suspending of laws or the execution of laws by regal authority without consent of parliament is illegal. (2) That the pretended power of dispensing with laws or the execution of laws by regal authority, as it hath been assumed and exercised of late, is illegal. (3) That the commission for erecting the late court of commissioners for ecclesiastical causes, and all other commissions and courts of like nature, are illegal and pernicious. (4) That levying money for or to the use of the crown, by pretence of prerogative, without grant of parliament, for longer time or in other manner than the same is or shall be granted, is illegal. (5) That it is the right of the subjects to petition the king, and all commitments and prosecutions for such petitioning are illegal. (6) That the raising or keeping a standing army within the kingdom in time of peace, unless it be with consent of parliament, is against law. (7) That the subjects which are Protestants may have arms for their defence suitable to their conditions, and as allowed by law. (8) That elections of members of parliament ought to be free. (9) That the freedom of speech, and debates or proceedings in parliament, ought not to be impeached or questioned in any court or place out of parliament. (10) That excessive bail ought not to be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted. (11) That jurors ought to be duly impanelled and returned and jurors which pass upon men in trials for high treason ought to be freeholders. (12) That all grants and promises of fines and forfeitures of particular persons before conviction are illegal and void. (13) And that for redress of all grievances, and for the amending, strengthening and preserving of the laws,

parliament ought to be held frequently. And they do claim, demand and insist upon all and singular the premises, as their undoubted rights and liberties."

The further provisions of the act were concerned with the settlement of the crown upon the prince and princess of Orange, with the exception of § 12, which negatived the right of dispensation by *non obstante*[1] to or of any statute or any part thereof, unless a dispensation be allowed in the statute itself or by bill or bills to be passed during the then session of parliament.

It is to be noticed that the Declaration of Right and the Bill of Rights introduced no new principle into the English constitution; it was merely a declaration of the law as it stood. In the United States, the main provisions of the Bill of Rights, so far as they are applicable, have been adopted both in the constitution of the United States and in the state constitutions.

1 *Non obstante* (notwithstanding) means a licence from the crown to do that which could not be lawfully done without it.

BILL OF SALE, in its original sense, a legal document assigning personal property, and still used in connexion with the transference of property in ships. The term has come to be applied to mortgages as well as to sales, and the expression "bill of sale" may now be understood to signify generally a document evidencing a sale or mortgage of personal chattels, unaccompanied by an actual transfer of possession to the purchaser or mortgagor.

The first English legislation on the subject was the Bills of Sale Act 1854, which, after reciting that "frauds were frequently committed upon creditors by secret bills of sale of personal chattels, whereby persons are enabled to keep up the appearance of being in good circumstances and possessed of property, and the grantees or holders of such bills of sale have the power of taking possession of the property of such person to the exclusion of the rest of their creditors," provided that all bills of sale, as defined in the act, should be void against execution creditors unless registered. This act was amended by the Bills of Sale Act 1866. These acts were repealed and a new act passed, the Bills of Sale Act 1878, which, in the main, followed the lines of the act of 1854. The scope of this legislation was very much widened by the Bills of Sale Act (1878) Amendment Act 1882, which was intended primarily "to prevent needy persons being entrapped into signing complicated documents which they might often be unable to comprehend, and so being subjected by their creditors to the enforcement of harsh and unreasonable provisions" (*Manchester &c. Ry. Co.* v. *N.C. Wagon Co.*, 1888, 13 App. Ca. 554). The law is now regulated by these two acts, together with the Bills of Sale Acts of 1890 and 1891, which effected further small amendments by excluding from the operation of the principal acts instruments hypothecating, charging or declaring trusts on imported goods, during the interval between their unloading from a ship and their deposit in a warehouse, or re-shipping.

Under the acts of 1878 and 1882 bills of sale are of two kinds, *i.e. absolute bills of sale* (where chattels are sold absolutely to a purchaser), and *bills of sale by way of security for the payment of money*. The Bills of Sale Act 1878 governs both kinds and is the only act which applies to absolute bills. Bills of sale given by way of security for the payment of money on or after the 1st of November 1882 are governed by the act of 1882, which, however, does not apply to absolute bills. Section 4 of the act of 1878 defines a bill of sale as (1) including bills of sale, assignments, transfers, declarations of trust without transfer, inventories of goods with receipt thereto attached, or receipts for purchase moneys of goods and other assurances of personal chattels; the term assurance has been best explained as a document "on which the title of the transferee of the goods depends, either as the actual transfer of the property, or an agreement to transfer," *Marsden* v. *Meadows*, 1881, 7 Q.B.D. 80; (2) powers of attorney, authorities or licences to take possession of personal chattels as security for any debt; these words would not include a power of distress for rent in an ordinary lease or bona fide hiring or hire purchase agreements; (3) any agreement, whether intended or not to be followed by the execution of any other instrument, by which a right in equity to any personal chattels, or to any charge or security thereon, shall be conferred; (4) any mode of disposition of trade machinery and attornments and other instruments giving powers of distress to secure a debt or advance. On the other hand, certain assurances and instruments are expressly exempt by statute from the definition: marriage settlements, assignments of ships, assignments for the benefit of creditors, bills of lading and dock warrants, and by the act of 1882, debentures and debenture stock of a company. The expression "personal chattels" is defined as goods, furniture and other articles capable of complete transfer by delivery, and (when separately assigned or charged) fixtures and growing crops.

Absolute Bills.—Absolute bills of sale must be duly attested by a solicitor, and the attestation must state that before execution the effect of it was explained to the grantor by the attesting solicitor. The consideration must be truly stated. The bill of sale, and all schedules and inventories annexed to or referred to in the bill, and also a true copy of the bill and of every schedule and inventory and of every attestation, together with an affidavit stating the time of making or giving the bill, its due execution and attestation and the residence and occupation of the grantor, and every attesting witness, must be presented to, and the copies filed by, the registrar within seven clear days. In the case of absolute bills the effect of non-compliance does not affect the validity of the bill as between the parties to it, but makes it void as against the trustee in bankruptcy and execution creditors of the grantor.

Bills by Way of Security.—All bills of sale given by way of security for the repayment of money must be made in accordance with the form given in the schedule to the act of 1882, and they must not depart from the statutory form in anything which is not merely a matter of verbal difference. The form given in the schedule to the act is as follows:—

This Indenture made the day of between A. B. of of the one part and C. D. of of the other part, witnesseth that in consideration of the sum of £ now paid to A. B. by C. D, the receipt of which the said A. B. hereby acknowledges, he the said A. B. doth hereby assign unto C. D. his executors, administrators and assigns all and singular the several chattels and things specifically described in the schedule hereto annexed by way of security for the payment of the sum of £ and interest thereon at the rate of % per annum. And the said A. B. doth further agree and declare that he will duly pay to the said C. D. the principal sum aforesaid together with the interest then due, by equal payments of £ on the day of And the said A. B. doth also agree with the said C. D. that he will (*here insert terms as to insurance, payment of rent, &c., which the parties may agree to for the maintenance or defeasance of the security*). Provided always that the chattels hereby assigned shall not be liable to seizure or to be taken possession of by the said C. D. for any cause other than those specified in § 7 of the Bills of Sale Act (1878) Amendment Act 1882.

In witness, &c.

Signed and sealed by the said A. B. in the presence of me E. F. (*add witness's name, address and description*).

Non-compliance with the requirement of the statute as to form renders a bill of sale void even as between the parties. The bill of sale must have annexed to it an inventory of the chattels comprised in it, and is void, except as against the grantor, in respect of any personal chattels not specifically described. It must be duly attested by one or more credible witnesses (not necessarily by a solicitor, as in the case of absolute bills). Every witness must sign his name and add his address and description. It must be duly registered within seven clear days after the execution thereof, or if it is executed in any place out of England then within seven clear days after the time at which it would in the ordinary course of post arrive in England if posted immediately after the execution. It must truly set forth the consideration. The grantor must be the true owner of the goods described in the schedule; as to any personal chattels of which he is not the true owner, the bill is void, except as against the grantor. Every bill of sale made or given in consideration of any sum under £30 is void. By § 7 of the act personal chattels shall only be liable to be seized or taken possession of in the following cases:—(1) If the grantor make default in payment of the debt or in the performance of any covenant or agreement contained in the bill and necessary for maintaining the security; (2) if the grantor becomes a bankrupt or suffers the goods to be distrained for rent, rates or taxes; (3) if the grantor fraudulently removes the goods from the

premises; (4) if the grantor does not, without reasonable excuse, upon demand in writing by the grantee, produce to him his last receipts for rent, rates or taxes; (5) if execution is levied against the goods of the grantor under any judgment. By § 13 personal chattels seized or taken possession of under a bill must not be removed or sold until after the expiration of five clear days from the date of seizure, and, if the goods have been wrongly seized, the grantor may within the five days apply to the High Court or a judge in chambers for an order to restrain the grantee from removing or selling the goods. The Bills of Sale Acts 1878 and 1882 do not apply to Scotland or Ireland. According to Scots law no security or charge can be created over moveable property without delivery of possession. The Irish statutes corresponding to the English acts are the Bills of Sale (Ireland) Act 1879 and the Amendment Act 1883.

The stamp duties payable on an absolute bill of sale are 2s. 6d. on every £25 secured up to £300; over £300, 5s. on every £50. On bills of sale by way of security, 1s. 3d. for every £50 up to £300 secured; over £300, 2s. 6d. for every £100. The fees payable on filing a bill of sale are, 5s. where the consideration (including further advances) does not exceed £100; above £100 and not exceeding £200, 10s.; above £200, £1.

The various trade protection papers always publish the registration of a bill of sale, and the usual effect is, therefore, to destroy the credit of any person giving one.

(T. A. I.)

BILLROTH, ALBERT CHRISTIAN THEODOR (1829-1894), Viennese surgeon, was born on the 26th of April 1829 at Bergen, on the island of Rügen, his family being of Swedish origin. He studied at the universities of Greifswald, Göttingen and Berlin, and after taking his doctor's degree at the last in 1852, started on an educational tour, in the course of which he visited the medical schools of Vienna, Prague, Paris, Edinburgh and London. On his return to Berlin he acted as assistant to B.R.K. Langenbeck from 1853 to 1860, and then accepted the professorship of surgery at Zürich. In 1867 he was invited to fill the same position at Vienna, and in that city the remainder of his professional life was spent. In 1887 he received the distinction, rarely bestowed on members of his profession, of a seat in the Austrian *Herrnhaus*. He died at Abbazia, on the Adriatic, where he had a beautiful villa, on the 6th of February 1894. Billroth was one of the most distinguished surgeons of his day. His boldness as an operator was only equalled by his skill and resourcefulness; no accident or emergency could disturb his coolness and presence of mind, and his ability to invent or carry out any new procedure that might be demanded in the particular case with which he was dealing, gained for him the appellation of "surgeon of great initiatives." At the same time he was full of consideration for the comfort and well-being of his patient, and never forgot that he had before him a human being to be relieved, not a mere "case" for the display of technical dexterity. He was especially interested in military surgery, and during the Franco-German War volunteered to serve in the hospitals of Mannheim and Weissenburg. His efforts did much to improve the arrangements for the transport and treatment of the wounded in war, and in a famous speech on the War Budget in 1891, he eloquently urged the necessity for an improved ambulance system, pointing out that the use of smokeless powder and the greater precision of the arms of modern warfare must tend to increase the number of men wounded, and that therefore more efficient means must be provided for removing them from the battlefield. Possessing a clear and graceful style, he was the author of numerous papers and books on medical subjects; his *Allgemeine chirurgische Pathologie und Therapie* (1863) ran through many editions, and was translated into many languages. He was of an exceedingly artistic disposition, and in particular was devoted to music. A good performer on the pianoforte and violin, he was an intimate friend and admirer of Brahms, many of whose compositions were privately performed at his house before they were published. His work on the physiology of music (*Wer ist musikalisch?*) was published after his death.

BILMA, or Kawar, an oasis in the heart of the Sahara desert, some 60 m. long by 10 broad. The inhabitants are Tibbu and Kanuri. The name Bilma is properly confined to the southern part of this region, where is the chief settlement, called Bilma or Garu. This place is 800 m. due S. of the town of Tripoli and about 350 N. of the N.W. corner of Lake Chad. In the vicinity are a number of lakes, the waters of which on evaporation yield large quantities of very pure and fine salt, which is the object of an extensive trade with the countries of Central Africa. North of Bilma is the town of Dirki, said to date from the 11th century. Near Bilma is a small circular oasis, kept green by a fine spring, but immediately to the south begins the most dreary part of the Saharan desert, over which the caravans travel for fifteen days without discovering the slightest trace of vegetable life. Gustav Nachtigal, who visited Bilma in 1870, records that the temperature during the day rarely sank below 113° Fahr. By the Anglo-French Declaration of the 21st of March 1899 Bilma was included in the French sphere of influence in West Africa. Turkey claimed the oasis as part of the hinterland of Tripoli and garrisoned Bilma in 1902. In 1906, however, a French force from Zinder occupied the town, no opposition being offered by the Ottoman authorities. In 1907 the oasis and surrounding district was created a circle of the Military Territory of the Niger (see Sahara).

BILNEY, THOMAS (d. 1531), English martyr, was born at or near Norwich. The exact date of his birth is uncertain, but at all events it was not before 1495. He was educated at Trinity Hall, Cambridge, graduating LL.B. and taking holy orders in 1519. Finding no satisfaction in the mechanical system of the schoolmen, he turned his attention to the edition of the New Testament published by Erasmus in 1516. "Immediately," he records, "I felt a marvellous comfort and quietness." The Scriptures now became his chief study, and his influence led other young Cambridge men to think along the same lines. Among his friends were Matthew Parker, the future archbishop of Canterbury, and Hugh Latimer. Latimer, previously a strenuous conservative, was completely won over, and a warm friendship sprang up between him and Bilney. "By his confession," said Latimer, "I learned more than in twenty years before." In 1525 Bilney obtained a licence to preach throughout the diocese of Ely. He denounced saint and relic worship, together with pilgrimages to Walsingham and Canterbury, and refused to accept the mediation of the saints. The diocesan authorities raised no objection, for, despite his reforming views in these directions, he was to the last perfectly orthodox on the power of the pope, the sacrifice of the mass, the doctrine of transubstantiation and the authority of the church. But Wolsey took a different view. In 1526 he appears to have summoned Bilney before him. On his taking an oath that he did not hold and would not disseminate the doctrines of Luther, Bilney was dismissed. But in the following year serious objection was taken to a series of sermons preached by him in and near London, and he was arrested and imprisoned in the Tower. Arraigned before Wolsey, Warham, archbishop of Canterbury, and several bishops in the chapter-house at Westminster, he was convicted of heresy, sentence being deferred while efforts were made to induce him to recant, which eventually he did. After being kept for more than a year in the Tower, he was released in 1529, and went back to Cambridge. Here he was overcome with remorse for his apostasy, and after two years determined to preach again what he had held to be the truth. The churches being no longer open to him, he preached openly in the fields, finally arriving in Norwich, where the bishop, Richard Nix, caused him to be arrested. Articles were drawn up against him by Convocation, he was tried, degraded from his orders and handed over to the civil authorities to be burned. The sentence was carried out in London on the 19th of August 1531. A

parliamentary inquiry was threatened into this case, not because parliament approved of Bilney's doctrine but because it was alleged that Bilney's execution had been obtained by the ecclesiastics without the proper authorization by the state. In 1534 Bishop Nix was condemned on this charge to the confiscation of his property. The significance of Bilney's execution lies in the fact that on essential points he was an orthodox Roman Catholic.

See *Letters and Papers of Henry VIII.* vols. iv.-v.; Foxe's *Acts and Monuments*; Gairdner's *History of the Church*; Pollard's *Henry VIII.*

(A. F. P.)

BILOXI, a city of Harrison county, Mississippi, U.S.A., in the south part of the state, on Biloxi Bay, a branch of the Mississippi Sound, which is a part of the Gulf of Mexico. By rail it is 80 m. N.E. of New Orleans and 61 m. S.E. of Mobile, Alabama. Pop. (1880) 1540; (1890) 3234; (1900) 5467 (949 being negroes and 455 foreign-born); (1910) 7988. The city is served by a branch of the Louisville & Nashville railway, and by an electric railway extending to Bay St Louis, through Gulfport (pop., 1900, 1060; 1910, 6386), 13 m. S.W., the port of entry of the Pearl River customs district, whose exports, chiefly timber, lumber, naval stores and charcoal, were valued at $8,392,271 in 1907. Biloxi is both a summer and a winter resort, particularly for the people of New Orleans and Mobile, and has a fine beach, extending for about 12 m. around its peninsula, and bordered by an automobile drive; along the beach are some attractive residences, hotels and boarding houses, and several sanatoriums. The city's principal industries are the canning of oysters, shrimp, fish, figs and vegetables, and the manufacture of fertilizers and flour. A beautiful thin faience with remarkable metallic glazes is made here. The municipality owns the water-works, the water being obtained from artesian wells. Pierre le Moyne d'Iberville (1661-1706) in 1699 built Fort Maurepas across the bay from the present city; and the settlement there, called Biloxi after the Biloxi Indians, was the first to be established by the French in this region. In 1702 this post, known as Old Biloxi, was abandoned, and the seat of government was removed to the Mobile river. In 1712 a settlement was made on the present site, being the first permanent settlement within what is now the state of Mississippi. Many of the early settlers were French Canadians, who came down the Mississippi to join the new colony. Biloxi was again the capital from 1719 until 1722. It was incorporated as a village in 1872, and was chartered as a city in 1896.

BILSTON, a market town of Staffordshire, England, 2½ m. S.E. of Wolverhampton and 124 N.W. of London, in the Black Country. Pop. of urban district (1901) 24,034. It is served by the Great Western railway, and by the London & North-Western at Ettingshall Road station. In the vicinity are very productive mines of coal and ironstone, as well as sand of fine quality for casting, and grinding-stones for cutlers. Bilston contains numerous furnaces, forges, rolling and slitting mills for the preparation of iron, and a great variety of factories for japanned and painted goods, brass-work and heavy iron goods. Though retaining no relics of antiquity, the town is very ancient, appearing in Domesday. The parish church of St Leonard, dating as it stands mainly from 1827, is on the site of a building of the 13th century. Bilston suffered severely from an outbreak of cholera in 1832. The town is within the parliamentary borough of Wolverhampton.

BILTONG, a South African Dutch word (from *bil*, buttock, and *tong*, tongue), for sun-dried strips of antelope or buffalo meat.

BIMANA (Lat. "two-handed"), a word first used by the naturalist Johann Friedrich Blumenbach to distinguish the order of man from Quadrumana or other mammals. The term was popularized by Cuvier, and the majority of writers followed him in its adoption. In 1863, however, Huxley in his *Man's Place in Nature* demonstrated that the higher apes might fairly be included in Bimana. Again and again it has been proved that the human great toe can be by constant practice used as a thumb; artists exist who have painted pictures grasping the brush with their toes, and violinists have been known to play their instruments in the same manner. Among many savage races there is developed a remarkable power of foot-grasp, which in a lesser degree is often so noticeable among sailors. Haeckel calls attention to the fact that a baby can hold a spoon with the big-toe as with a thumb. Man, in a word, is potentially quadrumanous.

BIMETALLISM. The very general employment of both gold and silver for currency purposes (see MONEY) has given rise to serious practical difficulties which have in turn led to keen theoretical discussion as to the proper remedies to be employed. Though every arrangement under which two metals form the money of a region may be described as "bimetallism," the term—as often happens in economics—has received a specialized meaning. It denotes a system under which the two metals are freely received by the mint and are equally available as legal tender. The last clause implies the establishment of a definite ratio in value between the two metals (*e.g.* 1 oz. of gold = 15½ oz. of silver) so that the title "rated bimetallism" may be given to it, in contradistinction to the "unrated bimetallism" which exists wherever two metals circulate together, but have their relative values determined, not by law, but by "the higgling of the market." Further, the inventor of the term—H. Cernuschi in 1869—regarded it as properly applicable to an international arrangement by which a number of states agree to adopt the same ratio, rather than to the use of the two metals by a single country, which may be described as national bimetallism. International bimetallism is at all events the form which has attracted attention in recent times, and it is certainly the most important.

Regarded from the historical point of view it appears that the failure of separate countries to maintain the two metals in circulation was the cause which produced the idea of bimetallism as an international system. We find first the upholders of a national double standard, as in France and the United States, and these are followed by the advocates of bimetallism set up by a combination of countries. The theoretical considerations which underlie the controversy between the supporters and the opponents of bimetallism find their appropriate place in the article MONEY, as does also the earlier history of the double standard. The circumstances that have led to the prominence of the bimetallic question and the principal events that have marked the course of the movement form the subject of this article.

In the earlier years of the 19th century, when the monetary disturbances that resulted from the Revolutionary wars had ceased, we find France (1803) and the United States (1792) with the double standard legally established. England, on the other hand, had in 1816 accepted by law the gold standard, which had come into use in the 18th century. Silver formed the currency of the other European countries. The great discoveries of gold in California (1848) and Australia (1851) brought about the displacement of silver by gold in France, and the continuance of gold as the principal currency metal in the United States, where by the law of 1834 it had been somewhat over-rated (1 : 16), as compared with the ratio adopted in France (1 : 15½), and had therefore expelled most of the silver previously in circulation. Between 1848 and 1860 over £100,000,000 of gold was coined in France, while an equivalent amount of silver was exported, principally to the East.

At this time the weight of economic and official opinion was very decidedly in favour of the single gold standard as the best system. In 1865 the Latin Union was established, in which the French currency system was adopted and was followed by the international conference of 1867 in Paris (see Monetary Conferences), when gold was unanimously accepted as the standard for the proposed international system to be produced by coordinating the various currencies with that of the Latin Union.

A series of political and economic events speedily changed this situation. The Franco-German War (1870-71) deposed France from her leading position, and led to the establishment of a German gold currency with a different unit from the franc, accompanied by the demonetization of the silver currencies previously in use in the German states. The United States, where an inconvertible paper currency had been introduced during the Civil War, formally established the gold dollar as the standard coin (1873) and arranged for a return to specie payments (1878). At this time, too, the great production of gold which had marked the period 1850-1870 diminished, while very productive silver mines were discovered in the Pacific states of America. As a result of these combined influences the gold price of silver, which had risen a little during the height of the gold discoveries, began to fall rapidly, and the reverse process to that by which France had in the ’fifties acquired a gold currency came into operation. Silver, in accordance with *Gresham’s Law*, was imported and offered for coinage. To obviate this the policy of limiting the coinage of silver (the *Limping Standard*) was adopted by the Latin Union. A further fall in the gold price of silver naturally resulted, and this made the position of Eastern trade and the finances of the Indian government insecure. American silver producers, and the German government, as holders of a large mass of demonetized silver, were also sufferers by the depreciation. The effect on public and official opinion was shown by the English parliamentary committee on the depreciation of silver (1876), the American silver commission of the same year, and the appearance of many works on the subject, most of them advocating the double standard. On the initiative of the United States an international monetary conference met in Paris in 1878, but though the necessity of keeping a place for silver in the money of the world was recognized, the proposal to adopt the double standard for general use was rejected by the European states. By the Bland-Allison Act (Feb. 1878) the United States had provided for the coinage of a certain amount of silver per month as a mode of keeping up the price of the metal, which notwithstanding fell to 48 pence per oz. in 1879. The prolonged depression of trade in America and Germany was attributed to the scarcity of money, due to what was described as “the outlawry of silver.” By the joint action of France and the United States a fresh monetary conference was held in Paris in 1881, where the advocates of bimetallism were very strongly represented. After prolonged discussion no conclusion was reached, in consequence of the refusal of England and Germany to abandon the gold standard. Though an adjournment to the following year was resolved on, the conference did not reassemble, and the bimetallic movement took the form of agitation, carried on in each country. The English inquiry into the depression of trade (1885-1886) drew from the commission a recommendation for a fresh commission to investigate the relation of gold and silver. This latter body, appointed in 1886, obtained a great body of important evidence, and in 1888 closed its work by a report in which the views of the two sections of the commission were separately presented. Six members supported the existing gold standard and six were in favour of the bimetallic system. This inconclusive result was soon followed in the United States by the Sherman Act (1890), providing for a larger monthly coinage of silver. A temporary rise in the price of the metal was followed by a further fall, making the situation still more critical. A new monetary conference was summoned by the United States and met in Brussels in November 1892. To modify opposition the “desirability of increasing the use of silver” was the resolution proposed; the actual method being left open. This conference also proved abortive and adjourned to 1893, but like that of 1881 did not meet again.

International action having failed to secure any system of bimetallism, the United States and India sought to relieve their position by local legislation. The former repealed the Sherman Act, and the latter closed its mints to the free coinage of silver (1893). As these measures were opposed to bimetallism in that they restricted the use of silver, and were followed by a lower price for that metal than had ever been known, the agitation in the United States and Europe continued. In America it took the form of advocating the free coinage of silver by the United States without waiting for other countries; and in this shape made the principal issue at the presidential elections of 1896 and 1900, in each of which it was emphatically rejected.

A further attempt at securing international bimetallism was made by Senator Wolcott’s commission in 1897. The American envoys, in concert with the French government, proposed to England (1) the reopening of the Indian mints, and (2) the annual purchase by England of £10,000,000 of silver. The French minister claimed further concessions which were regarded as inadmissible by the English government; but the fate of the mission was settled by the refusal of the Indian government to reopen its mints.

After the American election of 1900, bimetallism as a popular cause disappeared from view. The silver issue was withdrawn from the democratic platform in 1904, and the bimetallic movement died out in England.

Amongst the causes of this collapse the most important are: (1) the adoption of the *gold standard* by so many countries—Austria-Hungary (1892), Russia and Japan (1897), India (1899), Mexico (1904)-a movement which pointed to the complete triumph of gold in the future; (2) the great increase in the output of gold. Australia and South Africa so developed their gold mines as to bring the yield for 1906 to £81,000,000 as contrasted with the less than £20,000,000 of 1883. This growing supply removed all that dread of a “gold famine” which served as a popular argument with bimetallists. To these may be added (3) the knowledge that experience had brought of the difficulties surrounding any attempt to establish a common ratio where the interests of different countries are so opposed; and (4) the great expansion of trade and industry, concomitantly with the wider adoption of the gold standard. Therefore, to quote the words of perhaps the ablest advocate of bimetallism, “The outcome of the prolonged controversy ... appears to be that the commercial world will carry on its business principally and more and more on a gold basis, and that particular countries will endeavour in different ways to adjust their actual medium ... to the gold standard” (Nicholson, *Money and Monetary Problems*, 6th ed.).

Perhaps the principal service rendered by the many able minds engaged in the movement will prove to be the fuller development of the more difficult parts of monetary theory and the additional light thrown on the course of monetary history.

A proposal, sometimes confounded with bimetallism, is that for a standard composed of both gold and silver, which is better described as the *Joint-standard* or as *Symmetallism*.

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(C. F. B.)

BIMLIPATAM, a town of British India, in the Vizagapatam district of Madras, on the sea-coast 18 m. N.E. of Vizagapatam. Pop. (1901) 10,212. It was formerly a Dutch factory, and is now the principal port of the district. The anchorage is an open roadstead protected to some extent by headlands with a lighthouse at Santapalli. Nearly half the sea-borne trade is conducted with foreign countries. The principal exports are oil-seeds, hides and jute.

BIN, a receptacle of various kinds, originally of wicker or basket work. The word appears in most European languages, of. M.L. and Ital. *benna*, Ger. *Benne*, &c.; etymologists trace the word to a root meaning "to plait." It survives in various connexions, *e.g.* dust-bin, wine-bin (for holding bottles), hop-bin, coal-bin, corn-bin.

BINAN, a town of the province of La Laguna, Luzon, Philippine Islands, on the W. shore of Laguna de Bay, about 20 m. S.S.E. of Manila. Pop. (1903) 9563. The town is surrounded by an extensive and extremely fertile plain which produces very large quantities of rice as well as a great variety of tropical fruits, and a ready market for these products is found in Manila whither they are shipped by boat. The language is Tagalog.

BINARY SYSTEM, in astronomy, a system composed of two stars revolving around each other under the influence of their mutual attraction. A distinction was formerly made between double stars of which the components were in revolution around each other, and those in which no relative motion was observed; but it is now considered that all double stars must really be binary systems.

BINCHOIS, EGIDIUS (d. 1460), an early 15th-century musical composer evidently named after his birthplace, Binche, near Mons. He was esteemed by contemporary and later theorists as second only to Dunstable and Dufay.

BINGEN (anc. *Vincum* or *Bingium*), a town of Germany, in the grand-duchy of Hesse-Darmstadt, 15 m. N.W. from Mainz, on the main line to Cologne. Pop. (1905) 9950. It is situated on the left bank of the Rhine opposite Rüdesheim, at the confluence of the Nahe (or Nava), which is crossed near its mouth by a stone bridge, attributed to Drusus, and certainly of Roman origin, and an iron railway bridge. On a height immediately to the south-east is the ruined castle of Klopp, on the site of a fortress founded by Drusus, and higher still the celebrated chapel of St Roch (rebuilt in 1895 after a fire), where thousands of pilgrims gather on the first Sunday after the 16th of August. Apart from its situation, which renders it a convenient place of tourist resort, the town itself presents but few attractions. There are a Protestant and three Roman Catholic churches, among the latter the parish church with a crypt dating from the 11th century, and a medieval town hall. It has a considerable commerce in wine, grain and cattle, and, new quays and a harbour having been recently constructed, does an extensive transit trade in coal and iron. A short way down the Rhine is the Bingerloch, a famous whirlpool, while about halfway between it and the town rises on a rock in the middle of the stream the *Mäuseturm* (derived from *Muserie*, cannon), in which, according to legend, Archbishop Hatto II. of Mainz was in 969 eaten by mice (the legend being doubtless due to the erroneous derivation from *Mäuse*, mice). Another legend states that the Nibelung treasure is hidden hereabouts in the Rhine.

BINGERBRÜCK, a town of Germany, in the Prussian Rhine province, at the confluence of the Nahe and the Rhine, lying just below Bingen, and at the junction of the main lines of railway—Mainz-Coblenz and Bingerbrück-Metz. It has an extensive trade in the wines of the district. Pop. 2500.

BINGHAM, JOSEPH (1668-1723), English scholar and divine, was born at Wakefield in Yorkshire in September 1668. He was educated at University College, Oxford, of which he was made fellow in 1689 and tutor in 1691. A sermon preached by him from the university pulpit, St Mary's, on the meaning of the terms "Person" and "Substance" in the Fathers, brought upon him a most unjust accusation of heresy. He was compelled to give up his fellowship and leave the university; but he was immediately presented by Dr John Radcliffe to the rectory of Headbournworthy, near Winchester (1695). In this country retirement he began his laborious and valuable work entitled *Origines Ecclesiasticae*, or Antiquities of the Christian Church, the first volume of which appeared in 1708 and the tenth and last in 1722. His design, learnedly, exhaustively and impartially executed, was "to give such a methodical account of the antiquities of the Christian Church as others have done of the Greek and Roman and Jewish antiquities, by reducing the ancient customs, usages and practices of the church under certain proper heads, whereby the reader may take a view at once of any particular usage or custom of Christians for four or five centuries." Notwithstanding his learning and merit, Bingham received no higher preferment than that of Headbournworthy till 1712, when he was collated to the rectory of Havant, near Portsmouth, by Sir Jonathan Trelawney, bishop of Winchester. Nearly all his little property was lost in the great South Sea Bubble of 1720. He died on the 17th of August 1723.

BINGHAMTON, a city and the county-seat of Broome county, New York, U.S.A., in the south part of the state, on both banks of the north branch of the Susquehanna river, at the mouth of the Chenango river. Pop. (1880) 17,317; (1890) 35,005; (1900) 39,647, of whom 4272 were foreign-born; (1910), 48,443. It is an important railway centre, being served by the Delaware & Hudson, the Erie, and the Delaware, Lackawanna & Western railways; and an extensive system of electric railways connects it with the suburbs and neighbouring towns. Binghamton is picturesquely situated and has a number of parks, the most attractive of which are Ross Park of 100 acres, and Ely Park of 134 acres. Among the principal buildings are the city hall, the court-house, the post-office, the Binghamton city hospital, Stone opera-house, the Carnegie library (1904), the central high school, and a state armoury. Binghamton has also some fine office buildings. Among the city's educational and charitable institutions are the Lady Jane Grey school (for girls), St Joseph's academy, St Mary's home for orphans, the Susquehanna Valley orphan asylum, and a state hospital for the insane. Binghamton is a manufacturing centre of considerable importance, ranking twelfth in the state in 1905 in the value of factory products, $13,907,403, which was an increase of 32.0% over the value of the factory products in 1900; among its manufactures are tobacco, cigars, chewing tobacco and snuff (value in 1905, $2,879,217), patent medicines (value in 1905, $2,133,198), flour and grist mill products ($1,089,910), men's clothing ($833,835), and, of less importance, commercial and computing scales and time recorders, chemicals, distilled liquor, beer, fire-alarm apparatus, overalls, agricultural implements, wagons, electrical apparatus, refined oil, sheet metal, paper bags and envelopes, tacks and nails, window glass, glass-ware, clocks, whips and furniture (especially Morris chairs). In the village of Lestershire (pop. in 1910, 3775; incorporated in 1892), about 2 m. west, and in Endicott, another suburb, are large boot and shoe factories. The municipality owns and operates the water-works. When Binghamton was first settled, about 1787, it was known as Chenango Point. Its site was originally included in the so-called "Bingham Patent," a tract on both sides of the Susquehanna river owned by William Bingham (1751-1804), a Philadelphia merchant, who was a member of the Continental Congress in 1787-1788 and of the United States Senate in 1795-1801, being president *pro tempore* of the Senate from the 16th of February to the 3rd of March 1797. In 1800 a village was laid out by an agent of Mr Bingham, and was named Binghamton. In 1834 it was incorporated as a village, and in 1867 was chartered as a city.

BINGLEY, a market town in the Otley parliamentary division of the West Riding of Yorkshire, England, on the Aire, 5½ m. N.W. of Bradford, on the Midland railway. Pop. of urban district (1901) 18,449. The church of All Saints is good Perpendicular, though considerably restored. The large industrial population is engaged principally in the worsted and cotton manufacture. The neighbourhood is populous, but the natural beauty of the Aire valley is not greatly impaired.

BINIOU, or Bignou, a species of cornemuse or bagpipe, still in use at the present day in Brittany. The biniou is a primitive kind of bagpipe consisting of a leather bag inflated by means of a short valved insufflation tube or blow-pipe, a chaunter with conical bore furnished with a double reed concealed within the stock or socket (see Bag-Pipe), and seven holes, the first being duplicated to accommodate left- and right-handed players.

The scale of the biniou is usually 

[1] and the single drone is tuned to the lower octave of the first hole  .

The more primitive biniou, still occasionally found in the remote districts of Cornouailles and Morbihan, has a chaunter with but five holes,[2] giving part of the scale of D, the drone being also tuned to D. The drone of the biniou is of boxwood, handsomely inlaid with tin, and has a single or beating reed hidden within the stock.

The word biniou or bignou (a Gallicized form), often erroneously derived from *bigno, se renfler beaucoup*—an etymology not supported by Breton dictionaries—is the Breton plural form of *benvek*, instrument, tool, *i.e. binviou, binvijou*.[3] The word is also found in the phrase, "*Sac'h ar biniou*" (a biniou bag), a bag used by weavers to hold their tools, spindles, &c. The biniou is still the traditional and popular instrument of the Breton peasants of Cornouailles and Morbihan, and is almost inseparable from the bombard (*q.v.*), which is no other than a survival of the medieval musette, hautbois or chalémie, formerly associated with the bag-pipe in western Europe (see Oboe). At all festivals, at the *pardons*, wedding feasts and threshing dances, the two traditional musicians or *sonneurs* give out in shrill penetrating tones the ancient Breton *rondes*[4] and melodies.

1 See Victor Mahillon, *Catalogue descriptif*, vol. ii. (Ghent, 1896), p. 353, No. 1126; and Captain C.R. Day, *Descriptive Catalogue of Musical Instruments* (London, 1891), p. 62, No. 135.

2 See N. Quellien, *Chansons et danses des Bretons* (Paris, 1889), p. 39, and note, where the description of the instrument is not technical.

3 See Le Gonidec, *Dictionnaire breton-français*, ed. by T. Hersart de la Villemarque; and N. Quellien, *op. cit.* p. 37, note.

4 For examples of these see N. Quellien, *op. cit.* part ii.

BINMALEY, a town of the province of Pangasinan, Luzon, Philippine Islands, on the delta of the Agno river, about 5 m. W. of Dagupan, the north terminus of the Manila & Dagupan railway. Pop. (1903) 16,439. It has important fisheries, and manufactures salt, pottery, roofing (made of nipa leaves), and nipa wine. Rice and cocoanuts are the principal agricultural products of the town.

BINNACLE (before 18th century *bittacle*, through Span. *bitácula*, from Lat. *habitaculum*, a little dwelling), a case on the deck of a ship, generally in front of the steersman, in which is kept a compass, and a light by which the compass is read at night.

BINNEY, EDWARD WILLIAM (1812-1881), English geologist, was born at Morton, in Nottinghamshire, in 1812. He was articled to a solicitor in Chesterfield, and in 1836 settled at Manchester. He retired soon afterwards from legal practice and gave his chief attention to geological pursuits. He assisted in 1838 in founding the Manchester Geological Society, of which he was then chosen one of the honorary secretaries; he was elected president in 1857, and again in 1865. He was also successively secretary and president of the Literary and Philosophical Society of Manchester. Working especially at the Carboniferous and Permian rocks of the north of England, he studied also the Drift deposits of Lancashire, and made himself familiar with the geology of the country around Manchester. On the Coal Measures in particular he became an acknowledged authority, and his *Observations on the Structure of Fossil Plants found in the Carboniferous Strata* (1868-1875) formed one of the monographs of the Palaeontographical Society. His large collection of fossils was placed in Owens College. He was elected a fellow of the Royal Society in 1856. He died at Manchester on the 19th of December 1881.

BINNEY, HORACE (1780-1875), American lawyer, was born in Philadelphia, Pennsylvania, on the 4th of January 1780. He graduated at Harvard College in 1797, and studied law in the office of Jared Ingersoll (1749-1822), who had been a member of the Constitutional convention of 1787, and who from 1791 to 1800 and again from 1811 to 1816 was the attorney-general of Pennsylvania. Admitted to the bar in Philadelphia in 1800, Binney practised with great success for half a century, and was recognized as one of the leaders of the bar in the United States. He served in the Pennsylvania legislature in 1806-1807, and was a Whig member of the National House of Representatives from 1833 until 1835, ably defending the United States Bank, and in general opposing the policy of President Andrew Jackson. His most famous case, in which he was unsuccessfully opposed by Daniel Webster, was the case of *Bidal* v. *Girard's Executors*, which involved the disposition of the fortune of Stephen Girard (*q.v.*). Binney's argument in this case greatly influenced the interpretation of the law of charities. Binney made many public addresses, the most noteworthy of which, entitled *Life and Character of Chief Justice Marshall*, was published in 1835. He also published *Leaders of the Old Bar of Philadelphia* (1858), and an *Inquiry into the Formation of Washington's Farewell Address* (1859); and during the Civil War he issued three pamphlets (1861, 1862 and 1865), discussing the right of *habeas corpus* under the American Constitution, and justifying President Lincoln in his suspension of the writ.

See the *Life of Horace Binney* (Philadelphia, 1904), by his grandson, C.C. Binney.

BINNEY, THOMAS (1798-1874), English Congregationalist divine, was born of Presbyterian parents at Newcastle-on-Tyne in 1798, and educated at an ordinary day school. After spending seven years in the employment of a bookseller he entered the theological school at Wymondley, Herts, now incorporated in New College, Hampstead. In 1829, after short pastorates at Bedford (New Meeting) and Newport, Isle of Wight, he accepted a call to the historic Weigh House chapel, London. Here he became very popular, and it was found necessary to build a much larger chapel on Fish Street Hill, to which the congregation removed in 1834. An address delivered on the occasion of the laying of the foundation stone was published, with an appendix containing a strong attack on the influence of the Church of England, which gave rise to a long and bitter controversy. Throughout his whole career Binney was a vigorous opponent of the state church principle, but those who simply classified him as a narrow-minded political dissenter did him injustice. His liberality of view and breadth of ecclesiastical sympathy entitle him to rank on questions of Nonconformity among the most distinguished of the school of Richard Baxter; and he maintained friendly relations with many of the dignitaries of the Established Church. He continued to discharge the duties of the ministry until 1869, when he resigned. In 1845 he paid a visit to Canada and the United States, and in 1857-1859 to the Australian colonies. The university of Aberdeen conferred the LL.D. degree on him in 1852, and he was twice chairman of the Congregational Union of England and Wales.

Binney was the pioneer in a much-needed improvement of the forms of service in Nonconformist churches, and gave a special impulse to congregational psalmody by the publication of a book entitled *The Service of Song in the House of the Lord*. Of numerous other works the best-known is his *Is it Possible to Make the Best of Both Worlds?* an expansion of a lecture delivered to young men in Exeter Hall, which attained a circulation of 30,000 copies within a year of its publication. He wrote much devotional verse, including the well-known hymn "Eternal Light! Eternal Light!" His last sermon was preached in November 1873, and after some months of suffering he died on the 24th of February 1874. Dean Stanley assisted at his funeral service in Abney Park cemetery.

BINOCULAR INSTRUMENT, or briefly Binocular,[1] an apparatus through which objects are viewed with both eyes. In this article only those instruments will be considered in which solid objects or *objects in space* are viewed; reference should be made to the article Stereoscope for the instruments in which *plane* representations are offered to both eyes. The natural vision is such that different central projections of the objects are communicated to both eyes; the difference of the two perspective representations arises from the fact that the projection centres are laterally separated by an interval about equal to the distance between the eyes (the inter-pupillary distance). Binocular instruments should aid the natural spatial or stereoscopic vision, or make it possible if the eyes fail. If the objects be so far distant that the two perspectives formed by the naked eye are no more distinguished from each other, recourse may be had to binocular telescopes and range-finders; and if the objects be so small that, in order to observe details on them, we must bring our eyes so close to the objects that they cannot accommodate the images, recourse may be had to binocular microscopes and magnifying glasses.

The construction of binocular instruments dates back over several centuries, and has now been brought to great perfection. The subject of their theory and history has been exhaustively treated by M. von Rohr, *Die binokularen Instrumente* (Berlin, 1907), the first publication to present a complete account of these instruments.

Telescope.

Binocular Instruments for Observation only.—The first binocular telescope, consisting of two telescopes placed side by side, was constructed in 1608 by Johann Lipperhey, the inventor of the ordinary or Dutch telescope. The subject was next taken up by the monks. The Capuchin Antonius Maria Schyrläus (Schyrl) de Rheita (1597-1660) described in 1645 the construction of double terrestrial telescopes. Greater success attended the efforts of the Capuchin Chérubin d'Orléans, who flourished at about the

same time, and constructed large double telescopes of the Dutch type of high magnification, for use in war, and smaller instruments of lower magnification; these instruments were provided with mechanism for adjusting to the interval between the eyes of the observer (fig. 1). After these discoveries the subject received no more attention until the 19th century; no improvements of these instruments are recorded in the literature of the second half of the 18th century.

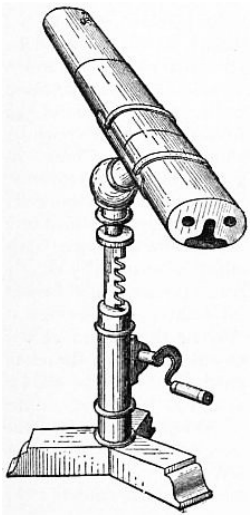


Fig. 1.

The re-invention of the Dutch binocular telescope apparently dates from 1823, and is to be assigned to the Viennese optician, Johann Friedrich Voigtländer (1779-1859); but the credit of having placed these instruments on the market probably belongs to J.P. Lemière in Paris, who, in 1825, took out a French patent for an improvement of the Dutch double telescope. Lemière's instruments were furnished with a common focusing arrangement, and the adapting to the inter-pupillary distance was effected by turning the two parallel telescopes round their common axis. The development of this instrument was studied by opticians for the remainder of the first half of the 19th century; the last improvement apparently was made by P.G. Bardou in 1854, and by H. Helmholtz in 1857 when he described the telestereoscope (fig. 2) with telescopic magnification. By utilizing the telescope with prism-inversion, devised in 1851 by Ignazio Porro (1795-1875), A.A. Boulanger succeeded in producing a binocular of an entirely new type in 1859 (fig. 3). But he overlooked the possibility of increasing the distance between the objectives; Camille Nachet introduced this improvement in 1875, but his instruments did not meet with much popularity. This was probably due to the fact that, at this time, the manufacture of the glass for the prisms was too difficult; this was overcome by E. Abbe, after the founding of the glass-works at Jena, who effected, independently of his predecessors, the wider separation of the objectives (fig. 4), and increased it in the telestereoscope (fig. 5), or relief telescope, in a manner nearly approaching to Helmholtz's proposal.

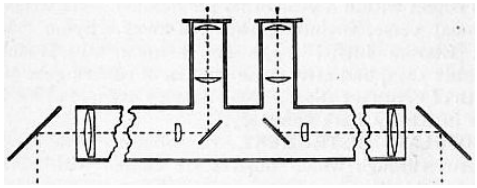


Fig. 2.

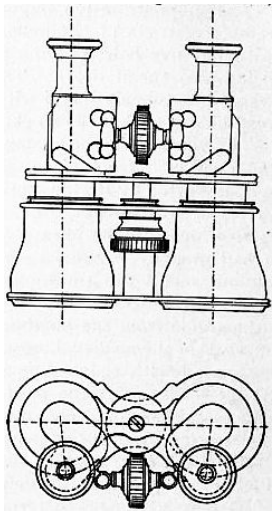


Fig. 3.

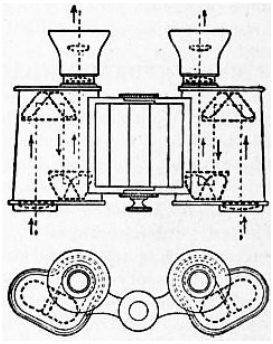


Fig. 4.

Microscope.

The first binocular microscope was invented by the previously mentioned Father Chérubin, whose instrument consisted of two inverting systems, and consequently gave a totally wrong impression of depth, *i.e.* depressions appeared as elevations, and vice versa, or, as we must say after Charles Wheatstone, it presented a pseudoscopic impression; this quality, however, was not recognized by the microscopists of the time. The instrument subsequently fell into complete neglect for nearly two centuries, to be revived in 1852 by Charles Wheatstone, who has stated that he had previously studied the problem; the publication of his views in his second great paper "On Binocular Vision,"[2] in the *Phil. Trans.* for 1852, undoubtedly stimulated the investigation of this instrument, which was carried on with zeal and success more especially in England and the United States. In 1853 the American J.L. Riddell (1807-1867) devised his binocular microscope, which contained the essentials of Wheatstone's pseudoscope. F.H. Wenham, another constructor, did not at first succeed in avoiding the pseudoscopic effect, but, by the application of *refracting* dividing prisms, he subsequently arrived at orthoscopic representations and continued the development of the different methods for producing micro-photographic stereograms; this was effected in the first case by placing a diaphragm over one half of the objective for each exposure, and in the second case by a suitable direction of the illuminating pencil (fig. 6). Of greater benefit, however, for stimulating interest in binocular microscopes, was his invention of *reflecting* dividing prisms (fig. 7). Other experiments, begun by Powell and Lealand, and developed with greater skill by Wenham, were concerned with the binocular vision of identical images. Such an impression could not possibly be stereoscopic, and these experiments led to the construction of a non-stereoscopic binocular microscope. Of the other workers in this field mention may be made of Alfred Nachet, who in 1853, and subsequently in 1863, brought forward two forms of binocular microscope.

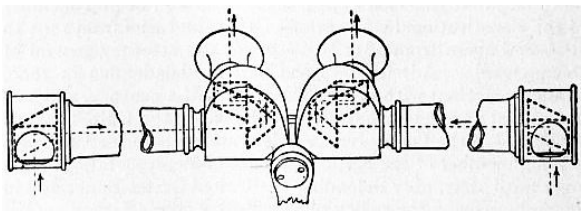


Fig. 5.

The earliest stages of the development of the binocular microscope had been always confined to those instruments with *one* objective, in the immediate neighbourhood of which the systems for dividing the pencil were placed. At a later date attempts were made to separate the two halves of the objective by modifying the eye-piece; this led to the construction of stereoscopic eye-pieces, initiated by R.B. Tolles, E. Abbe and A. Prazmowski. Of special importance is the work of Abbe; although, as he himself has stated, his methods accidentally led to the Wenham system, he certainly was far above his predecessors in his theoretical treatment of the problem, and in the perspicuity and clearness of his explanation. To him is also due the re-establishment of the instruments, which Wenham had abandoned by reason of too great technical difficulties (fig. 8). The newest form of the binocular microscope is very similar to the oldest form in which two completely separated tubes were employed. The inventor, H.S. Greenough, employs two systems for setting up the image, in order to avoid the pseudoscopic effect. After experiments in the Zeiss works, the erecting of Porro's prisms simultaneously permitted a convenient adaptation to the eye-distance of the observer.

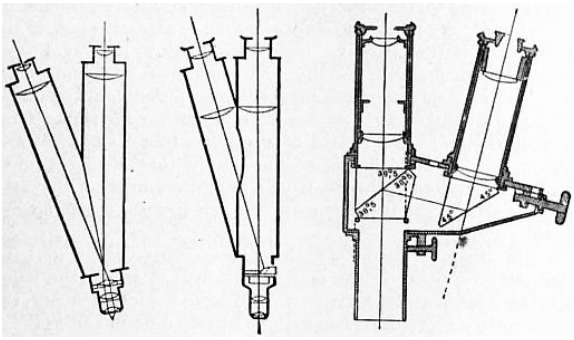


FIG. 6. FIG. 7. FIG. 8.

Simple microscope.

The first binocular magnifying glass or simple microscope (German, *Lupe*) was devised by J.L. Riddell in 1853; in this instrument (fig. 9) the pencil of light is transmitted to the eyes by means of two pairs of parallel mirrors. Of the many different improvements mention may be made of A. Nachet's. H. Westien made use of two Chevalier-Brücke's simple microscopes with their long working distances in order to form an instrument in which the curvature of the image was not entirely avoided. Mention may also be made of the binoculars of K. Fritzsch (formerly Prokesch) and E. Berger.

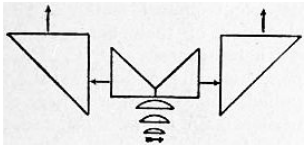


FIG. 9.

Binocular Instruments for Range-finding.—For measuring purposes binocular telescopes with parallel axes are the only types employed. The measurement is effected by adjoining to the space or interval to be measured some means of measurement defined; for example, by a fixed scale which extends into the space, or by a movable point (*Wandermarke*). This instrument shows a transition to the stereoscope, inasmuch as the scale or means of measurement is not directly observed, but to each eye a plane representation is offered, just as in the stereoscope; the space to be measured, on the other hand, is portrayed in exactly the same way as in the double telescope. The method for superposing the two spaces on one another was deduced by Sir David Brewster in 1856, but he does not appear to have dealt with the problem of range-finding. The problem was attacked in 1861 by A. Rollet; later, in 1866, E. Mach published a promising idea, and finally—independently of the researches of his predecessors—Hektor de Grousilliers, in partnership with the Zeiss firm (E. Abbe and C. Pulfrich), constructed the first stereoscopic range-finder suitable for practical use.

(O. HR.)

1 The term binocular (from the Lat. *bini*, two at a time, and *oculi*, eyes) was originally an adjective used to describe things adapted for the simultaneous use of both eyes, as in "binocular vision," "a binocular telescope or microscope"; now "a binocular" is used as a noun, meaning a binocular microscope, a field-glass, &c.

2 The first part appeared in 1838.

BINOMIAL (from the Lat. *bi-, bis*, twice, and *nomen*, a name or term), in mathematics, a word first introduced by Robert Recorde (1557) to denote a quantity composed of the sum or difference to two terms; as a + b, a − b. The terms trinomial, quadrinomial, multinomial, &c., are applied to expressions composed similarly of three, four or many quantities.

The *binomial theorem* is a celebrated theorem, originally due to Sir Isaac Newton, by which any power of a binomial can be expressed as a series. In its modern form the theorem, which is true for all values of n, is written as

$$(x + a)^n = x^n + nax^{n-1} + \frac{n\cdot(n-1)}{1\cdot2}a^2x^{n-2}\frac{n\cdot(n-1)\cdot(n-2)}{1\cdot2\cdot3}a^3x^{n-3} \ldots + a^n.$$

The reader is referred to the article ALGEBRA for the proof and applications of this theorem; here we shall only treat of the history of its discovery.

The original form of the theorem was first given in a letter, dated the 13th of June 1676, from Sir Isaac Newton to Henry Oldenburg for communication to Wilhelm G. Leibnitz, although Newton had discovered it some years previously. Newton there states that

$$(p + pq)^{m/n} = p^{m/n} + \frac{m}{n}aq + \frac{m-n}{2n}bq + \frac{m-2n}{3n}cq \ldots \text{ \&c.},$$

where p + pq is the quantity whose $(m/n)^{th}$ power or root is required, p the first term of that quantity, and q the quotient of the rest divided by p, m/n the power, which may be a positive or negative integer or a fraction, and a, b, c, &c., the several terms in order, *e.g.*

$$a = p^{m/n},\ b = \frac{m}{n}aq,\ c = \frac{m-n}{2n}bq, \text{ and so on.}$$

In a second letter, dated the 24th of October 1676, to Oldenburg, Newton gave the train of reasoning by which he devised the theorem.

> "In the beginning of my mathematical studies, when I was perusing the works of the celebrated Dr Wallis, and considering the series by the interpolation of which he exhibits the area of the circle and hyperbola (for instance, in this series of curves whose common base or axis is x, and the ordinates respectively $(1 - xx)^{0/2}$, $(1 - xx)^{1/2}$, $(1 - xx)^{2/2}$, $(1 - xx)^{3/2}$, &c), I perceived that if the areas of the alternate curves, which are x, $x - \frac{1}{3}x^3$, $x - \frac{2}{3}x^3 + \frac{1}{5}x^5$, $x - \frac{3}{3}x^3 + \frac{3}{5}x^5 - \frac{1}{7}x^7$, &c., could be interpolated, we

should obtain the areas of the intermediate ones, the first of which $(1 - xx)^{1/2}$ is the area of the circle. Now in order to [do] this, it appeared that in all the series the first term was x; that the second terms $0/3x^3$, $1/3x^3$, $2/3x^3$, &c., were in arithmetical progression; and consequently that the first two terms of all the series to be interpolated would be $x - 1/2x^3/3$, $x - 3/2x^3/3$, $x - 5/2x^3/3$, &c.

"Now for the interpolation of the rest, I considered that the denominators 1, 3, 5, &c., were in arithmetical progression; and that therefore only the numerical coefficients of the numerators were to be investigated. But these in the alternate areas, which are given, were the same with the figures of which the several powers of 11 consist, viz., of 11^0, 11^1, 11^2, 11^3, that is, the first 1; the second, 1, 1; the third, 1, 2, 1,; the fourth 1, 3, 3, 1; and so on. I enquired therefore how, in these series, the rest of the terms may be derived from the first two being given; and I found that by putting m for the second figure or term, the rest should be produced by the continued multiplication of the terms of this series $(m - 0)/1 \times (m - 1)/2 \times (m - 2)/3$ ..., &c. ... This rule I therefore applied to the series to be interpolated. And since, in the series for the circle, the second term was $(1/2x^3)/3$, I put $m = 1/2$.... And hence I found the required area of the circular segment to be $x - (1/2x^3)/3 - (1/8x^5)/5 - (1/16x^7)/7$, &c. ... And in the same manner might be produced the interpolated areas of other curves; as also the area of the hyperbola and the other alternates in this series $(1 + xx)^{0/2}$, $(1 + xx)^{1/2}$, $(1 + xx)^{2/2}$, &c. ... Having proceeded so far, I considered that the terms $(1 - xx)^{0/2}$, $(1 - xx)^{2/2}$, $(1 - xx)^{4/2}$, $(1 - xx)^{6/2}$, &c., that is 1, $1 - x^2$, $1 - 2x^2 + x^4$, $1 - 3x^2 + 3x^4 - x^6$, &c., might be interpolated in the same manner as the areas generated by them, and for this, nothing more was required than to omit the denominators 1, 3, 5, 7, &c., in the terms expressing the areas; that is, the coefficients of the terms of the quantity to be interpolated $(1 - xx)^{1/2}$ or $(1 - xx)^{3/2}$, or generally $(1 - xx)^m$ will be produced by the continued multiplication of this series $m \times (m - 1)/2 \times (m - 2)/3 \times (m - 3)/4$ ... &c." 952

The binomial theorem was thus discovered as a development of John Wallis's investigations in the method of *interpolation*. Newton gave no proof, and it was in the *Ars Conjectandi* (1713) that James Bernoulli's proof for positive integral values of the exponent was first published, although Bernoulli must have discovered it many years previously. A rigorous demonstration was wanting for many years, Leonhard Euler's proof for negative and fractional values being faulty, and was finally given by Niels Heinrik Abel.

The *multi-* (or *poly-*) *nomial theorem* has for its object the expansion of any power of a multinomial and was discussed in 1697 by Abraham Demoivre (see Combinatorial Analysis).

References.—For the history of the binomial theorem, see John Collins, *Commercium Epistolicum* (1712); S.P. Rigaud, *The Correspondence of Scientific Men of the 17th Century* (1841); M. Cantor, *Geschichte der Mathematik* (1894-1901).

BINTURONG (*Arctictis binturong*), the single species of the viverrine genus *Arctictis*, ranging from Nepal through the Malay Peninsula to Sumatra and Java. This animal, also called the bear-cat, is allied to the palm-civets, or paradoxures, but differs from the rest of the family (*Viverridae*) by its tufted ears and long, bushy, prehensile tail, which is thick at the root and almost equals in length the head and body together (from 28 to 33 inches). The fur is long and coarse, of a dull black hue with a grey wash on the head and fore-limbs. In habits the binturong is nocturnal and arboreal, inhabiting forests, and living on small vertebrates, worms, insects and fruits. It is said to be naturally fierce, but when taken young is easily tamed and becomes gentle and playful.

BINYON, LAURENCE (1869-), English poet, born at Lancaster on the 10th of August 1869, was educated at St Paul's school, London, and Trinity College, Oxford, where he won the Newdigate prize in 1890 for his *Persephone*. He entered the department of printed books at the British Museum in 1893, and was transferred to the department of prints and drawings in 1895, the *Catalogue of English Drawings in the British Museum* (1898, &c.) being by him. As a poet he is represented by *Lyric Poems* (1894), *Poems* (Oxford, 1895), *London Visions* (2 vols., 1895-1898), *The Praise of Life* (1896), *Porphyrion and other Poems* (1898), *Odes* (1900), *The Death of Adam* (1903), *Penthesilea* (1903), *Dream come true* (1905), *Paris and Oenone* (1906), a one-act tragedy, and *Attila*, a poetical drama (1907); as an art critic by monographs on the 17th-century Dutch etchers, on John Crome and John Sell Cotman, contributed to the *Portfolio*, &c. In 1906 he published the first volume of a series of reproductions from William Blake, with a critical introduction.

See also R.A. Streatfeild, *Two Poets of the New Century* (1901), and W. Archer, *Poets of the Younger Generation* (1902).

BIO-BIO, a river of southern Chile, rising in the Pino Hachado pass across the Andes, 38° 45′ S. lat., and flowing in a general north-westerly direction to the Pacific at Concepción, where it is 2 m. wide and forms an excellent harbour. It has a total length of about 225 m., nearly one half of which is navigable.

BIO-BIO, an inland province of southern Chile, bounded N., W. and S. respectively by the provinces of Concepción, Arauco and Malleco, and E. by Argentina. It has an area of 5246 sq. m. of well-wooded and mountainous country, and exports timber to a large extent. The great trunk railway from Santiago S. to Puerto Montt crosses the western part of the province and also connects it with the port of Concepción. The capital, Los Angeles (est. pop. 7777 in 1902) lies 15½ m. E. of this railway and is connected with it by a branch line.

BIOGENESIS (from the Gr. βίος, life, and γένεσις, generation, birth), a biological term for the theory according to which each living organism, however simple, arises by a process of budding, fission, spore-formation of sexual reproduction from a parent organism. Under the heading of Abiogenesis (*q.v.*) is discussed the series of steps by which the modern acceptance of biogenesis and rejection of abiogenesis has been brought about. No biological generalization rests on a wider series of

observations, or has been subjected to a more critical scrutiny than that every living organism has come into existence from a living portion or portions of a pre-existing organism. In the articles Reproduction and Heredity the details of the relations between parent and offspring are discussed. There remains for treatment here a curious collateral issue of the theory. It is within common observation that parent and offspring are alike: that the new organism resembles that from which it has come into existence: in fine, biogenesis is homogenesis. Every organism takes origin from a parent organism of the same kind. The conception of homogenesis, however, does not imply an absolute similarity between parent and organism. In the first place, the normal life-cycle of plants and animals exhibits what is known as alternation of generations, so that any individual in the chain may resemble its grand-parent and its grand-child, and differ markedly from its parent and child. Next, any organism may pass through a series of free-living larval stages, so that the new organism at first resembles its parent only very remotely, corresponding to an early stage in the life-history of that parent. (See Embryology, Larval Forms and Reproduction.) Finally, the conception of homogenesis does not exclude the differences between parent and offspring that continually occur, forming the material for the slow alteration of stocks in the course of evolution (see Variation and Selection). Homogenesis means simply that such organism comes into existence directly from a parent organism of the same race, and hence of the same species, sub-species, genus and so forth.

From time to time there have been observers who have maintained a belief in the opposite theory, to which the name heterogenesis has been given. According to the latter theory, the offspring of a given organism may be utterly different from itself, so that a known animal may give rise to another known animal of a different race, species, genus, or even family, or to a plant, or vice versa. The most extreme cases of this belief is the well-known fable of the "barnacle-geese," an illustrated account of which was printed in an early volume of the Royal Society of London. Buds of a particular tree growing near the sea were described as producing barnacles, and these, falling into the water, were supposed to develop into geese. The whole story was an imaginary embroidery of the facts that barnacles attach themselves to submerged timber and that a species of goose is known as the bernicle goose. In modern times the exponents of heterogenesis have limited themselves to cases of microscopic animals and plants, and in most cases, the observations that they have brought forward have been explained by minuter observation as cases of parasitism. No serious observer, acquainted with modern microscopic technical methods, has been able to confirm the explanation of their observations given by the few modern believers in heterogenesis.

(P. C. M.)

BIOGRAPHY (from the Gr. βίος, life, and γράφη, writing), that form of history which is applied, not to races or masses of men, but to an individual. The earliest use of the word βιογραφία is attributed to Damascius, a Greek writer of the beginning of the 6th century, and in Latin *biographia* was used, but in English no earlier employment of the word, "biography" has been traced than that of Dryden in 1683, who uses it to describe the literary work of Plutarch, "the history of particular men's lives." It is obvious that this definition is necessary, for biography is not the record of "life" in general, but of the life of a single person. The idea of the distinction between this and history is a modern thing; we speak of "antique biography," but it is doubtful whether any writer of antiquity, even Plutarch, clearly perceived its possible existence as an independent branch of literature. All of them, and Plutarch certainly, considered the writing of a man's life as an opportunity for celebrating, in his person, certain definite moral qualities. It was in these, and not in the individual characteristics of the man, that his interest as a subject of biography resided.

The true conception of biography, therefore, as the faithful portrait of a soul in its adventures through life, is very modern. We may question whether it existed, save in rare and accidental instances, until the 17th century. The personage described was, in earlier times, treated either from the philosophical or from the historical point of view. In the former case, rhetoric inevitably clouded the definiteness of the picture; the object was to produce a grandiose moral effect, to clothe the subject with all the virtues or with all the vices; to make his career a splendid example or else a solemn warning. The consequence is that we have to piece together unconsidered incidents and the accidental record of features in order to obtain an approximate estimate. We may believe, for instance, that a faithful and unprejudiced study of the emperor Julian, from the life, would be a very different thing from the impression left upon us by the passions of Cyril or of Theodoret. In considering what biography, in its pure sense, ought to be, we must insist on what it is not. It is not a philosophical treatise nor a polemical pamphlet. It is not, even, a portion of the human contemporary chronicle. Broad views are entirely out of place in biography, and there is perhaps no greater literary mistake than to attempt what is called the "Life and Times" of a man. In an adequate record of the "times," the man is bound to sink into significance; even a "Life and Times" of Napoleon I. would be an impossible task. History deals with fragments of the vast roll of events; it must always begin abruptly and close in the middle of affairs; it must always deal, impartially, with a vast number of persons. Biography is a study sharply defined by two definite events, birth and death. It fills its canvas with one figure, and other personages, however great in themselves, must always be subsidiary to the central hero. The only remnant of the old rhetorical purpose of "lives" which clearer modern purpose can afford to retain is the relative light thrown on military or intellectual or social genius by the achievements of the selected subject. Even this must be watched with great care, lest the desire to illuminate that genius, and make it consistent, should lead the biographer to glose over frailties or obscure irregularities. In the old "lives" of great men, this is precisely what was done. If the facts did not lend themselves to the great initial thesis, so much the worse for them. They must be ignored or falsified, since the whole object of the work was to "teach a lesson," to magnify a certain tendency of conduct. It was very difficult to persuade the literary world that, whatever biography is, it is not an opportunity for panegyric or invective, and the lack of this perception destroys our faith in most of the records of personal life in ancient and medieval times. It is impossible to avoid suspecting that Suetonius loaded his canvas with black in order to excite hatred against the Roman emperors; it is still more difficult to accept more than one page in three of the stories of the professional hagiographers. As long as it was a pious merit to deform the truth, biography could not hope to flourish. It appears to have originally asserted itself when the primitive instinct of sympathy began to have free play, that is to say, not much or often before the 17th century. Moreover, the peculiar curiosity which legitimate biography satisfies is essentially a modern thing; and presupposes our observation of life not unduly clouded by moral passion or prejudice.

Among the ancients, biography was not specifically cultivated until comparatively later times. The lost "Lives" of Critias were probably political pamphlets. We meet first with deliberate biography in Xenophon's memoirs of Socrates, a work of epoch-making value. Towards the close of the 1st century, Plutarch wrote one of the most fascinating books in the world's literature, his *Parallel Lives* of 46 Greeks and Romans. In later Greek, the *Life of Apollonius of Tyana* was written by Philostratus, who also produced a *Lives of the Sophists*. In the 3rd century, Diogenes Laertius compiled a *Lives of the Philosophers*, which is of greater interest than a *Lives of the Sophists* composed a hundred years later by Eunapius. Finally in the 10th century, Suidas added a biographical section to his celebrated *Lexicon*. In Latin literature, the earliest biography we meet with is the fragment of the *Illustrious Men* of Cornelius Nepos. Memoirs began to be largely written at the close of the Augustan age, but these, like the *Life of Alexander the Great*, by Q. Curtius Rufus, were rather historical than biographical. Tacitus composed a life of his father-in-law, Agricola; this is a work of the most elegant and stately beauty. Suetonius was the author of several biographical compilations, of which the *Lives of the Twelve Caesars* is the best-known; this was produced in the year 120. Marius Maximus, in the 4th century, continued the series of emperors down to Heliogabalus, but his work has not been preserved. The *Augustan History*, finished under Constantine, takes its place, and was concluded and edited by Flavius Vopiscus.

Biography hardly begins to exist in English literature until the close of the reign of Henry VIII. William Roper (1496-1578) wrote a touching life of his father-in-law, Sir Thomas More, and George Cavendish (1500-1561?), a memoir of Cardinal Wolsey which is a masterpiece of liveliness and grace. It is with these two works, both of which remained in manuscript until the 17th century, that biography in England begins. The lives of English writers compiled by John Bale (1495-1563) are much more

primitive and slight. John Leland (d. 1552) and John Pits (1560-1616) were antiquaries who affected a species of biography. In the early part of the 17th century, the absence of the habit of memoir writing extremely impoverishes our knowledge of the illustrious authors of the age, of none of whom there are preserved such records as our curiosity would delight in. The absence of any such chronicle was felt, and two writers, Thomas Heywood and Sir Aston Cokayne, proposed to write lives of the poets of their time. Unfortunately they never carried their plans into execution. The pioneer of deliberate English biography was Izaak Walton, who, in 1640, published a *Life of Donne*, followed in 1651 by that of *Sir Henry Wotton*, in 1665 by that of *Richard Hooker*, in 1670 by that of *George Herbert*, and in 1678 by that of *Dr Robert Saunderson*. These five reprinted, under the title of *Walton's Lives*, were not only charming in themselves, but the forerunners of a whole class of English literature. Meanwhile, Fuller was preparing his *History of the Worthies of England*, which appeared after his death, in 1662, and John Aubrey (1626-1697) was compiling his *Minutes of Lives*, which show such a perfect comprehension of the personal element that should underlie biography; these have only in our own days been completely given to the public. Edward, Lord Herbert of Cherbury (1583-1648), wrote a brilliant autobiography, first printed in 1764; that of Anne Harrison, Lady Fanshawe (1625-1680), remained unknown until 1829. A very curious essay in biography is the memoir of Colonel John Hutchinson, written by his widow, Lucy, between 1664 and 1671. Margaret Lucas, duchess of Newcastle (1624?-1674), wrote her own life (1656) and that of her duke (1667). The *Athenae Oxonienses* of Anthony à Wood (1632-1695) was a complicated celebration of the wit, wisdom and learning of Oxford notabilities since the Reformation. In 1668 Thomas Sprat (1635-1713) wrote a *Life of Cowley*, which was very much admired and which exercised for many years a baneful influence on British biography. Sprat considered that all familiar anecdote and picturesque detail should be omitted in the composition of a memoir, and that moral effect and a solemn vagueness should be aimed at. The celebrated funeral orations of Jeremy Taylor were of the same order of eloquence, and the wind of those grandiose compositions destroyed the young shoot of genuine and simple biography which had budded in Walton and Aubrey.

From this time forth, for more than half a century, English biography became a highly artificial and rhetorical thing, lacking all the salient features of honest portraiture. William Oldys (1696-1761) was the first to speak out boldly; in 1747, in the preface to the *Biographia Britannica*, he pointed out "the cruelty, we might even say the impiety, of sacrificing the glory of great characters to trivial circumstances and mere conveniency," and attacked the timid and scrupulous superficiality of those who undertook to write lives of eminent men, while omitting everything which gave definition to the portrait. In 1753 the *Lives of the Poets*, which bore the name of Theophilus Cibber (1703-1758), but was mainly written by Robert Shiels (d. 1753), gave a great deal of valuable information with regard to the personal adventures of our writers. Dr Johnson's *Life of Savage* (1744), though containing some passages of extreme interest, was a work of imperfect form, but Mason's *Life and Letters of Gray* (1774) marks a great advance in the art of biography. This was the earliest memoir in which correspondence of a familiar kind was used to illustrate and to expand the narrative, and Mason's *Gray* is really the pioneer of almost all modern English biography. For the first time it was now admitted that letters to intimate friends, not written with a view to publication, might be used with advantage to illustrate the real character of the writer. Boswell, it is certain, availed himself of Mason's example, while improving upon it, and in 1791 he published his *Life of Dr Samuel Johnson*, which is the most interesting example of biography existing in English, or perhaps in any language.

As soon as the model of Boswell became familiar to biographers, it could no longer be said that any secret in the art was left unknown to them, and the biographies of the 19th century are all more or less founded upon the magnificent type of the *Life of Johnson*. But few have even approached it in courage, picturesqueness or mastery of portraiture. In the next generation Southey's lives of *Nelson* (1813) and *John Wesley* (1820) at once became classics; but the pre-eminent specimen of early 19-century biography is Lockhart's superb *Life of Sir Walter Scott* (1837-1838). The biographies of the 19th century are far too numerous to be mentioned here in detail; in the various articles dedicated to particular men and women in this Encyclopaedia, the date and authorship of the authoritative life of each person will in most cases be found appended. Towards the close of the century there was unquestionably an excess, and even an abuse, in the habit of biography. It became the custom a few years or even months after the decease of an individual who had occupied a passing place in the eyes of the public, to issue a "Life" of him; in many cases such biography was a labour of utter supererogation. But the custom has become general, and it is very unlikely, notwithstanding the ephemeral interest of readers in the majority of the subjects, that it will ever go out of fashion, for it directly indulges both vanity and sentiment. What is true of Great Britain is true, though in less measure, of all other modern nations, and it is not necessary here to deal with more than the early manifestations of biography in the principal European literatures.

To Switzerland appears due the honour of having given birth to the earliest biographical dictionary ever compiled, the *Bibliotheca Universalis* of Konrad Gesner (1516-1565), published at Zürich in Latin, Greek and Hebrew, from 1545 to 1549. A very rare work, by a writer of the greatest obscurity, the *Prosopographia* of Verdier de Vauprivas, published at Lyons in 1573, professed to deal with the lives of all illustrious persons who had flourished since the beginning of the world.

In medieval and renaissance France there existed numerous memoirs and histories, such as those of Brantôme, into which the lives of great men were inserted, and in which a biographical character was given to studies of virtue and valour, or of the reverse. But the honour of being the earliest deliberate contribution to biography is generally given to the *Acta Sanctorum*, compiled by the Bollandists, the first volume of which appeared in 1653. This was the first biographical dictionary compiled in Europe, and its publication produced a great sensation. It was confined to the lives of saints and martyrs, but in 1674 Louis Moréri, in his *Grand Dictionnaire*, included a biographical section of a general character. But the earliest biographical dictionary which had anything of a modern form was the celebrated *Dictionnaire historique et critique* of Pierre Bayle, in 1696; the lives in this great work, however, are too often used as mere excuses for developing the philosophical and controversial views of the author; they are nevertheless the result of genuine research and have a true biographical view. The *Dictionnaire* was translated into English in 1734, and had a wide influence in creating a legitimate interest in biography in England.

In Italian literature, biography does not take a prominent place until the 15th century. *The Lives of Illustrious Florentines*, in which a valuable memoir of Dante occurs, was written in Latin by Filippo Villani. Vespasiano da Bistrici (1421-1498) compiled a set of biographies of his contemporaries, which are excellent of their kind. The so-called *Life of Castruccio Castracani*, by Machiavelli, is hardly a biography, but a brilliant essay on the ideals of statecraft. Paolo Giovio (1483-1552) wrote the lives of poets and soldiers whom he had known. All these attempts, however, seem insignificant by the side of the autobiography of Benvenuto Cellini (1501-1571), confessedly one of the most entertaining works of the world's literature. A great deal of biography is scattered throughout the historical compilations of the Italian renaissance, and the *Lives of the Artists*, by Giorgio Vasari (1512-1574), is a storehouse of anecdotes admirably told. We find nothing else that requires special mention till we reach the memoir-writers of the 18th century, with the autobiographies of Count Carlo Gozzi and Alfieri; and on the whole, Italy, although adopting in the 19th century the habit of biography, has rarely excelled in it.

In Spanish literature Fernán Pérez de Guzmán (1378-1460), with great originality, enshrined, in his *Generations and Likenesses*, a series of admirable literary portraits; he has been called the Plutarch of Spain. But, in spite of numerous lives of saints, poets and soldiers, Spanish literature has not excelled in biography, nor has it produced a single work of this class which is universally read. In Germany there is little to record before the close of the 18th century.

In the course of the 19th century a new thing in biography was invented, in the shape of dictionaries of national biography. Of these, the first which was carried to a successful conclusion was the Swedish (1835-1857), which occupied 23 volumes. This dictionary was followed by the Dutch (1852-1878), in 24 volumes; the Austrian (1856-1891), in 35 volumes; the Belgian (which was begun in 1866); the German (1875-1900), in 45 volumes; and others, representing nearly all the countries of Europe. England was behind the competitors named above, but when she joined the ranks a work was produced the value of which can hardly be exaggerated. The project was started in 1882 by the publisher George Smith (1824-1901), who consulted Mr (afterwards Sir) Leslie Stephen. The first volume of the English *Dictionary of National Biography* was published on the 1st of January 1885, under Stephen's editorship. A volume was published quarterly, with complete punctuality until Midsummer 1900,

when volume 63 closed the work, which was presently extended by the issue of three supplementary volumes. In May 1891 Leslie Stephen resigned the editorship and was succeeded by Mr Sidney Lee, who conducted the work to its prosperous close, bringing it up to the death of Queen Victoria. The *Dictionary of National Biography* contains the lives of more than 30,000 persons, and has proved of inestimable service in elucidating the private annals of the British people.

(E. G.)

BIOLOGY (Gr. βίος, life). The biological sciences are those which deal with the phenomena manifested by living matter; and though it is customary and convenient to group apart such of these phenomena as are termed mental, and such of them as are exhibited by men in society, under the heads of psychology and sociology, yet it must be allowed that no natural boundary separates the subject matter of the latter sciences from that of biology. Psychology is inseparably linked with physiology; and the phases of social life exhibited by animals other than man, which sometimes curiously foreshadow human policy, fall strictly within the province of the biologist.

On the other hand, the biological sciences are sharply marked off from the abiological, or those which treat of the phenomena manifested by not-living matter, in so far as the properties of living matter distinguish it absolutely from all other kinds of things, and as the present state of knowledge furnishes us with no link between the living and the not-living.

These distinctive properties of living matter are—

The properties of living matter.

1. Its *chemical composition*—containing, as it invariably does, one or more forms of a complex compound of carbon, hydrogen, oxygen and nitrogen, the so-called protein or albumin (which has never yet been obtained except as a product of living bodies), united with a large proportion of water, and forming the chief constituent of a substance which, in its primary unmodified state, is known as *protoplasm*.

2. Its *universal disintegration and waste by oxidation; and its concomitant reintegration by the intussusception of new matter*.

A process of waste resulting from the decomposition of the molecules of the protoplasm, in virtue of which they break up into more highly oxidated products, which cease to form any part of the living body, is a constant concomitant of life. There is reason to believe that carbonic acid is always one of these waste products, while the others contain the remainder of the carbon, the nitrogen, the hydrogen and the other elements which may enter into the composition of the protoplasm.

The new matter taken in to make good this constant loss is either a ready-formed protoplasmic material, supplied by some other living being, or it consists of the elements of protoplasm, united together in simpler combinations, which consequently have to be built up into protoplasm by the agency of the living matter itself. In either case, the addition of molecules to those which already existed takes place, not at the surface of the living mass, but by interposition between the existing molecules of the latter. If the processes of disintegration and of reconstruction which characterize life balance one another, the size of the mass of living matter remains stationary, while, if the reconstructive process is the more rapid, the living body *grows*. But the increase of size which constitutes growth is the result of a process of molecular intussusception, and therefore differs altogether from the process of growth by accretion, which may be observed in crystals and is effected purely by the external addition of new matter—so that, in the well-known aphorism of Linnaeus, the word “grow” as applied to stones signifies a totally different process from what is called “growth” in plants and animals.

3. Its *tendency to undergo cyclical changes*.

In the ordinary course of nature, all living matter proceeds from pre-existing living matter, a portion of the latter being detached and acquiring an independent existence. The new form takes on the characters of that from which it arose; exhibits the same power of propagating itself by means of an offshoot; and, sooner or later, like its predecessor, ceases to live, and is resolved into more highly oxidated compounds of its elements.

Thus an individual living body is not only constantly changing its substance, but its size and form are undergoing continual modifications, the end of which is the death and decay of that individual; the continuation of the kind being secured by the detachment of portions which tend to run through the same cycle of forms as the parent. No forms of matter which are either not living, or have not been derived from living matter, exhibit these three properties, nor any approach to the remarkable phenomena defined under the second and third heads. But in addition to these distinctive characters, living matter has some other peculiarities, the chief of which are the dependence of all its activities upon moisture and upon heat, within a limited range of temperature, and the fact that it usually possesses a certain structure or organization.

Life conditioned by moisture.

As has been said, a large proportion of water enters into the composition of all living matter; a certain amount of drying arrests vital activity, and the complete abstraction of this water is absolutely incompatible with either actual or potential life. But many of the simpler forms of life may undergo desiccation to such an extent as to arrest their vital manifestations and convert them into the semblance of not-living matter, and yet remain potentially alive. That is to say, on being duly moistened they return to life again. And this revivification may take place after months, or even years, of arrested life.

Life conditioned by temperature.

The properties of living matter are intimately related to temperature. Not only does exposure to heat sufficient to coagulate protein matter destroy life, by demolishing the molecular structure upon which life depends; but all vital activity, all phenomena of nutritive growth, movement and reproduction are possible only between certain limits of temperature. These limits may be set down as from a little above the freezing point of water to a little below the boiling point It is to be noted, however, that these limits apply to the living matter itself, and many of the apparent exceptions are due to cases in which the living matter is enclosed in protective wrappings capable of resisting heat and cold. In many low organisms, such as the spores of bacteria, the thick, non-conducting wall may preserve the living protoplasm from subjection to external temperatures below freezing point, or above boiling point, but all the evidence goes to show that applications of such cold or heat, if prolonged or arranged so as to penetrate to the living matter, destroy life. In warm-blooded animals, such as birds and mammals, protective mechanisms for the regulation of temperature enable them to endure exposure to extreme heat or cold, but in such cases the actually living cells do not appreciably rise or fall in temperature. A variation of a very few degrees in the blood itself produces death.

Recent investigations point to the conclusion that the immediate cause of the arrest of vitality, in the first place, and of its destruction, in the second, is the coagulation of certain substances in the protoplasm, and that the latter contains various coagulable matters, which solidify at different temperatures. And it remains to be seen, how far the death of any form of living matter, at a given temperature, depends on the destruction of its fundamental substance at that heat, and how far death is brought about by the coagulation of merely accessory compounds.

Life and organization.

It may be safely said of all those living things which are large enough to enable us to trust the evidence of microscopes, that they are heterogeneous optically, and that their different parts, and especially the surface layer, as contrasted with the interior, differ physically and chemically; while, in most living things, mere heterogeneity is exchanged for a definite structure, whereby the body is distinguished into visibly different parts, which possess different powers or functions. Living things which present this visible structure are said to be *organized*; and so widely does organization obtain among living beings, that *organized* and *living* are not unfrequently used as if they were

terms of co-extensive applicability. This, however, is not exactly accurate, if it be thereby implied that all living things have a visible organization, as there are numerous forms of living matter of which it cannot properly be said that they possess either a definite structure or permanently specialized organs: though, doubtless, the simplest particle of living matter must possess a highly complex molecular structure, which is far beyond the reach of vision.

The broad distinctions which, as a matter of fact, exist between every known form of living substance and every other component of the material world, justify the separation of the biological sciences from all others. But it must not be supposed that the differences between living and not-living matter are such as to justify the assumption that the forces at work in the one are different from those which are to be met with in the other. Considered apart from the phenomena of consciousness, the phenomena of life are all dependent upon the working of the same physical and chemical forces as those which are active in the rest of the world. It may be convenient to use the terms "vitality" and "vital force" to denote the causes of certain great groups of natural operations, as we employ the names of "electricity" and "electrical force" to denote others; but it ceases to be proper to do so, if such a name implies the absurd assumption that "electricity" and "vitality" are entities playing the part of efficient causes of electrical or vital phenomena. A mass of living protoplasm is simply a molecular machine of great complexity, the total results of the working of which, or its vital phenomena, depend—on the one hand, upon its construction, and, on the other, upon the energy supplied to it; and to speak of "vitality" as anything but the name of a series of operations is as if one should talk of the "horology" of a clock. 956

Classification of the phenomena of life.

Living matter, or protoplasm and the products of its metamorphosis, may be regarded under four aspects:—

1. It has a certain external and internal form, the latter being more usually called structure;

2. It occupies a certain position in space and in time;

3. It is the subject of the operation of certain forces in virtue of which it undergoes internal changes, modifies external objects, and is modified by them; and

4. Its form, place and powers are the effects of certain causes.

In correspondence with these four aspects of its subject, biology is logically divisible into four chief subdivisions—I. Morphology; II. Distribution; III. Physiology; IV. Aetiology.

Various accidental circumstances, however, have brought it about that the actual distribution of scientific work does not correspond with the logical subdivisions of biology. The difference in technical methods and the historical evolution of teaching posts (for in all civilized countries the progress of biological knowledge has been very closely associated with the existence of institutions for the diffusion of knowledge and for professional education) have been the chief contributory causes to this practical confusion. Details of the morphology of plants will be found in the articles relating to the chief groups of plants, those of animals in the corresponding articles on groups of animals, while the classification of animals adopted in this work will be found in the article Zoology. Distribution is treated of under Zoological Distribution, Plankton, Palaeontology and Plants: *Distribution*. Physiology and its allied articles deal with the subject generally and in relation to man, while the special physiology of plants is dealt with in a section of the article Plants. Aetiology is treated of under the heading Evolution. But practical necessity has given rise to the existence of many other divisions; see Cytology, for the structure of cells; Embryology, for the development of individual organisms; Heredity and Reproduction, for the relations between parents and offspring.

(T. H. H.; P. C. M.)

BION, Greek bucolic poet, was born at Phlossa near Smyrna, and flourished about 100 B.C. The account formerly given of him, that he was the contemporary and imitator of Theocritus, the friend and tutor of Moschus, and lived about 280 B.C., is now generally regarded as incorrect. W. Stein (*De Moschi et Bionis aetate*, Tübingen, 1893) puts Bion, chiefly on metrical grounds, in the first half of the 1st century B.C. Nothing is known of him except that he lived in Sicily. The story that he died of poison, administered to him by some jealous rivals, who afterwards suffered the penalty of their crime, is probably only an invention of the author of the Ἐπιτάφιος Βίωνος (see Moschus). Although his poems are included in the general class of bucolic poetry, the remains show little of the vigour and truthfulness to nature characteristic of Theocritus. They breathe an exaggerated sentimentality, and show traces of the overstrained reflection frequently observable in later developments of pastoral poetry. The longest and best of them is the *Lament for Adonis* (Ἐπιτάφιος Ἀδώνιδος). It refers to the first day of the festival of Adonis (*q.v.*), on which the death of the favourite of Aphrodite was lamented, thus forming an introduction to the *Adoniazusae* of Theocritus, the subject of which is the second day, when the reunion of Adonis and Aphrodite was celebrated. Fragments of his other pieces are preserved in Stobaeus; the epithalamium of Achilles and Deidameia is not his.

Bion and Moschus have been edited separately by G. Hermann (1849) and C. Ziegler (Tübingen, 1869), the *Epitaphios Adonidos* by H.L. Ahrens (1854) and E. Hiller in *Beiträge zur Textegeschichte der griechischen Bukoliker* (1888). Bion's poems are generally included in the editions of Theocritus. There are English translations by J. Banks (1853) in Bohn's *Classical Library*, and by Andrew Long (1889), with Theocritus and Moschus; there is an edition of the text by U. Wilamowitz-Möllendorff in the Oxford *Scriptorum Classicorum Bibliotheca* (1905). On the date of Bion see F. Bücheler in *Rheinisches Museum*, xxx. (1875), pp. 33-41; also G. Knaack in Pauly-Wissowa's *Realencyclopädie*, s.v.; and F. Susemihl, *Geschichte der griechischen Litteratur in der Alexandrinerzeit*, i. (1891), p. 233.

BION, of Borysthenes (Olbia), in Sarmatia, Greek moralist and philosopher, flourished in the first half of the 3rd century B.C. He was of low origin, his mother being a courtesan and his father a dealer in salt fish, with which he combined the occupation of smuggling. Bion, when a young man, was sold as a slave to a rhetorician, who gave him his freedom and made him his heir. After the death of his patron, Bion went to Athens to study philosophy. Here he attached himself in succession to the Academy, the Cynics, the Cyrenaics and the Peripatetics. One of his teachers was the Cyrenaic Theodorus, called "the atheist," whose influence is clearly shown in Bion's attitude towards the gods. After the manner of the sophists of the period, Bion travelled through Greece and Macedonia, and was admitted to the literary circle at the court of Antigonus Gonatas. He subsequently taught philosophy at Rhodes and died at Chalcis in Euboea. His life was written by Diogenes Laertius. Bion was essentially a popular writer, and in his *Diatribae* he satirized the follies of mankind in a manner calculated to appeal to the sympathies of a low-class audience. While eulogizing poverty and philosophy, he attacked the gods, musicians, geometricians, astrologers, and the wealthy, and denied the efficacy of prayer. His influence is distinctly traceable in succeeding writers, *e.g.* in the satires of Menippus. Horace (*Epistles*, ii. 2. 60) alludes to his satires and caustic wit (*sal nigrum*). An idea of his writings can be gathered from the fragments of Teles, a cynic philosopher who lived towards the end of the 3rd century, and who made great use of them. Specimens of his apophthegms may be found in Diogenes Laertius and the florilegium of Stobaeus, while there are traces of his influence in Seneca.

See Hoogvliet, *De Vita, Doctrina, et Scriptis Bionis* (1821); Rossignol, *Fragmenta Bionis Borysthenitae* (1830); Heinze, *De Horatio Bionis Imitatore* (1889).

BIOT, JEAN BAPTISTE (1774-1862), French physicist, was born at Paris on the 21st of April 1774. After serving for a short time in the artillery, he was appointed in 1797 professor of mathematics at Beauvais, and in 1800 he became professor of physics at the Collège de France, through the influence of Laplace, from whom he had sought and obtained the favour of reading the proof sheets of the *Mécanique céleste*. Three years later, at an unusually early age, he was elected a member of the Academy of Sciences, and in 1804 he accompanied Gay Lussac on the first balloon ascent undertaken for scientific purposes. In 1806 he was associated with F.J.D. Arago, with whom he had already carried out investigations on the refractive properties of different gases, in the measurement of an arc of the meridian in Spain, and in subsequent years he was engaged in various other geodetic determinations. In 1814 he was made chevalier and in 1849 commander, of the Legion of Honour. He failed in his ambition of becoming perpetual secretary of the Academy of Sciences, but was somewhat consoled by his election as a member of the French Academy in 1856. He died in Paris on the 3rd of February 1862. His researches extended to almost every branch of physical science, but his most important work was of an optical character. He was especially interested in questions relating to the polarization of light, and his observations in this field, which gained him the Rumford medal of the Royal Society in 1840, laid the foundations of the polarimetric analysis of sugar.

Biot was an extremely prolific writer, and besides a great number of scientific memoirs, biographies, &c., his published works include: *Analyse de la mécanique céleste de M. Laplace* (1801); *Traité analytique des courbes et des surfaces du second degré* (1802); *Recherches sur l'intégration des équations différentielles partielles et sur les vibrations des surfaces* (1803); *Traité de physique* (1816); *Recueil d'observations géodésiques, astronomiques et physiques exécutées en Espagne et Écosse*, with Arago (1821); *Mémoire sur la vraie constitution de l'atmosphère terrestre* (1841); *Traité élementaire d'astronomie physique* (1805); *Recherches sur plusieurs points de l'astronomie égyptienne* (1823); *Recherches sur l'ancienne astronomie chinoise* (1840); *Études sur l'astronomie indienne et sur l'astronomie chinoise* (1862); *Essai sur l'histoire générale des sciences pendant la Révolution* (1803); *Discours sur Montaigne* (1812); *Lettres sur l'approvisionnement de Paris et sur le commerce des grains* (1835); *Mélanges scientifiques et littéraires* (1858).

His son, Edouard Constant Biot (1803-1850), after amassing a competence from railway engineering, turned to the study of Chinese subjects, and published *Causes de l'abolition de l'esclavage ancien en occident* (1840); *Dictionnaire des noms anciens et modernes des villes et des arrondissements compris dans l'empire chinois* (1842); *Essai sur l'histoire de l'instruction publique en Chine et de la corporation des lettres* (1847); *Mémoire sur les colonies militaires et agricoles des chinois* (1850).

BIOTITE, an important rock-forming mineral belonging to the group of micas (*q.v.*). The name was given by J.F.L. Hausmann in 1847 in honour of the French physicist, J.B. Biot, who in 1816 found the magnesia-micas to be optically uniaxial or nearly so. The magnesia-micas are now referred to the species biotite and phlogopite, which differ in that the former contains a considerable but widely varying amount of iron. Biotite is an orthosilicate of aluminium, magnesium, ferrous and ferric iron, potassium and basic hydrogen, with small amounts of calcium, sodium, lithium, fluorine, titanium, &c., and ranges in composition between $(H, K)_2(Mg, Fe)_4(Al, Fe)_2(SiO_4)_4$ and $(H, K)_2(Mg, Fe)_2Al_2(SiO_4)_3$.

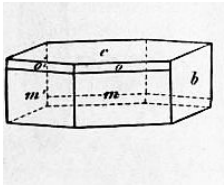


Fig. 1.

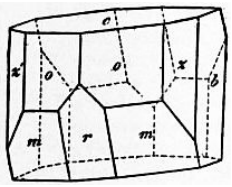


Fig. 2.

Like the other micas, it is monoclinic with pseudo-hexagonal symmetry (figs. 1, 2) and possesses a perfect cleavage in one direction (*c*). Biotite is, however, readily distinguished by its darker colour, strong pleochroism, and small optic axial angle. The colour is usually dark-green or brown; thick crystals are often deep-black and opaque. The absorption of light-rays vibrating parallel to the cleavage is much greater than of rays vibrating in a direction perpendicular thereto, and in dark-coloured crystals the former are almost completely absorbed. The angle between the optic axes is usually very small, the crystals being often practically uniaxial; an axial angle of 50° has, however, been recorded in a dark-coloured biotite. The specific gravity of biotite is, as a rule, higher than that of other micas, varying from 2.7 to 3.1 according to the amount of iron present. The hardness is 2½ to 3.

Several varieties of biotite are distinguished. By G. Tschermak it is divided into two classes, *meroxene* and *anomite*; in the former the plane of the optic axis coincides with the plane of symmetry, whilst in the latter it is perpendicular thereto. Meroxene includes nearly all ordinary biotite, and is the name given by A. Breithaupt in 1841 to the Vesuvian crystals; on the other hand, anomite (named from ἄνομος, "contrary to law") is of rare occurrence. Haughtonite and siderophyllite are black varieties rich in ferrous iron, and lepidomelane (from λεπίς, a scale, and μέλας, black) is a variety rich in ferric iron. In barytobiotite and manganophyllite the magnesia is partly replaced by baryta and manganous oxide respectively. Rubellane, hydrobiotite, pseudobiotite, and others are altered forms of biotite, which is a mineral particularly liable to decomposition with the production of chlorites and vermiculites.

Biotite is a common constituent of igneous and crystalline rocks; in granite, gneiss and mica-schist it is often associated with muscovite (white mica), the two kinds having sometimes grown in parallel position. In volcanic rocks, and in nearly all other kinds of igneous rocks with the exception of granite, biotite occurs to the exclusion of the muscovite. In the dyke-rocks known as mica-traps or mica-lamprophyres biotite is especially abundant. It is also one of the most characteristic products of contact-metamorphism, being developed in sedimentary and other rocks at their contact with granite masses. In the ejected blocks of crystalline limestone of Monte Somma, Vesuvius, the most perfectly developed crystals of biotite (figs. 1, 2), or indeed of any of the micas, are found in abundance, associated with brilliant crystals of augite, olivine, humite, &c.

Although biotite (black mica) is much more common and widely distributed than white mica, yet it is of far less economic importance. The small size of the sheets, their dark colour and want of transparency render the material of little value. Large, cleavable masses yielding fine smoky-black and green sheets, sufficiently elastic for industrial purposes, are, however, found in Renfrew county, Ontario.

(L. J. S.)

BIPARTITE (from the Lat. *bi-*, two, and *partire*, to divide). In a general sense, the word means having two corresponding parts or in duplicate. In geometry, a bipartite curve consists of two distinct branches (see PARABOLA, figs. 3, 5). In botany, the word is applied to leaves divided into two parts near the base. A *bipartient factor* is a number whose square exactly divides another number. In zoology, the *Bipartiti* was a name given by P.A. Latreille to a group of carnivorous *Coleoptera*.

BIPONT EDITIONS, the name of a famous series of editions, in 50 volumes, of Greek and Latin classical authors, so called from Bipontium, the modern Latin name of Zweibrücken or Deux-Ponts in Bavaria, where they were first issued in 1779. Their place of publication was afterwards transferred to Strassburg.

See Butters, *Ûber die Editiones Bipontinae* (1877).

BIQUADRATIC (from the Lat. *bi-, bis*, twice, and *quadratus*, squared). In mathematics, the biquadratic power or root of a quantity is its fourth power or root (see ALGEBRA); a biquadratic equation is an equation in which the highest power of the unknown is the fourth (see EQUATION: *Biquadratic*).

BIQUINTILE (from Lat. prefix *bi-*, twice, *quintilis*, fifth), the aspect of two planets which are distant from each other twice the fifth part of a great circle, *i.e.* 144°. It was one of the new aspects introduced by Kepler.

BIRBHUM, a district of British India in the Burdwan division of Bengal, situated in the Gangetic plain and partly on the hills, being bounded on the south by the river Ajai. The administrative headquarters are at Suri, which is the only town in the district. The area comprises 1752 sq. m. The eastern portion of the district is the ordinary alluvial plain of the Gangetic delta; the western part consists of undulating beds of laterite resting on a rock basis, and covered with small scrub jungle. The Ajai, Bakheswar and Mor or Maurakshi, are the principal rivers of the district, but they are merely hill streams and only navigable in the rains. In 1901 the population was 902,280, showing an increase of 13% in the decade. The principal industry is the spinning and weaving of silk, chiefly from tussur or jungle silkworms. There are also several lac factories. The loop-line of the East Indian railway runs through the district, with a junction at Nalhati for Murshidabad.

History.—Birbhum in the early part of the 13th century was a Hindu state, with its capital at Rajnagar or Nagar. In the course of the century it was conquered by the Pathans and formed part of the Pathan kingdom of Bengal. At the beginning of the 18th century it appears as a kind of military fief held under the nawab of Murshidabad by one Asadullah Pathan, whose family had probably been its chieftains since the fall of the Pathan dynasty of Bengal in 1600. It passed into British possession in 1765, but the East India Company did not assume its direct government until 1787, when that course became necessary. In the interval it had been a prey to armed bands from the highlands of Chota Nagpur, with whom the raja was unable to cope, and who practically brought the trade of the Company in the district to a standstill. The two border principalities of Birbhum and Bankura were accordingly united into a district under a British collector, being, however, separated again in 1793. By 1789, after considerable trouble, the marauders were driven back into their mountains, and since that time (except during the Santal rising of 1855) the district has been one of the most peaceful and prosperous in India.

See *Imperial Gazetteer of India* (Oxford, 1908), vol. viii. *s.v.*

BIRCH, SAMUEL (1813-1885), English Egyptologist and antiquary, was born on the 3rd of November 1813, being the son of the rector of St Mary Woolnoth, London. From an early age he manifested a tendency to the study of out-of-the-way subjects, and after a brief employment in the Record Office obtained in 1836 an appointment in the antiquities department of the British Museum on account of his knowledge of Chinese. He soon extended his researches to Egyptian, and when the cumbrous department came to be divided he was appointed to the charge of the Egyptian and Assyrian branch. In the latter language he had assistance, but for many years there was only one other person in the institution—in a different department—who knew anything of ancient Egyptian, and the entire arrangement of the department devolved upon Birch. He found time nevertheless for Egyptological work of the highest value, including a hieroglyphical grammar and dictionary, translations of *The Book of the Dead* and the Harris papyrus, and numerous catalogues and guides. He further wrote what was long a standard history of pottery, investigated the Cypriote syllabary, and proved by various publications that he had not lost his old interest in Chinese. Paradoxical in many of his views on things in general, he was sound and cautious as a philologist; while learned and laborious, he possessed much of the instinctive divination of genius. He died on the 27th of December 1885.

BIRCH, THOMAS (1705-1766), English historian, son of Joseph Birch, a coffee-mill maker, was born at Clerkenwell on the 23rd of November 1705. He preferred study to business, but as his parents were Quakers he did not go to the university. Notwithstanding this circumstance, he was ordained deacon in the Church of England in 1730 and priest in 1731. As a strong supporter of the Whigs, he gained the favour of Philip Yorke, afterwards lord chancellor and first earl of Hardwicke, and his subsequent preferments were largely due to this friendship. He held successively a number of benefices in different counties, and finally in London. In 1735 he became a member of the Society of Antiquaries, and was elected a fellow of the Royal Society, of which he was secretary from 1752 to 1765. In 1728 he had married Hannah Cox, who died in the following year. Birch was

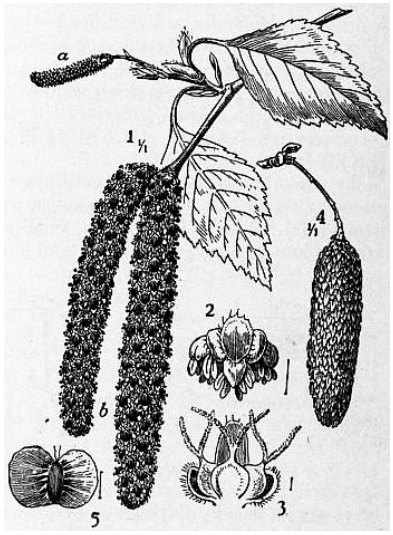
killed on the 9th of January 1766 by a fall from his horse, and was buried in the church of St Margaret Pattens, London, of which he was then rector. He left his books and manuscripts to the British Museum, and a sum of about £500 to increase the salaries of the three assistant librarians.

Birch had an enormous capacity for work and was engaged in a large number of literary undertakings. In spite of their dulness many of his works are of considerable value, although Horace Walpole questioned his “parts, taste and judgment.” He carried on an extensive correspondence with some of the leading men of his time, and many of his letters appear in *Literary Anecdotes of the 18th Century* (London, 1812-1815) and *Illustrations of the Literary History of the 18th Century* (London, 1817-1858) by J. Nichols, in the *Bibliotheca Topographica Britannica*, vol. iii. (London, 1780-1790), and in Boswell’s *Life of Johnson*. Birch wrote most of the English lives in the *General Dictionary, Historical and Critical*, 10 vols. (London, 1734-1741), assisted in the composition of the *Athenian Letters* (London, 1810), edited the *State Papers* of John Thurloe (London, 1742) and the *State Papers* of W. Murdin (London, 1759). He also wrote a *Life of the Right Honourable Robert Boyle* (London, 1744); *Inquiry into the share which King Charles I. had in the transactions of the Earl of Glamorgan for bringing over a body of Irish rebels* (London, 1756); *Historical view of Negotiations between the Courts of England, France and Brussels 1592-1617* (London, 1749); *Life of Archbishop Tillotson* (London, 1753); *Memoirs of the Reign of Queen Elizabeth from 1581* (London, 1754); *History of the Royal Society of London* (London, 1756-1757); *Life of Henry, Prince of Wales* (London, 1760), and many other works. Among the papers left at his death were some which were published in 1848 as the *Court and Times of James I.* and the *Court and Times of Charles I.*

See W.P. Courtney in the *Dictionary of National Biography*, vol. v. (1886); A. Kippis, *Biographia Britannica* (London, 1778-1793); Horace Walpole, *Letters* (London, 1891).

BIRCH (*Betula*), a genus of plants allied to the alder (*Alnus*), and like it a member of the natural order *Betulaceae*. The various species of birch are mostly trees of medium size, but several of them are merely shrubs. They are as a rule of a very hardy character, thriving best in northern latitudes—the trees having round, slender branches, and serrate, deciduous leaves, with barren and fertile catkins on the same tree, and winged fruits, the so-called seeds. The bark in most of the trees occurs in fine soft membranous layers, the outer cuticle of which peels off in thin, white, papery sheets.

The common white or silver birch (*B. alba*) (see fig.) grows throughout the greater part of Europe, and also in Asia Minor, Siberia and North America, reaching in the north to the extreme limits of forest vegetation, and stretching southward on the European continent as a forest tree to 45° N. lat., beyond which birches occur only in special situations or as isolated trees. It is well known in England for its graceful habit, the slender, grey—or white—barked stem, the delicate, drooping branches and the quivering leaves, a bright, clear green in spring, becoming duller in the summer, but often keeping their greenness rather late into the autumn. The male and female flowers are borne on separate catkins in April and May. It is a shortlived tree, generally from 40 to 50 ft. high with a trunk seldom more than 1 ft. in diameter. It flourishes in light soils and is one of the few trees that will grow amongst heather; owing to the large number of “winged seeds” which are readily scattered by the wind, it spreads rapidly, springing up where the soil is dry and covering clearings or waste places.



From Strasburger, *Lerbuch der Botanik.*

Betula alba. 1, Branch with male (*a*) and female (*b*) inflorescences; 2, bract with three male flowers; 3, bract with three female flowers; 4, infrutescence; 5, fruit. (After Wossidlo.)

The birch is one of the most wide-spread and generally useful of forest trees of Russia, occurring in that empire in vast forests, in many instances alone, and in other cases mingled with pines, poplars and other forest trees. The wood is highly valued by carriage-builders, upholsterers and turners, on account of its toughness and tenacity, and in Russia it is prized as firewood and a source of charcoal. A very extensive domestic industry in Russia consists in the manufacture of wooden spoons, which are made to the extent of 30,000,000 annually, mostly of birch. Its pliant and flexible branches are made into brooms; and in ancient Rome the fasces of the lictors, with which they cleared the way for the magistrates, were made up of birch rods. A similar use of birch rods has continued among pedagogues to times so recent that the birch is yet, literally or metaphorically, the instrument of school-room discipline. The bark of the common birch is much more durable, and industrially of greater value, than the wood. It is impermeable to water, and is therefore used in northern countries for roofing, for domestic utensils, for boxes and jars to contain both solid and liquid substances, and for a kind of bark shoes, of which it is estimated 25 millions of pairs are annually worn by the Russian peasantry. The jars and boxes of birch bark made by Russian peasants are often stamped with very effective patterns. By dry distillation the bark yields an empyreumatic oil, called *diogott* in Russia, used in the preparation of Russia leather; to this oil the peculiar pleasant odour of the leather is due. The bark itself is used in tanning; and by the Samoiedes and Kamchatkans it is ground up and eaten on account of the starchy matter it contains. A sugary sap is drawn from the trunk in the spring before the opening of the leaf-buds, and is fermented into a kind of beer and vinegar. The whole tree, but especially the bark and leaves, has a very pleasant resinous odour, and from the young leaves and buds an essential oil is distilled with water. The leaves are used as fodder in northern latitudes.

The species which belong peculiarly to America (*B. lenta, excelsa, nigra, papyracea*, &c.) are generally similar in appearance and properties to *B. alba*, and have the same range of applications. The largest and most valuable is the black birch (*B. lenta*) found abundantly over an extensive area in British North America, growing 60 to 70 ft. high and 2 to 3 ft. in diameter. It is a wood most extensively used for furniture and for carriage-building, being tough in texture and bearing shocks well, while much of it has a handsome grain and it is susceptible of a fine polish. The bark, which is dark brown or reddish, and very durable, is used by Indians and backwoodsmen in the same way as the bark of *B. alba* is used in northern Europe.

The canoe or paper birch (*B. papyracea*) is found as far north as 70° N. on the American continent, but it becomes rare and stunted in the Arctic circle. Professor Charles Sprague Sargent says: “It is one of the most widely distributed trees of North America. From Labrador it ranges to the southern shores of Hudson’s Bay and to those of the Great Bear Lake, and to the valley of the Yukon and the coast of Alaska, forming with the aspen, the larch, the balsam poplar, the banksian pine, the black and white spruces and the balsam fir, the great subarctic transcontinental forest; and southward it ranges through all the forest region of the Dominion of Canada and the northern states.” It is a tree of the greatest value to the inhabitants of the Mackenzie river district in British North America. Its bark is used for the construction of canoes, and for drinking-cups, dishes and baskets. From the wood, platters, axe-handles, snow-shoe frames, and dog sledges are made, and it is worked into articles of furniture which are susceptible of a good polish. The sap which flows in the spring is drawn off and boiled down to an agreeable spirit, or fermented with a birch-wine of considerable alcoholic strength. The bark is also used as a substitute for paper. A species (*B. Bhojputtra*) growing on the Himalayan Mountains, as high up as 9000 ft., yields large quantities of fine thin papery bark, extensively sent down to the plains as a substitute for wrapping paper, for covering the “snakes” of hookahs and for umbrellas.

It is also said to be used as writing paper by the mountaineers; and in Kashmir it is in general use for roofing houses.

BIRCH-PFEIFFER, CHARLOTTE (1800-1868), German actress and dramatic writer, was born at Stuttgart on the 23rd of June 1800, the daughter of an estate agent named Pfeiffer. She received her early training at the Munich court theatre, and in 1818 began to play leading tragic rôles at various theatres. In 1825 she married the historian Christian Birch of Copenhagen, but continued to act. From 1837 to 1843 she managed the theatre at Zürich. In 1844 she accepted an engagement at the royal theatre in Berlin, to which she remained attached until her death on the 24th of August 1868. Her intimate knowledge of the technical necessities of the stage fitted her for the successful dramatization of many popular novels, and her plays, adapted and original, make twenty-three volumes, *Gesammelte dramatische Werke* (Leip. 1863-1880). Many still retain the public favour. Her novels and tales, *Gesammelte Novellen und Erzählungen*, were collected in three volumes (Leip. 1863-1865).

Her daughter, Wilhelmine von Hillern (b. 1836), born at Munich, went on the stage, but retired upon her marriage in 1857. After 1889 she lived in Oberammergau and won a reputation as a novelist. Her most popular works are *Ein Arzt der Seele* (1869, 4th ed. 1886); and *Die Geier-Wally* (1883), which was dramatized and translated into English as *The Vulture Maiden* (Leip. 1876).

BIRD, the common English name for feathered vertebrates, members of the class *Aves*. The word in Old Eng. is *brid* and in Mid. Eng. *byrd* or *bryd*, and in early uses meant the young or nestlings only. It is partly due to this early meaning that the derivation from the root of "brood" has been usually accepted; this the *New English Dictionary* regards as "inadmissible." The word does not occur in any other Teutonic language. As a generic name for the feathered vertebrates "bird" has replaced the older "fowl," a common Teutonic word, appearing in German as *Vogel*. "Bird," when it passed from its earliest meaning of "nestlings," seems to have been applied to the smaller, and "fowl" to the larger species, a distinction which was retained by Johnson. In modern usage "fowl," except in "wild-fowl" or "water-fowl," is confined to domestic poultry.

The scope of the anatomical part of the following article is a general account of the structure of birds (*Aves*) in so far as they, as a class, differ from other vertebrates, notably reptiles and mammals, whilst features especially characteristic, peculiar or unique, have been dwelt upon at greater length so far as space permitted. References to original papers indicate further sources of information. For a comprehensive account the reader may be referred to Prof. M. Fürbringer's enormous work *Untersuchungen zur Morphologie und Systematik der Vögel*, 4to., 2 vols. (1888); H.G. Bronn's *Klassen und Ordnungen des Thierreichs*, vol. vi., "Aves," Leipzig, completed 1893 by Gadow; and A. Newton's *Dictionary of Birds*, London, 1896. For the history of the classification of birds see the article Ornithology, where also the more important ornithological works are mentioned. Egg, Feather (including Moult), Migration, &c., also form separate articles to which reference should be made. In this article (A) the general anatomy of birds is discussed, (B) fossil birds, (C) the geographical distribution of birds, (D) the latest classification of birds.

A. Anatomy of Birds

1. *Skeleton*.

Skull.—When W.K. Parker wrote the account of the skull in the article Birds for the 9th edition of the *Encyclopaedia Britannica*, he had still to wrestle with the general problem of the composition and evolution of the skull. That chapter of comparative anatomy (together with other anatomical details, for which see the separate articles) is now dealt with in the article Skull; here only the most avine features are alluded to, and since some of Parker's original illustrations have been retained, the description has been shortened considerably.

One general feature of the adult bird's skull is the almost complete disappearance of the sutures between the bones of the cranium proper, whilst another is the great movability of the whole palatal and other suspensorial apparatus. The occipital condyle (fig. 1) is a single knob, being formed almost wholly by the basioccipital, while the lateral occipitals (often perversely called exoccipitals) take but little share in it. Part of the membranous roof between the supra-occipital and parietal bones frequently remains unossified and presents in the macerated skull a pair of fontanelles. The squamosals form the posterior outer margin of the orbits and are frequently continued into two lateral downward processes across the temporal fossa. One of these, the *processus orbitatis posterior*, often combines with an outgrowth of the alisphenoid, and may be, *e.g.* in cockatoos, continued forwards to the lacrymal bone, so as to form a complete infraorbital bridge. The posterior, so-called *processus Zygomaticus* is very variable; in many Galli it encloses a foramen by distally joining the orbital process. The ethmoid frequently appears on the dorsal surface between the frontals. There are three periotic bones (pro-, epi-, opisth-otic). The proötic encloses between it and the lateral occipital the fenestra ovalis, into which fits the columella of the ear. The epiotic is often small, ossifies irregularly, and fuses with the supra-occipital. The opisthotic lies between the epiotic and the lateral occipital with which it ultimately fuses; in some birds, *e.g.* in *Larus*, it extends far enough to help to bound the foramen magnum. The basisphenoids are ventrally overlaid, and later on fused with, a pair of membrane bones, the basi-temporals, homologous in part with the parasphenoid of lower vertebrates. They contribute to the formation of the auditory meatus, and of the right and left carotid canals which accompany the eustachian tubes. In many birds the basisphenoids send out a pair of basipterygoid processes by which they articulate with the pterygoids. Dorso-laterally the basisphenoid is joined by the alisphenoid, which forms most of the posterior wall of the orbit. The orbito-sphenoids diverge only posteriorly, otherwise they are practically unpaired and form the median interorbital septum, which is very large in correlation with the extraordinary size of the eyeballs.,

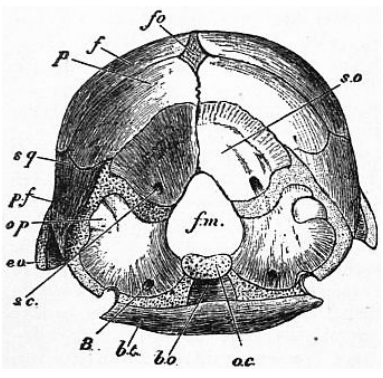


Fig. 1.—End view of skull of a Chicken three weeks old. Here the opisthotic bone appears in the occipital region, as in the adult Chelonian. (After W.K. Parker.)

bo, Basi-occipital.
bt, Basi-temporal.
eo, Opisthotic.
f, Frontal.
fm, Foramen magnum.
fo, Fontanella.
oc, Occipital condyle.
op, Opisthotic.
p, Parietal.
pf, Post-frontal.
sc, Sinus canal in supra-occipital.
so, Supra-occipital.
sq, Squamosal.
8, Exit of vagus nerve.

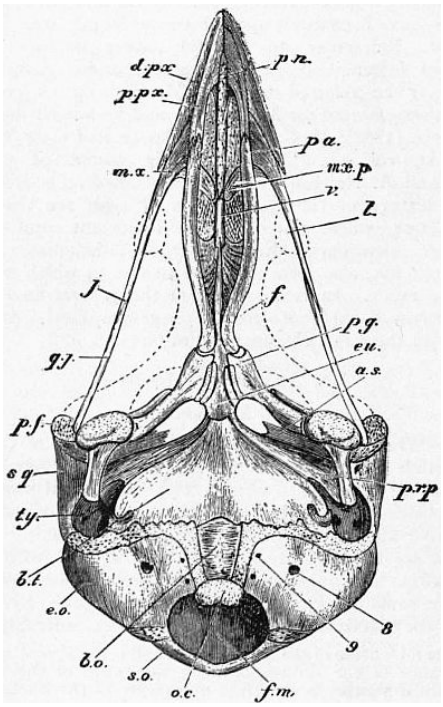


FIG. 2.—Ripe Chick's head, 1¼ in. long. (After W.K. Parker.)

as, Alisphenoid.
bo, Basi-occipital.
bt, Basi-temporal.
dpx, Dentary process of premaxilla.
eo, Opisthotic.
eu, Eustachian tube.
f, Frontal.
fm, Foramen magnum.
j, Jugal.
l, Lacrymal.
mx, Maxilla.
mxp, Maxillo-palatine process.
oc, Occipital condyle.
pa, Palatine.
pf, Post-frontal.
pg, Pterygoid.
pn, Prenasal cartilage.
ppx, Palatine process of pre-maxillary.
prp, Pterygoid process of sphenoid.
qj, Quadratojugal.
so, Supra-occipital.
sq, Squamosal.
ty, Tympanic cavity.
v, Vomer.
8, Exit of vagus nerve.
9, Exit of hypoglossal nerve.

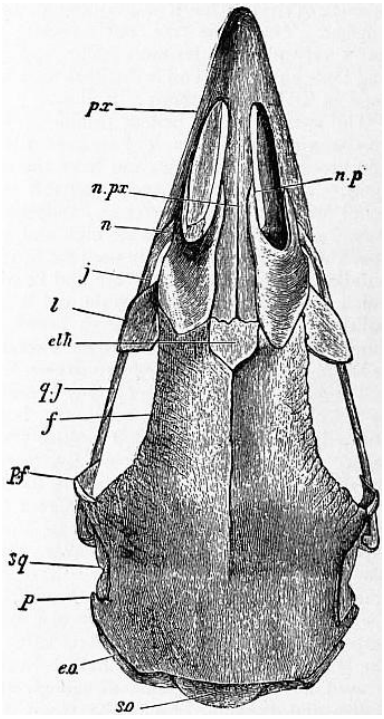


FIG. 3.—Skull of an old Fowl, upper view. (After W.K. Parker.)

eo, Lateral occipital.
eth, Ethmoid.
f, Frontal.
j, Jugal.
l, Lacrymal.
n, Nostril.
np, Upper process of nasal.
npx, Nasal process of premaxillary.
p, Parietal.
pf, Post-frontal.
px, Premaxilla.
qj, Quadratojugal.
so, Supra-occipital.
sq, Squamosal.

Prefrontal bones are absent; post-frontals are possibly indicated by a frequently occurring separate centre of ossification in the post-orbital process, to which the frontals always contribute. The lacrymal is always present, and perforated by a glandular duct. Attached to it or the neighbouring frontal is often a supraorbital; infraorbitals occur also, attached to the jugal or downward process of the lacrymal. The nasals were used by A.H. Garrod to distinguish the birds as holorhinal (fig. 2) where the anterior margin of the nasal is concave, and schizorhinal where this posterior border of the outer nares is continued backwards into a slit which extends beyond the frontal processes of the premaxilla. Many birds possess a more or less well developed cross-joint in front of the frontals and lacrymals, perhaps best developed in *Anseres* and *Psittaci*. Owing to this joint the whole upper beak can be moved up and down with extra facility, according to the shoving forwards or backwards of the palato-pterygo-quadrate apparatus which moves sledge-like upon the cranial basis. The premaxilla is always unpaired, but each half has three long processes directed backwards; one fuses with the maxillary bone, another helps to form the anterior part of the palate, while the third, together with its fellow, forms the "culmen" and extends backwards to the frontals, or rather to the ethmoid which there crops up on the surface. The maxillaries (fig. 3) have besides others, a maxillo-palatine process directed inwards in a transverse horizontal direction. The palatines are long, always fused anteriorly with the premaxilla, and frequently with the maxillo-palatine processes; posteriorly they slide upon the presphenoidal rostrum, and articulate in most birds with the pterygoids; they form the greater part of the palatal roof and border the choanae or inner nares. Between these, resting vertically upon the rostrum, appears the vomer; very variable in shape and size, often reduced to a mere trace, as in the Galli, or even absent, broken up into a pair of tiny splints in Pici.

The taxonomic importance of the configurations of the palate was first pointed out by J. de Cornay. T.H. Huxley, in 1868, divided the carinate birds into Dromaeo-, Schizo-, Desmo-, and Aegithognathae, an arrangement which for many years had a considerable influence upon classification. However, subsequent additions and corrections have detracted much from its value, especially when it became understood that the above sub-orders are by no means natural groups. *Dromaeognathae* have a struthious palate, with a broad vomer meeting in front the broad maxillo-palatal plates, while behind it reaches the pterygoids. The only representatives are the Tinamous. *Schizognathae, e.g.* fowls (fig. 4), pigeons, gulls, plovers, rails and penguins, have the vomer pointed in front while the maxillo-palatines are free, leaving a fissure between the vomer and themselves. The schizognathous formation is doubtless the most primitive, and its representatives form a tolerably natural assembly. *Desmognathae* (fig. 5) were supposed to have the maxillo-palatines united across the middle line, either directly or by the intermediation of ossifications in the nasal septum. This is a hopeless assembly. Parker and Fürbringer have demonstrated that desmognathism has been produced in half a dozen ways, implying numerous cases of convergence without any nearer relationship than that they are all derived from some schizognathous group or other. The *Aegithognathae*, meant to comprise the passeres, woodpeckers and swifts, &c., are really schizognathous but with a vomer which is broadly truncated in front.

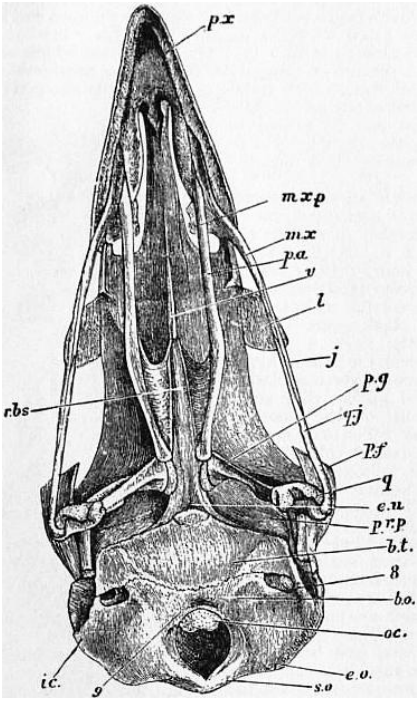


FIG. 4.—Skull of adult Fowl. This skull is unusually *schizognathous*, the vomer (*v.*) being very small, and the maxillo-palatine process (*mxp*) much aborted.

bo, Basi-occipital.
bt, Basi-temporal.
eo, Lateral occipital.
eu, Eustachian tube.
ic, Internal carotid.
j, Jugal.
l, Lacrymal.
mx, Maxilla.
mxp, Maxillo-palatine process.
oc, Occipital condyle.
pa, Palatine.
pf, Post-frontal.
pg, Pterygoid.
prp, Pterygoid process of sphenoid.
px, Premaxilla.
q, Quadrate.
qj, Quadratojugal.
rbs, Rostrum of basisphenoid.
so, Supra-occipital.
v, Vomer.
8, Exit of vagus nerve.
9, Exit of hypoglossal nerve.

(After W.K. Parker.)

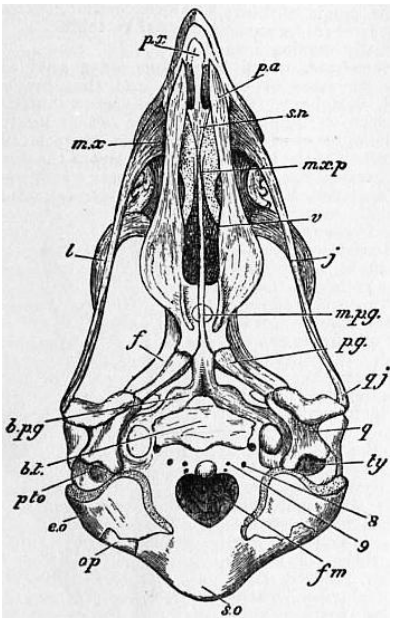


FIG. 5.—Skull of a nestling Sparrow-hawk (*Accipiter nisus*), palatal view. The circular space on each side of the basi-temporal (*bt.*) is the opening of the anterior tympanic recess. The basi-pterygoids (*bpg*) are mere knobs, and the common eustachian opening is seen between them. The maxillo-palatine plates (*mxp*) are dotted to show their spongy character.

bt, Basi-temporal.
bpg, Basi-pterygoid.
eo, Lateral occipital.
f, Frontal.
fm, Foramen magnum.
j, Jugal.
l, Lacrymal.
mpg, Mesopterygoid process of W.K. Parker.
mx, Maxillary.
mxp, Maxillo-palatine process.
op, Opisthotic.
pa, Palatine.
pg, Pterygoid.
px, Premaxilla.
pto, Prootic.
q, Quadrate.
qj, Quadratojugal.
sn, Nasal septum.
so, Supra-occipital.
ty, Tymapanic cavity.
v, Vomer.
8, Exit of vagus nerve.
9, Exit of hypoglossal nerve.

(After W.K. Parker.)

The remainder of the appendicular skeleton (fig. 6) of the head requires little description. The maxillaries are connected with the distal anterior corner of the quadrate by the thin, splint-like jugal and quadratojugal. The quadrate is invariably a conspicuous bone and movably articulating with the cranium and by a special process with the pterygoid. The mandible is composed of several bones as in reptiles. The os articulare bears on its inner side the inner mandibular process which serves for the insertion of part of the digastric muscle or opener of the mouth; another portion of this muscle is attached to the os angulare, which frequently forms a posterior mandibular process. The greater part of the under-jaw is formed by the right and left dentaries, which in all recent birds are fused together in front. Supra-angular and coronoid splint-bones serve for the insertion of part of the temporal or masseter muscle. Additional splints rest on the inner side of the jaw. Like the crocodiles, birds possess a *siphonium, i.e.* a membranous, or ossified, tube which rises from a pneumatic foramen in the os articulare, on the median side of the articulation, and passes upwards between the quadrate and lateral occipital bone, opening into the cavity of the middle ear.

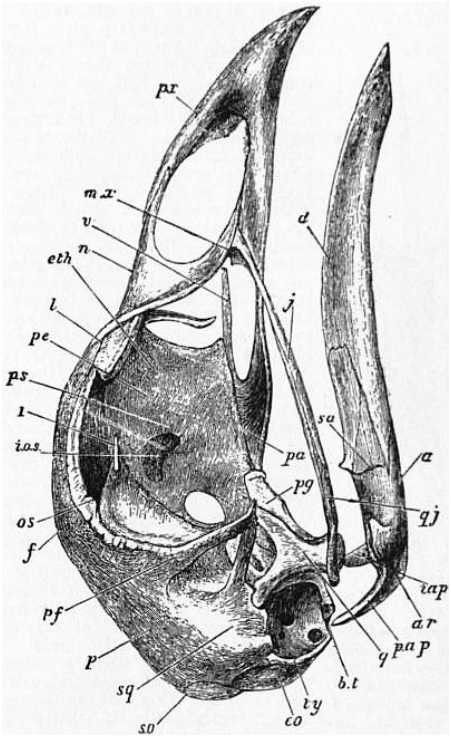


FIG. 6.—Skull of adult Fowl. Here the temporal fossa is bridged over by the junction of the post-frontal and squamosal processes (*pf., sq.*). The processes of the mandible (*iap, pap*) are characteristic of this type, and of the anseres.

a, Angular of mandible.
ar, Articular.
bt, Basi-temporal.
d, Dentary.
eo, Lateral occipital.
eth, Ethmoid.
f, Frontal.
iap, Interangular process of mandible.
ios, Interorbital septum.
j, Jugal.
l, Lacrymal.
mx, Maxillar.
n, Nasal.
os, Orbito-sphenoid.
p, Parietal.
pa, Palatine.
pap, Posterior angular process of mandible.
pe, Ethmoid.
pf, Post-frontal.
pg, Pterygoid.
ps, Pre-sphenoid.
px, Premaxilla.
q, Quadrate.
qj, Quadratojugal.
sa, Supra-angular or coronoid.
so, Supra-occipital.
sq, Squamosal.
ty, Tympanic cavity.
v, Vomer.
1, Exit of olfactory nerve.

The *Hyoid apparatus* is, in its detail, subject to many variations in accord with the very diverse uses to which the tongue of birds is put. It consists of (1) the basihyal variously called copula, or corpus linguae, or unpaired middle portion. (2) The urohyal likewise unpaired, rested ventrally on the larynx. (3) The os entoglossum originally paired, but coalescing into an arrow-headed piece, attached to the anterior end of the basihyal and lodged in the tongue proper. It is homologous with the distal ends of the ceratohyals or ventral elements of the hyoidean or second visceral arch. The dorsal or hyomandibular portion of this same arch is transformed into the auditory chain, ending in the fenestra ovalis. (4) A pair of thyrohyals, homologous with the posterior hyoid horns of mammals, *i.e.* third visceral or first branchial arch. As the most developed pair in birds they are commonly, although wrongly, called the hyoid horns. They articulate upon facets of the hinder outer corners of the basihyal.

The vertebrae are stereospondylous, the centrum or body and the arch being completely fused into one mass, leaving not even a neuro-central suture. The arch alone sends out processes, viz. the spinous process, the anterior and posterior oblique (commonly called pre- and post-zygapophyses), and the transverse processes. The latter articulate with the tuberculum of the corresponding rib, while the capitulum articulates by a knob on the side of the anterior end of the centrum. In the cervical region the ribs are much reduced, fused with their vertebrae and enclosing the transverse canal or foramen. When the vertebrae are free their centra articulate with each other by complicated joints, exhibiting four types. (1) Amphicoelous; each end of the centrum is concave; this, the lowest condition, is embryonic, but was retained in *Archaeopteryx* and in the thoracic vertebrae of *Ichthyornis*. (2) Procoelous, concave in front; only in the atlas, for the reception of the occipital condyle. (3) Opisthocoelous, or concave behind, only occasionally found in the thoracic region, *e.g.* Sphenisci. (4)

Heterocoelous (fig. 8) or saddle-shaped; the anterior surface is concave in a transverse, but convex in a vertical direction, which on posterior surface shows the conditions reversed. This is the most perfect arrangement attained by the vertebral column, and is typical of, and restricted to, birds. The intervertebral joints are further complicated by the interposition of a cartilaginous or fibrous pad or ring. This pad varies much; it is morphologically the homologue of the pair of basiventral elements which by their lateral extension give origin to the corresponding ribs. Later those pads fuse with the anterior end of the centrum of the vertebra to which they belong; where the vertebral column is rendered inflexible, the disks are ossified with the centra and all trace of them is lost. Sometimes the pad is reduced to a ventral semi-ring or meniscus; it retains its largest almost original shape and size in the second vertebra, the axis or epistropheus, where it forms a separately ossifying piece which connects, and coössifies with, the odontoid process (the centrum of the atlas) and the centrum of the second vertebra. Sometimes the ventral portions of these pads form paired or unpaired little ossifications, then generally described as intercentra; such are not uncommon on the tail. The atlas is composed of three pieces; a pair of lateral elements (the right and left dorsal arch pieces) joining above the spinal cord, and a ventral piece equivalent to the first basiventral elements, *i.e.* serially homologous with the intervertebral pads. In the adults the atlas forms a more or less solid ring. A remnant of the *chorda dorsalis* and its sheath persists as the *ligamentum suspensorium* between the central portions of the successive vertebrae.

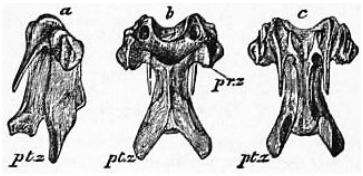


Fig. 8.—A cervical vertebra from the middle of the neck of a Fowl; natural size. *a*, Side view; *b*, upper view; *c*, lower view; *pr.z*, pre-zygapophyses; *pt.z*, post-zygapophyses.

In birds we distinguish between the following regions of the *axial skeleton*. (1) Cervical vertebrae, or those between the skull and the first vertebra which is connected with the sternum by a pair of complete ribs. The last 1 to 5 of these vertebrae have movable ribs which do not reach the sternum, and are called cervico-dorsals. (2) Dorsals, those which begin with the first thoracic rib, and end at the last that is not fused with the ilium. The term "lumbar" vertebrae is inapplicable to birds. (3) Pelvic, all those which are fused with the iliac portion of the pelvis, generally a considerable number. (4) Caudal, those which are not connected with the pelvis. It is to be noted that often no absolute line of demarcation can be drawn in regard to these regions, their definitions being rather convenient than morphological.

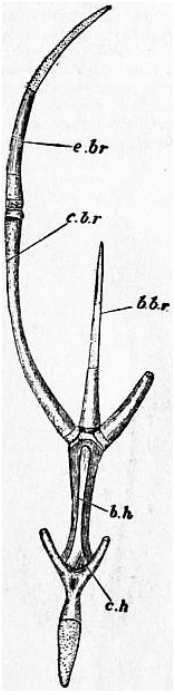


Fig. 7.—Oshyoides of adult Fowl.

c.h, Ceratohyals (confluent).
b.h, The so-called basihyal, answering to the first basibranchial of a fish.
b.br, Basibranchial, or urohyal, answering to the rest of the basibranchial series.
c.br, e.br, together form the thyrohyal, answering to the first cerato- and epi-branchials.

In comparison with all other vertebrates the number of neck-vertebrae of the birds is considerably increased; the lowest number, 14 to 15, is that of most Passeres and many other Coraciomorphae; the largest numbers, 20 or 21, are found in the ostrich, 23 in *Cygnus olor* and 25 in the black swan. Dorsal vertebrae frequently have a ventral outgrowth of the centrum; these hypapophyses may be simple vertical blades, ⊥-shaped, or paired knobs; they serve for the attachment of the thoracic origin of the longus collianticus muscle, reaching their greatest development in Sphenisci and Colymbidae. In many birds some of the thoracic vertebrae are more or less coössified, in most pigeons for instance the 15th to 17th; in most Galli the last cervical and the next three or four thoracics are coalesced, &c. The pelvic vertebrae include of course the sacrum. There are only two or three vertebrae which are equivalent to those of the reptiles; these true sacrals are situated in a level just behind the acetabulum; as a rule between these two primary sacral vertebrae issues the last of the spinal nerves which contributes to the composition of the sciadic plexus. These true sacrals alone are connected with the ilium by processes which are really equivalent to modified ribs; but the pelvis of birds extends considerably farther forwards and backwards, gradually coming into contact with other vertebrae, which in various ways send out connecting transverse processes or buttresses, and thus become pre- and post-sacral vertebrae (fig. 9). The most anterior part of the ilium often overlaps one or more short lumbar ribs and fuses with them, or even a long, complete thoracic rib. Similarly during the growth of the bird the posterior end of the ilium connects itself with the transverse processes of vertebrae which were originally free, thus transforming them from caudals into secondary post-sacrals. Individual, specific and generic variations are frequent.

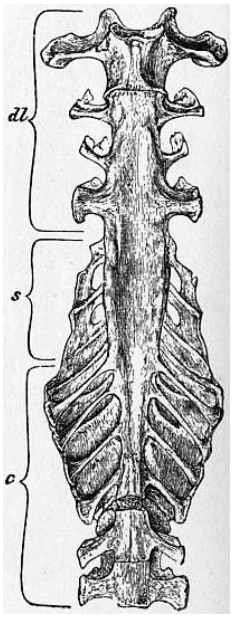


Fig. 9.—The "sacrum" of a young Fowl; natural size, seen from below. *d.l*, Dorso-lumbar, *s*, sacral, *c*, caudal vertebrae.

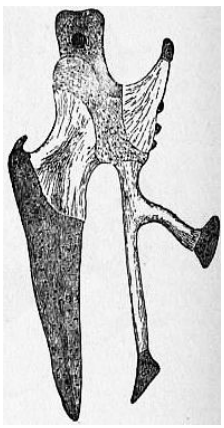


Fig. 10.—A side view of the Chick's sternum.

The last six or seven caudal vertebrae coalesce into the pygostyle, an upright blade which carries the rectrices. Such a pygostyle is absent in *Archaeopteryx, Hesperornis, Tinami* and *Ratitae*, but it occurs individually in old specimens of the ostrich and the kiwi. In *Ichthyornis* it is very small. In all the *Neornithes* the total number of caudal vertebrae, inclusive of those which coalesce, is reduced to at least 13.

Sternum (figs. 10 and 11).—Characteristic features of the sternum are the following. There is a well-marked *processus lateralis anterior* (the right and left together equivalent to the mammalian manubrium), which is the product of two or three ribs, the dorsal parts of which reduced ribs remain as cervico-dorsal ribs. Then follows the rib-bearing portion and then the *processus lateralis posterior*; this also is the product of ribs, consequently the right and left processes together are equivalent to the xiphoid process or xiphisternum of the mammals. The lateral process in most birds sends out an outgrowth, directed out and upwards, overlapping some of the ribs, the *processus obliquus*. The median and posterior extension of the body of the sternum is a direct outgrowth of the latter, therefore called meta-sternum. The anterior margin of the sternum, between the right and left anterior lateral processes receives in sockets the feet of the coracoids. Between them arises a median crest, which varies much in extent and composition, and is of considerable taxonomic value. It is represented either by a *spina interna* or by a *spina externa*, or by both, or they join to form a *spina communis* which is often very large and sometimes ends in a bifurcation. Eventually, when the right and left feet of the coracoids overlap each other, the anterior sternal spine contains a foramen. The keel, or *carina sterni*, is formed as a direct cartilaginous outgrowth of the body of the sternum, ossifying from a special centre. This keel is much reduced in the New Zealand parrot, *Stringops*, less in various

flightless rails, in the dodo and solitaire. It is absent in the Ratitae, which from this feature have received their name, but considerable traces of a cartilaginous keel occur in the embryo of the ostrich, showing undeniably that the absence of a keel in the recent bird is not a primitive, fundamental feature. The keel has been lost, and is being lost, at various epochs and by various groups of birds. The swimming *Hesperornis* (see ODONTORNITHES) was also devoid of such a structure. In many birds the spaces between the meta-sternum and the posterior processes and again the spaces between this and the oblique process are filled up by proceeding ossification and either remain as notches, or as fenestrae, or they are completely abolished so that the breastbone is turned into one solid more or less oblong plate.

Shoulder Girdle.—Scapula, coracoid and clavicle, meet to form the foramen triosseum, through which passes the tendon of the *supracoracoideus*, or *subclavius* muscle to the *tuberculum superius* of the humerus. The coracoid is one of the most characteristic bones of the bird's skeleton. Its upper end forms the acrocoracoid process, against the inner surface of which leans the proximal portion of the clavicle. From the inner side of the neck of the coracoid arises the precoracoidal process, the remnant of the precoracoid. Only in the ostrich this element is almost typically complete, although soon fused at either end with the coracoid. Near the base of the precoracoidal process is a small foramen for the passage of the *nervus supracoracoideus*. In most birds the feet of the coracoids do not touch each other; in some groups they meet, in others one overlaps the other, the right lying ventrally upon the left. The scapula is sabre-shaped, and extends backwards over the ribs, lying almost parallel to the vertebral column. This is a peculiar character of all birds. The clavicles, when united, as usual, form the furcula; mostly the distal median portion is drawn out into a hypocleidium of various shape. Often it reaches the keel of the sternum, with subsequent syndosmosis or even synostosis, *e.g.* in the gannet. In birds of various groups the clavicles are more or less degenerated, the reduction beginning at the distal end. This condition occurs in the Ratitae as well as in the well-flying *Platyrcecinae* amongst parrots.

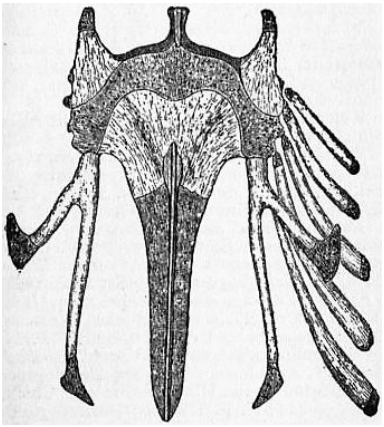


FIG. 11.—Sternum of a Chick (*Gallus domesticus*) three days old, lower view. The cartilage is shaded and dotted, and the bony centers are light and striated.

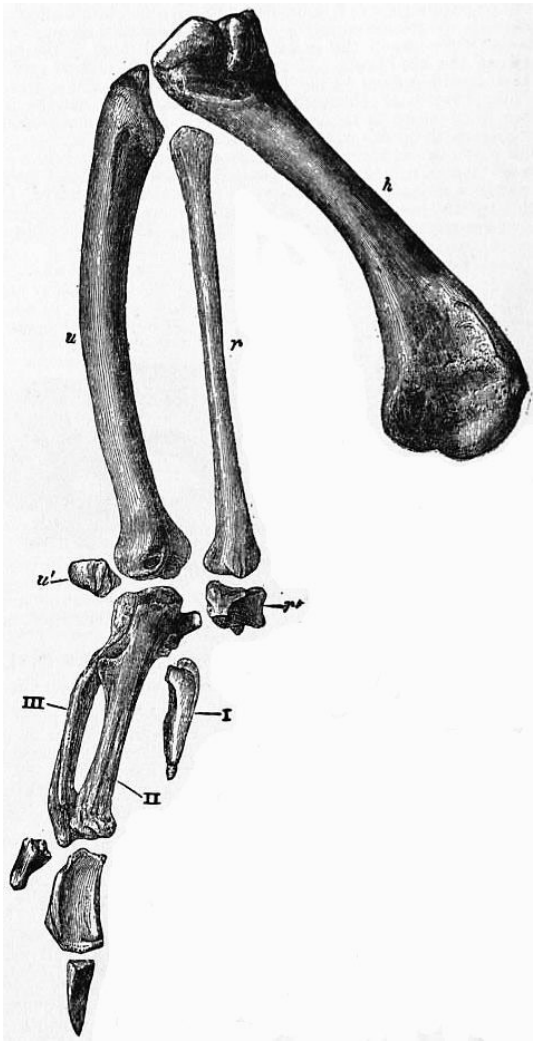


FIG. 12.—Bones of Fowl's right wing, adult, nat. size.

h, Humerus.
r, Radius.
u, Ulnar.
r', *u'*, Radial and ulnar carpal bones; with the three digits I., II., III.

The *fore-limb* or *wing* (fig. 12); highly specialized for flight, which, initiated and made possible mainly by the strong development of quill-feathers, has turned the wing into a unique organ. The humerus with its crests, ridges and processes, presents so many modifications characteristic of the various groups of birds, that its configuration alone is not only of considerable taxonomic value but that almost any genus, excepting, of course, those of Passeres, can be "spotted" by a close examination and comparison of this bone. When the wing is folded the long glenoid surface of the head of the humerus is bordered above by the *tuberculum externum* or *superius*, in the middle and below by the *tuberculum medium* or *inferius* for the insertion of the *coraco-brachialis posterior* muscle. From the outer tuberculum extends the large *crista superior* (insertion of *pectoralis major* and of *deltoideus major* muscles). The ventral portion of the neck is formed by the strong *crista inferior*, on the

median side of which is the deep *fossa subtrochanterica* by which air sacs enter the humerus. On the outer side of the humerus between the head and the *crista inferior* is a groove lodging one of the coraco-humeral ligaments. The distal end of the humerus ends in a trochlea, with a larger knob for the ulna and a smaller oval knob for the radius. Above this knob is often present an ectepicondylar process whence arise the tendons of the ulnar and radial flexors. The radius is the straighter and more slender of the two forearm bones. Its proximal end forms a shallow cup for articulation with the outer condyle of the humerus; the distal end bears a knob which fits into the radial carpal. The ulna is curved and rather stout; it articulates with both carpal bones; the cubital quills often cause rugosities on its dorsal surface. Of wrist-bones only two remain in the adult bird; the original distal carpals coalesce with the proximal end of the metacarpals. These are reduced, in all birds, to three, but traces of the fourth have been observed in embryos. The first metacarpal is short and fuses throughout its length with the second. This and the third are much longer and fuse together at their upper and distal ends, leaving as a rule a space between the shafts. The pollex and the third finger are as a rule reduced to one phalanx each, while the index still has two. The first and second fingers frequently carry a little claw. The greatest reduction of the hand-skeleton is met with in *Dromaeus* and in *Apteryx*, which retain only the index finger. It is of importance for our understanding of the position of the Ratitae in the system, that the wing-skeleton of the ostrich and rhea is an exact repetition of that of typical flying birds; the bones are much more slender, and the muscles are considerably reduced in strength also to a lesser extent in numbers, but the total length of the wing of an ostrich or a rhea is actually and comparatively enormous. Starting with the kiwi and cassowary, people have got into the habit of confounding flightless with wingless conditions. It is absolutely certain that the wings of the Ratitae bear the strongest testimony that they are the descendants of typical flying birds.

The *pelvis* (fig. 13), consisting of the sacrum (already described) and the pelvic arch, namely ilium, ischium and pubis, it follows that only birds and mammals possess a pelvis proper, whilst such is entirely absent in the Amphibia and in reptiles with the exception of some of the Dinosaurs. The ventral inner margin of the preacetabular portion of the ilium is attached to the pre-sacral vertebrae, whilst the inner and dorsal margin of the postacetabular portion is attached to the primary sacral and the postsacral vertebrae. In rare cases the right and left preacetabular blades fuse with each other above the spinous processes. In front of the acetabulum a thick process of the ilium descends to meet the pubis, and a similar process behind meets the ischium. The acetabulum is completely surrounded by these three bones, but its cup always retains an open foramen; from its posterior rim arises the strong antitrochanter. The ischium and postacetabular ilium originally enclose the ischiadic notch or *incisura ischiadica*. This primitive condition occurs only in the Odontornithes (*q.v.*), Ratitae and Tinami; in all others this notch becomes converted into a *foramen ischiadicum*, through which pass the big stems of the ischiadic nerves and most of the blood-vessels of the hind-limb. The pubis consists of a short anterior portion (*spina pubica* or pectineal process, homologous with the prepubic process of Dinosaurs) and the long and slender pubis proper (equivalent to the *processus lateralis pubis* of most reptiles). The shaft of the pubis runs parallel with that of the ischium, with which it is connected by a short ligamentous or bony bridge; this cuts off from the long *incisura pubo-ischiadica* a proximal portion, the *foramen obturatum*, for the passage of the obturator nerve. Only in the ostrich the distal ends of the pubes meet, forming a dagger-shaped symphysis, which is curved forwards. The pectineal process is variable; it may grow entirely from the pubis, or both pubis and ilium partake of its formation, or lastly its pubic portion may be lost and the process is entirely formed by the ilium. It is largest in the Galli and some of the Cuculi, in others it is hardly indicated. It served originally for the origin of the ambiens muscle (see *Muscular System* below); shifting or disappearance of this muscle, of course, influences the process.

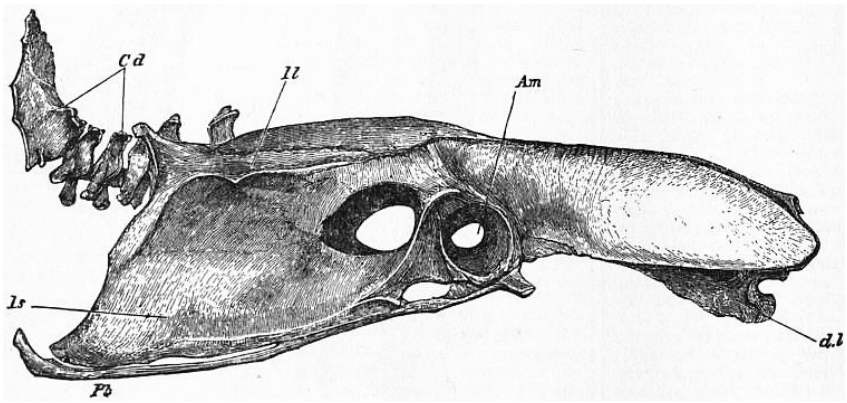


FIG. 13.—Pelvis and caudal vertebrae of adult Fowl, side view, natural size. *Il.* Ilium; *Is*, ischium; *Pb*, pubis; *d.l*, dorso-lumbar vertebrae; *Cd*, caudal vertebrae; *Am*, acetabulum.

The Hind Limb.—The femur often possesses a well visible pneumatic foramen on the median side of the proximal end of its shaft. The inner condyle, the intercondylar sulcus, and a portion only of its outer condyle, articulate with corresponding facets of the tibia. The outer condyle articulates mainly with the fibula. There is a patella, intercalated in the tendon of the *femori-tibialis* or *extensor cruris* muscle. In *Colymbus* the patella is reduced to a small ossicle, its function being taken by the greatly developed pyramidal *processus tibialis anterior*; in *Podiceps* and *Hesperornis* the patella itself is large and pyramidal. The distal half of the fibula is very slender and normally does not reach the ankle-joint; it is attached to the peroneal ridge of the tibia. On the anterior side of the tibia, is the intercondylar sulcus, which is crossed by an oblique bridge of tendon or bone, acting as a pulley for the tendon of the *extensor digitorum communis* muscle. The condyles of the tibia are in reality not parts of this bone, but are the three proximal tarsalia which fuse together and with the distal end of the tibia. The distal tarsalia likewise fuse together, and then on to the upper ends of the metatarsals; the *tarsale centrale* remains sometimes as a separate osseous nodule, buried in the inter-articular pad. Consequently the ankle-joint of birds is absolutely cruro-tarsal and tarso-metatarsal, *i.e.* intertarsal, an arrangement absolutely diagnostic of birds if it did not also occur in some of the Dinosaurs. Of the metatarsals the fifth occurs as an embryonic vestige near the joint; the first is reduced to its distal portion, and is, with the hallux, shoved on to the inner and posterior side of the foot, at least in the majority of birds. The three middle metatarsals become fused together into a cannon bone; the upper part of the third middle metatarsal projects behind and forms the so-called hypotarsus, which in various ways, characteristic of the different groups of birds (with one or more sulci, grooved or perforated), acts as guiding pulley to the tendons of the flexor muscles of the toes. Normally the four toes have two, three, four and five phalanges respectively, but in *Cypselus* the number is reduced to three in the front toes. Reduction of the number of toes (the fifth shows no traces whatever, not even in *Archaeopteryx*) begins with the hallux, which is completely or partly absent in many birds; the second toe is absent in *Struthio* only. The short feet of the penguins are quite plantigrade, in adaptation to which habit the metatarsals lie in one plane and are incompletely co-ossified, thus presenting a pseudo-primitive condition.

LITERATURE.—Only a mere fraction of the enormous literature dealing with the skeleton of birds can here be mentioned.

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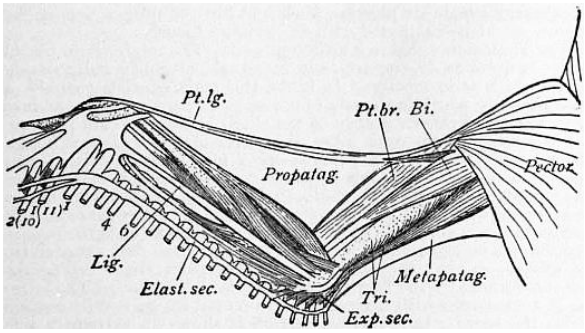
2. Muscular System.

Of the muscles of the stem or axis, those of the neck and tail are well-developed and specialized, while those of the lower back are more or less reduced, or even completely degenerated owing to the rigidity of this region, brought about by the great antero-posterior extent of the pelvis.

The muscles of the limbs show a great amount of specialization, away from the fundamental reptilian and mammalian conditions. The muscles of the fore limbs are most aberrant, but at the same time more uniformly developed than those of the hinder extremities. The reasons are obvious. The whole wing is a unique modification, deeply affecting the skeletal, muscular and tegumentary structures, but fluttering, skimming, sailing, soaring are motions much more akin to one another than climbing and grasping, running, scratching, paddling and wading. The modifications of the hind-limbs are in fact many times greater (such as extremely long legs, with four, three or only two toes; very short legs, almost incapable of walking, with all four toes directed forwards, or two or one backwards, and two or more connected and therefore bound to act together, in various ways). Thus it has come to pass that the muscles of the hind limbs are, like their framework, more easily compared with those of reptiles and mammals than are the wings, whilst within the class of birds they show an enormous amount of variation in direct correlation with their manifold requirements. The only really aberrant modifications of the wing-muscles are found in the Ratitae, where they are, however, all easily explained by reduction, and in the penguins, where the wings are greatly specialized into blades for rowing with screw-like motions.

The wing of the bird is folded in a unique way, namely, the radius parallel with the humerus, and the whole wrist and hand with their ulnar side against the ulna; upper and forearm in a state of supination, the hand in that of strong abduction. Dorsal and ventral bending, even in the extended wing, is almost impossible. Consequently only a few of the original extensor muscles have been preserved, but these are much modified into very independent organs, notably the *extensor metacarpi radialis longus*, the *ext. metac. ulnaris* and the two *radio-* and *ulnari-metacarpi* muscles, all of which are inserted upon the metacarpus by means of long tendons. The chief muscular mass, arising from the sternum in the shape of a U, is the *pectoralis* muscle; its fibres converge into a strong tendon, which is inserted upon the greater tubercle and upper crest of the humerus, which it depresses and slightly rotates forwards during the downstroke. This great muscle covers completely the *supracoracoideus*, generally described as the second pectoral, or *subclavius* muscle, in reality homologous with the mammalian *supraspinatus* muscle. This arises mostly from the angle formed by the keel with the body of the sternum, passes by a strong tendon through the *foramen triosseum*, and is inserted upon the upper tubercle of the humeral crest, which it rotates and abducts. The extent of the origin of this muscle from the sternum, on which it leaves converging, parallel or diverging impressions, is of some taxonomic value.



From Newton's *Dictionary of Birds*, by permission of A. & C. Black.

FIG. 14.—Wing muscles of a Goose. *Bi*, Biceps; *Elast. sec.*, elastic vinculum and *Exp.sec., expansor secundariorum*; *Pt.br* and *Pt.lg*, short and long propatagial muscles; *Tri*, triceps.

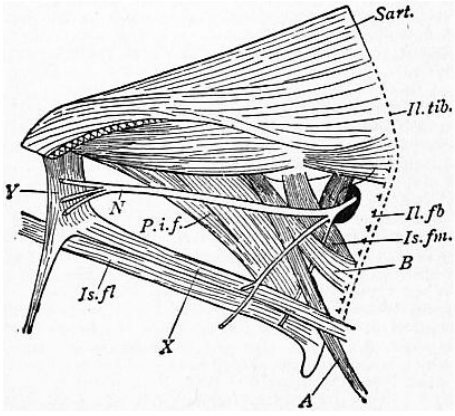
Much labour has been bestowed by A.H. Garrod and Max Fürbringer upon the investigation of the variations of the inserting tendons of the patagial muscles (fig. 14), mainly from a taxonomic point of view. The *propatagialis longus* muscle is composed of slips from the deltoid, pectoral, biceps and *cucullaris* muscles. Its strong belly originates near the shoulder joint from clavicle, coracoid and scapula. Its elastic tendon runs directly to the carpus, forming thereby the outer margin of the anterior patagium, or fold of skin between the upper and forearm, which it serves to extend, together with the *propatagialis brevis* muscle. This runs down the anterior and outer side of the upper arm, and is attached to the proximal tendon of the *extensor metacarpi radialis longus*, a little below the outer condyle of the humerus. In most birds the tendon is split into several portions, one of which is often attached to the outer side of the ulna, below the elbow joint, while others are in variable but characteristic ways connected with similar slips of the *propatagialis longus*. The posterior patagium, the fold between trunk and inner surface of the upper arm, is stretched by the *metapatagialis* muscle, which is composed of slips from the *serratus, superficialis, latissimus dorsi* and the *expansor secundariorum muscles*. This, the stretcher of the cubital quills, is a very interesting muscle. Arising as a long tendon from the sterno-scapular ligament, it passes the axilla by means of a fibrous pulley, accompanies the axillary vessels and nerves along the humerus, and is inserted by a few fleshy fibres on the base of the last two or three cubital quills. Here, alone, at the distal portion of the tendon, occur muscular fibres, but these are unstriped, belonging to the category of cutaneous muscles. We have here the interesting fact that a muscle (portion of the *triceps humeri* of the reptiles) has been reduced to a tendon, which in a secondary way has become connected with cutaneous muscles, which, when strongly developed, represent its belly.

The *flexor digitorum sublimis* muscle arises fleshy from the long elastic band which extends from the inner humeral condyle along the ventral surface of the ulna to the ulnar carpal bone, over which the tendon runs to insert itself on the radial anterior side of the first phalanx of the second digit. Owing to the elasticity of the humerocarpal band the wing remains closed without any special muscular exertion, while, when the wing is extended, this band assists in keeping it taut. The arm-muscles have been studied in an absolutely exhaustive manner by Fürbringer, who in his monumental work has tabulated and then scrutinized the chief characters of fourteen selected muscles. The results are as interesting from a morphological point of view (showing the subtle and gradual modifications of these organs in their various adaptations), as they are sparse in taxonomic value, far less satisfactory than are those of the hind-limb. He was, however, the first to show clearly that the Ratitae are the retrograde descendants of flying ancestors, that the various groups of surviving Ratitae are, as such, a polyphyletic group, and he has gone fully into the interesting question of the development and subsequent loss of the power of flight, a loss which has taken place not only in different orders of birds but also at various geological periods, and is still taking place. Very important are also the investigations which show how, for instance in such fundamentally different groups as petrels and gulls, similar bionomic conditions have produced step by step a marvellously close convergence, not only in general appearance, but even in many details of structure.

Of the muscles of the hind-limbs likewise only a few can be mentioned. The *ambiens* muscle, long and spindle-shaped, lying immediately beneath the skin, extending from the pectineal process or ilio-pubic spine to the knee, is the most median of the muscles of the thigh. When typically developed its long tendon passes the knee-joint, turning towards its outer side, and lastly, without being anywhere attached to the knee, it forms one of the heads of the *flexor perforatus digit*, ii. or iii. One of the functions of this peculiar muscle (which is similarly developed in crocodiles, but absent, or not differentiated from the ilio-tibial and ilio-femoral mass, in other vertebrates) is that its contraction helps to close the second and third toes. Too much has been made of this feature since Sir R. Owen (*Cyclop. Anat. Phys.* i. p. 296, 1835), following G.A. Borelli (*De motu animalium*, Rome, 1680), explained that birds are enabled to grasp the twig on which they rest whilst sleeping, without having to make any muscular exertion, because the weight of the body bends the knee and ankle-joints, over both of which pass the tendons of this compound muscle. There are many perching birds, *e.g.* all the Passeres, which do not possess this muscle at all, whilst many of those which have it fully developed, *e.g.* Anseres, can hardly be said to "perch."

Garrod went so far as to divide all the birds into *Homalogonatae* and *Anomalogonatae*, according to the presence or absence of the ambiens muscle. This resulted in a failure. To appreciate this, it is sufficient to enumerate the birds without the critical muscle: *Passeriformes* and *Coraciiformes*, without exception; *Ardeae* and *Podiceps*; lastly various genera of storks, pigeons, parrots, petrels and auks. The loss has taken place, and still takes place, independently in widely different groups. It follows, first, that the absence of this muscle does not always indicate relationship; secondly that we can derive birds that are without it from a group which still possess it, but not vice versa. The absence of the ambiens muscle in all owls, which apparently use their feet in the same way as the *Accipitres* (all of which possess it), indicates that owls are not developed from the latter, but from a group which, like the other *Coraciiformes*, had already lost their muscle.

Garrod further attributed much taxonomic value to the *caudilio-femoralis* muscle (fig. 15). This, when fully developed, consists of two parts, but inserted by a single ribbon-like tendon upon the hinder surface of the femur, near the end of its first third; the caudal part, *femoro-caudalis*, expressed by Garrod by the symbol *A*, arises from transverse processes of the tail; the iliac part (*accessoro-femoro-caudal* of Garrod, with the symbol *B*), arises mostly from the outer surface of the postacetabular ilium. Of course this double-headed condition is the more primitive, and as such exists in most nidifugous birds, but in many of these, as well as in many nidicolous birds, either the caudal or the iliac head is absent, and in a very few (*Cancroma, Dicholophus, Steatornis* and some *Cathartes*) the whole muscle is absent. The *caud-ilio flexorius* (*semitendinosus* of most authors) arises from the transverse processes of the tail, and from the distal half of the postacetabular ilium, thence passing as a broad ribbon to the popliteal region, where it splits into two portions. One of these, broad and fleshy, is inserted upon the posterior surface of the distal third of the femur. This portion, morphologically the original, was named the "accessory semitendinosus" with the symbol *Y*; the other portion descends on the hinder aspect of the leg and joins the fascia of the inner femoral head of the *gastrocnemius* muscle. In many birds the insertion is shifted from the femur to the neck of the tibia, in which case the "accessory head" is said to be absent, a condition expressed by Garrod by the symbol *X*. By combining the four symbols *A, B, X, Y*, according to their presence or absence, Garrod got a considerable number of formulae, each of which was overruled, so to speak, by the two categories of the presence or absence of the *ambiens* muscle. It needs hardly to be pointed out why such a purely mechanical scheme was doomed to failure. Its author, with a considerable mathematical and mechanical bias, reckoned entirely with the quantity, not with the quality of his units, and relied almost implicitly upon his formulae. It is, however, fair to state that his system was not built entirely upon these muscular variations, but rather upon a more laborious combination of anatomical characters, which were so selected that they presumably could not stand in direct correlation with each other, notably the oil-gland, caeca, carotids, nasal bones and above all, the muscles of the thigh. He was, indeed, the first to show clearly the relationship of the heron-like birds with the Steganopodes; of stork-like birds with the American vultures; the great difference between the latter and the other birds of prey; the connexion of the gulls and auks with the plovers, and that of the sand-grouse with the pigeons—discoveries expressed in the new terms of the orders Ciconiiformes and Charadriiformes. These are instances, now well understood, that almost every organic system, even when studied by itself, may yield valuable indications as to the natural affinities of the various groups of birds. That Garrod has so very much advanced the classification of birds is ultimately due to his comprehensive anatomical knowledge and general insight.



From Newton's *Dictionary of Birds*.

FIG. 15.—Left thigh-muscles of a Rail. Outer view after removal of the *Il.fb*, ilio-fibularis and *Il.tib*, ilio-tibialis.

A, Caudal.
B, Iliac portion of caud-ilio-femoralis.
X, Caud-ilio-flexorius.
Y, "Accessory" portion of the same.
Pif, Pubischio-femoralis.
N, Sciatic nerve.
Is.fm, Ischio-femoralis.
Is.fl, Ischio-fibularis.
Sart. Sartorius.

To return to these thigh muscles. The most primitive combination, ambiens and *A B X Y*, is the most common; next follows that of *A X Y*, meaning the reduction of *B*, *i.e.* the iliac portion of the *caud-ilio-femoralis*; *A B X* and *B X Y* are less common; *A X* and *X Y* are rare and occur only in smaller groups, as in subfamilies or genera; *B X* occurs only in *Podiceps*. But the greatest reduction, with only *A* remaining, is characteristic of such a heterogeneous assembly as Accipitres, Cypselidae. Trochilidae, Striges and Fregata. This fact alone is sufficient proof that these conditions, or rather reductions, have been acquired independently of the various groups. *A B Y, A Y, A B, X Y* and *B* do not occur at all, some of them for obvious reasons. Occasionally there is an instructive progressive evolution expressed in these formula; for instance *Phaethon*, in various other respects the lowest of the Steganopodes, has *A X Y*, *Sula* and *Phalacrocorax* have *A X*, *Fregata*, the most specialized of these birds, has arrived at the reduced formula *A*. Further, the combinations *B X Y* and *A X Y* cannot be derived from each other, but both directly from *A B X Y* in two different directions. Keeping this in mind, we may fairly conclude that the flamingo with *B X Y* points to an ancestral condition *A B X Y*, which is still represented by *Platalea* and *Ibis*, whilst the other storks proper have taken a different line, leading to *A X Y*.

LITERATURE.—Well nigh complete lists of the enormous myological literature are contained in Fürbringer's *Untersuchungen zur Morphologie und Systematik der Vögel*, and in Gadow's vol. *Vögel* of Bronn's *Klassen und Ordnungen des Tierreichs*. Only a few papers and works can be mentioned here, with the remark that few authors have paid attention to the all-important innervation

of the muscles. A. Carlsson, *Beiträge zur Kenntniss der Anatomieder Schiwmmvögel*; K. Svensk, *Vet. Ak. Handlinger. J.G.* No. 3 (1884); A. Alix, *Essai sur l'appareil locomoteur des oiseaux* (Paris, 1874); H. Gadow, *Zur vergl. Anat. der Muskulatur des Beckens und der hinteren Gliedmasse der Ratiten*,4° (Jena, 1880); A.H. Garrod, "On Certain Muscles of the Thigh of Birds and on their value in Classification," *P.Z.S.*, 1873, pp. 624-644; 1874, pp. 111-123. Other papers by Garrod, 1875, pp. 339-348 (deep planter tendons); 1876, pp. 506-519 (wing-muscles of Passeres), &c.; J.G. de Man, *Vergelijkende myologische en neurologische Studien over Amphibien en Vögels* (Leiden, 1873), (*Corvidae*); A. Milne-Edwards, *Recherches anatomiques et paléontologiques pour servir à l'histoire des oiseaux fossiles de la France* (Paris, 1867-1868), tom. i. pls. ix.-x. (*Aquila* and *Gallus*); R. Owen, article "Aves," Todds' *Cydopaed. of Anat. and Phys.* i. (London, 1835); "On the Anatomy of the Southern *Apteryx*," *Trans. Zool. Soc.*, iii., 1849; A. Quennerstedt, "Studier i foglarnas anatomi," *Lunds Univers. Aarsk.*, ix., 1872 (hind-limb of swimming birds); G. Rolleston, "On the Homologies of Certain Muscles connected with the Shoulder-joint," *Trans. Linn. Soc.*, xxvi., 1868; R.W. Shufeldt, *The Myology of the Raven* (London, 1891); M. Watson, "Report on the Anatomy of the *Spheniscidae*," *Challenger Reports*, 1883.

3. *Nervous System.*

Brain.—The more characteristic features of the bird's brain show clearly a further development of the reptilian type, not always terminal features in a direct line, but rather side-departures, sometimes even a secondary sinking to a lower level, and in almost every case in a direction away from those fundamentally reptilian lines which have led to the characters typical of, and peculiar to, the mammals.

The forebrain forms the bulk of the whole brain, but the large size of the hemispheres is due to the greater development of the basal and lateral portions (*pedunculi cerebri* and *corpora striata*), while the pallium (the portion external to the lateral ventricles) is thin, and restricted to the median side of each hemisphere. As a direct result of this undoubtedly secondary reduction of the pallium—due to the excessive preponderance of the basal and lateral parts—the corpus callosum (*i.e.* the transverse commissure of the right and left pallium) is in birds reduced to a narrow flat bundle of a few white fibres; it is situated immediately above and behind the much stronger anterior commissure, *i.e.* the connexion between the corpora striata, or chief remaining part of the hemispheres. Owing to the small size of the olfactory lobes the anterior arms of the latter commissure are wanting. There is very little grey matter in the cortex of the hemispheres, the surface of which is devoid of convolutions, mostly quite smooth; in others, for instance pigeons, fowls and birds of prey, a very slight furrow might be compared with the Sylvian fissure.

The Thalamencephalon is much reduced. The epiphysis, or pineal body, is quite as degenerate as in mammals, although still forming a long stalk as in reptiles. In birds, this stalk consists entirely of blood-vessels, which in the adult enclose no terminal vesicle, and fuse with the membranous linings of the skull. The midbrain is represented chiefly by the optic lobes, the cortex of which alone is homologous with the *corpora quadragemina* of the mammals. Their transverse dorsal connexion is the posterior commissure; otherwise the whole roof portion of the midbrain is reduced to a thin membrane, continuous with that which covers the Sylvian aqueduct, and this ventricle sends a lateral cavity into each optic lobe, as is the case in reptiles. The right and left lobes themselves are rent asunder (so to speak), so that they are freely visible from above, filling the corners formed by the hemispheres and the cerebellum. The latter is, in comparison with mammals; represented by its middle portion only, the *vermis*; in a sagittal section it shows an extremely well developed *arbor vitae*, produced by the transverse, repeated folding of the whole organ. In comparison with reptiles the cerebellum of birds shows high development. Forwards it covers, and has driven asunder, the optic lobes; backwards it hides the much shortened medulla oblongata.

Several futile attempts have been made to draw conclusions as to the intelligence of various birds, from comparison of the weight of the whole brain with that of the body, or the weight of the hemispheres with that of other parts of the central nervous system.

The *brachial plexus* is formed by four or five of the lowest cervical nerves; the last nerve of this plexus often marks the boundary of the cervical and thoracic vertebrae. The composition of the plexus varies much, not only in different species, but even individually. The most careful observations are those by Fürbringer. The serial number of these nerves depends chiefly upon the length of the neck, the extremes being represented by *Cypselus* (10th-14th cervical) and *Cygnus* (22nd-24th), the usual numbers of the common fowl being the 13th-17th nerves.

The *Crural Plexus* is divided into a crural, ischiadic and pubic portion. The first is generally composed of three nerves, the hindmost of which, the *furcalis*, issues in most birds between the last two lumbo-sacral vertebrae, and then divides, one half going to the crural, the other to the sciatic portions. The *obturatorius* nerve invariably comes from the two main stems of the crural. The ischiadic portion consists generally of five or six nerves, which leave the pelvis as one thick system through the ilio-ischiadic foramen. The last nerve which contributes to the ischiadic plexus leaves the spinal column in most birds either between the two primary sacral vertebrae, or just below the hindmost of them, and sends a branch to the pubic portion which is composed of post-ischiadic nerves, partly imbedded in the kidneys, and innervates the ventral muscles between the tail and pubis, together with those of the cloaca and copulatory organs.

The *Sympathetic System* forms a chain on either side of the vertebral column. In the region of the neck lateral strands pass through the transverse canal of the cervical vertebrae; but from the thoracic region onwards, where the cardiac branch to the heart is given off, each strand is double and the basal ganglia are successively connected with the next by a branch which runs ventrally over the capitulum of the rib, and by another which passes directly through the foramen or space formed between capitulum and tuberculum. In the pelvic region, from about the level of the posterior end of the ischiadic plexus, the strand of each side becomes single again, passing ventrally over the transverse processes. Lastly, towards the caudal region the right and left strands approach and anastomose, eventually coalescing in the mid line.

Literature.—A. Bumm, "Das Grosshirn der Vögel," *Zeitschr. wiss. Zool.*, 38, 1883, pp. 430-466, pls. 24-25; F. Leuret and P. Gratiolet, *Anatomie comparée du système nerveux* (Paris, 1839-1857), with atlas; A. Meckel, "Anatomie des Gehirns der Vögel," in *Meckel's Archiv f. Physiol.* vol. ii.; H.F. Osborn, "The Origin of the Corpus Callosum, a contribution upon the Cerebral Commissures of the Vertebrata," *Morphol. Jahrbuch*, 1886, xii. pp. 223-251, pls. 13-14; M.A. Schulgin, "Lobi optici der Vögel," *Zool. Anzeig.* iv. pp. 277 and 303; E.R.A. Serres, *Anatomie comparée du cerveau* (Paris, 1824, 4 pls.); L. Stieda, "Studien uber das centrale Nervensystem der Vögel und Säugethiere," *Zeitschr. wiss. Zool.* xix., 1869, pp. 1-92, pls.; J. Swan, *Illustrations of the Comparative Anatomy of the Nervous System* (London, 1835, 4to, with plates).

Concerning the spinal nerves and their plexus: H. v. Jhering, *Das peripherische Nervensystem der Wirbeltiere* (Leipzig, 1871); W.A. Haswell, "Notes on the Anatomy of Birds," *Proc. Linn. Soc. N.S.W.* iii., 1879; M. Fürbringer, "Zur Lehre von den Umbildungen der Nervenplexus," *Morph. Jahrb.* v., 1879, p. 358.

4. *Organs of Sense.*

The *Eye* is essentially reptilian, but in sharpness of vision, power and quickness of accommodation it surpasses that of the mammals. The eyeball, instead of being globular, resembles rather the tube of a short and thick opera-glass.

The anterior half of the sclerotic is composed of a ring of some ten to seventeen cartilaginous or bony scales which partly overlap each other. Another cartilage or ossification, the posterior sclerotic ring, occurs within the walls of the posterior portion of the cup, and surrounds, especially in the Pici and in the Passeres, the entrance of the optic nerve. The iris is in most young birds at first brown or dull-coloured, but with maturity attains often very bright tints which add considerably to the charm of the bird; sexual dimorphism is in this respect of common occurrence. The iris contains a sphincter and a dilator muscle; the former, supplied by branches from the *oculomotorius* nerve, is under control of the will, whilst the dilator fibres belong to the sympathetic system. When fully dilated, the pupil is round in all birds; when contracted it is usually round, rarely oval as in the fowl. From near the entrance of the optic nerve, through the original choroidal fissure, arises the much-folded pecten, deeply pigmented and very vascular, far into the vitreous humour. The number of its folds varies considerably, from three in

Caprimulgus to nearly thirty in crow (*Corvus*). *Apteryx*, which since Owen has generally been stated to be devoid of such an organ, likewise possesses a pecten; its base is, however, trumpet-shaped, covers almost the whole of the optic disk, and extends nearly to the lens in the shape of a thick, densely pigmented cone, without any plications, resembling in these respects the pecten of many Lacertilia (see G.L. Johnson, *Phil. Trans.*, 1901, p. 54). In the retina the cones prevail in numbers over the rods as in the mammals, and their tips contain, as in other Sauropsida, coloured drops of oil, mostly red or yellow. Near the posterior pole of the fundus, but somewhat excentrically placed towards the temporal or outer side, is the *fovea centralis*, a slight depression in the retina, composed almost entirely of cones, the spot of most acute vision. Many birds possess besides this temporal fovea a second fovea nearer the nasal side. It is supposed that the latter serves monocular, the other the binocular vision, most birds being able to converge their eyes upon one spot. Consequently the whole field of vision of these birds possesses three points where vision is most acute. It may here be remembered that of the mammalia man and monkeys alone are capable of convergence, and have a circumscribed macular area.

Of the outer eyelids, the lower alone is movable in most birds, as in reptiles, and it frequently contains a rather large saucer-shaped cartilage, the *tarsus palpebralis*. The margins of the lids are sometimes furnished with eyelashes, *e.g.* in the ostrich and in the Amazon parrots, which are vestigial feathers without barbs. During the embryonic stage the lids are fused together, and either become separated shortly before the bird is hatched, as is the case with most Nidifugae, or else the blind condition prevails for some time, in the young Nidicolae. All birds have, like most reptiles, a well-developed third lid or "nictitating membrane," which moves from the inner canthus obliquely upwards and backwards over the cornea. The moving mechanism is a further and much higher development of that which prevails in reptiles, there being two muscles completely separate from each other. Both are supplied by the *abducens* nerve, together with the *rectus externus* muscle. One, the *quadratus* or *bursalis* muscle, arises from the hinder surface of the eyeball, and forms with its narrow margin, which is directed towards the optic nerve, a pulley for the long tendon of the *pyramidalis* muscle. This arises from the nasal surface of the ball, and its tendon passes into the somewhat imperfectly transparent nictitating membrane. The quadrate muscle adjusts the motion, and prevents pressure upon the optic nerve; during the state of relaxation of both muscles the nictitans withdraws through its own elasticity.

See R. Leuckart in Graefe and Saemisch's *Handbuch d. Ophthalmologie* (Leipzig, 1876, vol. i. chap. 7); H. Müller, *Gesammelte Schriften* (Otto Becker, Leipzig, 1872), and *Arch. f. Ophthalmol.* iii.; Ch. Rouget, "Recherches anatomiques et physiologiques sur les appareils érectiles," "Appareil de l'adaptation de l'œil" ... *Compt. Rend.* (Paris, xlii., 1856, pp. 937-941); M. Schultze, art. "Retina," in Stricker's *Handbuch der Gewebelehre*, 1871, vol. ii.; J.R. Slonaker, "Comp. Study of the Area of Acute Vision in Vertebrates," *Journ. Morph.*, 1897.

Ear.—The outer opening of the ear is, with rare exceptions, concealed by feathers, which are often rather stiff, or modified into bristles. There is no other protection, but slight, imperfectly movable folds of skin arise from the outer rim. The largest ear-opening is met with in the owls, with correspondingly larger folds of skin, the function of which is less that of protection than, probably, the catching of sound. In many owls the right and left ears are asymmetrical, and this asymmetry affects the whole of the temporal region, all the bones which surround the outer and middle ear, notably the squamosal and the quadrate, so that the skull becomes lopsided, one ear being turned obliquely down, the other upwards. (For, detail see Collett, *Christiania Vidensk. Forhandl.*, 1881, No. 3.)

The middle ear communicates with the mouth by the Eustachian tubes, which pass between the basisphenoid and basioccipital bones, and unite upon the ventral side of the sphenoid, a little behind its articulation with the pterygoids, where they open into the mouth cavity by a short membranous duct. The columellar apparatus, or auditory chain of ossicles (fig. 16), extending between the fenestra ovalis and the tympanic membrane or drum, consists of (1) the long and slender columella, a straight, ossified rod which fits with a disk into the fenestra ovalis; it is homologous with the stapes (*m.st.*), although not stirrup-shaped; (2) the extracolumellar mass. This is chiefly cartilaginous and sends out three processes: the dorsal (*s.st.*) is attached to the upper wall of the drum cavity; the outermost (*e.st.*) is fastened on to the middle of the drum membrane; the third, ventral or infracolumellar process (*i.st.*) is directed downwards and tapers out into a thin, partly cartilaginous, strand, which originally extended to the inner corner of the articular portion of the mandible, but on its long way comes to grief, being squeezed in between the pterygoid and quadrate. This long downward process being homologous with an almost exactly identical arrangement in the crocodile, and with the *processus folii* of the mammalian malleus, it follows that the whole extracolumellar mass, that between stapes and drum, is equivalent to incus and malleus of the mammalia. There is, in birds, no *annulus tympanicus*. Birds possess an ear-muscle which at least acts as a *tensor tympani*; it arises near the occipital condyle, passes through a hole into the tympanic cavity, and its tendon is, in various ways, attached to the inside of the membrane and the neighbouring extracolumellar processes.

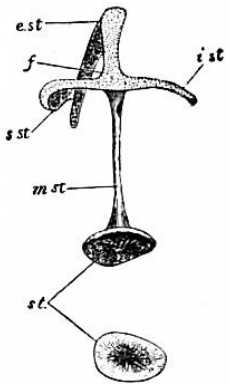


FIG. 16.—Auditory "chain" of Chicken. Lateral and basal views. (After W.K. Parker).

As regards the inner ear, the endolymphatic duct ends in a closed *saccus*, imbedded in the dura mater of the cranial cavity. The apex of the cochlea is turned towards, and almost reaches the anterior wall of the occipital condyle; at most it makes but half a twist or turn; it possesses both Reissner's membrane and the organ of Corti. Although the *scala tympani* is so rudimentary, not reaching a higher level than in most of the reptiles, and remaining far below the mammalia, birds do not only hear extremely well, but they distinguish between and "understand" pitch, notes and melodies.

See G. Breschet, *Recherches anatomiques et physiologiques sur l'organe de l'audition chez les oiseaux* (Paris, 1836), with Atlas; C. Hasse, various papers in *Zeitschr. f. wiss. Zool.* vol. xvii, and in *Anatomische Studien*, pts. ii. and iv. (Bresku, 1871); I. Ibsen, *Atlas anatomicus auris internae* (Copenhagen, 1846); G. Retzius, *Das Gehororgan der Wirbelthiere* (Stockholm, 1884), ii. pp. 139-198, pls. 15-20.

Nose.—The olfactory organ is poorly developed, and it is still a question whether birds possess much power of smell; many are certainly devoid of it. 968

The olfactory perceptive membrane is restricted to the posterior innermost region of the nasal chamber, where it covers a slight bulging-out prominence on the nasal wall. This so-called third, upper or posterior conch is not a true conch, nor is that of the vestibulum; only the middle one forms a scroll, and this corresponds to the only one of reptiles and the lower of the mammals. The nasal cavity communicates with the mouth by the choanae or posterior nares, situated between the palatine process of the maxillary, the palatine and the vomer. The outer nares or nostrils are most variable in size and shape. In the Steganopodes they tend to become much reduced, *e.g.* in cormorants (*Phalacrocoracidae*), and especially in *Sula*, where the nasal slits become completely closed up, and the greater portion of the nasal cavity is also abolished, being restricted to the olfactory region with its unusually wide choanae. The nasal septum is often more or less incomplete, producing *nares peniae*, *e.g.* in the Cathartae, in the Anseres, gulls, rails and various other aquatic birds. The secretions of the mucous membrane of the nasal cavity, and a pair of naso-lacrymal glands (not to be confounded with the Harderian and the lacrymal glands), moisten and clean the chamber. The glands are variable in size and position; when very large, *e.g.* in plovers, they extend upon the forehead, causing deep impressions on the bones of the skull. Jacobson's organ has been lost by the birds, apparently without a trace in the embryonic fowl, but T.J. Parker has described vestiges of the corresponding cartilages in the *Apteryx* (*Phil. Trans.*, 1890).

See C. Gegenbaur, "Über die Nasenmuscheln der Vögel," *Jena Zeitschr.* vii., 1873, pp. 1-21.

5. *Vascular System.*

The *heart* lies in the middle line of the body, its long axis being parallel with that of the trunk. The whole ventral surface of the pericardium is exposed when the sternum is removed. The right and left halves are completely divided by septa, no mixture of the venous and arterial blood being possible, an advance upon reptilian conditions, even the highest.

The atria are comparatively small, the walls being thin, especially those of the right, which possesses numerous muscular ridges projecting into the cavity presenting a honeycombed appearance. The interauricular septum is mostly entirely membranous; in the middle it is thinner, rather transparent, but there is no depression or *fossa ovalis*. The whole sinus venosus has become part of the right atrium. It receives the three great venous trunks of the body, namely the *vena cava superior dextra*, the *vena cava superior sinistra* more dorsally, and the *vena cava inferior* more to the right and below; the opening of the last is guarded by two prominent valves in place of the mammalian *valvula Eustachii*. The right ventricle occupies the ventral portion of the heart. The communication with the atrium is guarded by a *valvula cardiaca dextra*, which only in function represents the mammalian tricuspid; it consists of an oblique reduplication of the muscular fibres together with the endocardiac lining of the right ventricle, while the opposite wall is convex and forms neither a velum nor papillary muscles, nor *chordae tendineae*. The right anterior corner of the right ventricle passes into the short stem, guarded by three semi-lunar valves, which divides into the two pulmonary arteries. There are likewise two pulmonary veins, entering the left atrium by one orifice. Two or three membranous flaps, held by numerous *chordae tendineae*, form a true mitral valve, and allow the blood to pass through the left *ostium atrioventriculare*. The blood leaves the heart past three semi-lunar valves, by the *right* aorta, this being alone functional, a feature characteristic of, and peculiar to, birds. Remnants of the left aortic arch persist sometimes in the shape of a ligamentous strand. The aortic trunk is very short, sends off the coronary arteries and then the left *aorta brachiocephalica*, while the rest divides into the right brachiocephalic and the *aorta descendens*. Each brachiocephalic soon sends off its subclavian, while in the normal or more usual cases the rest proceeds as the carotid trunk, inclusive of the vertebral artery. But the carotids show several interesting modifications which have been examined chiefly by C.L. Nitzsch and by A.H. Garrod. (1) The right and left carotids converge towards the middle and extend up the neck, imbedded in a furrow along the ventral surface of the cervical vertebrae. This is the usual arrangement. (2) The two carotids are fused into one *carotis conjuncta*, imbedded in a special median osseous semicanal of the vertebrae; *e.g.* herons, flamingos, and some parrots. (3) There is one *carotis conjuncta*, but the basal portion of its original right component is obliterated, leaving a so-called *c. primaria sinistra*, an unfortunate name. Such *Aves laevocarotidinae* of Garrod are common, *e.g.* all the Passeriformes. (4) The reverse of the third modification, producing a *c. primaria dextra* in the bustard *Eupodotis*. In other likewise very rare cases a left, or a left and right, superficial carotids are developed and take the place of the then vanished deep or primary carotids.

Venous System.—The bird's liver receives nearly all the blood from the stomach, gut, pancreas and spleen, as well as from the left liver itself, into the right hepatic lobe, by a right and left portal vein. The *venae hepaticae magnae* join the *vena cava posterior* and thereby form with it the *vena cava inferior*. The left *hepatica magna* receives also the umbilical vein, which persists on the visceral surface of the abdominal wall, often anastomosing with the epigastric veins. A likewise unpaired vena *coccygeo-mesenterica* is usually present. There is no renal portal system, excepting unimportant vestiges of such a system in the head kidneys.

Lymphatic System.—The white blood-corpuscles are produced in the follicles at the base of the intestinal villi. The lymph vessels of the tail and hinder parts of the body enter the hypogastric veins; and at the point of junction, on either side, lies a small lymph heart, which often persists until maturity. The red blood-corpuscles are invariably oval disks, with a central nucleus which causes a slight swelling; hence they are oval and biconvex.

See A.H. Garrod, "On the Carotid Arteries of Birds," *Proc. Zool. Soc.*, 1873, pp. 457-472; E.A. Lauth, "Mémoire sur les vaisseaux lymphatiques des oiseaux," *Ann, Sci. nat.* (iii. 1824), p. 381; J.J. Mackay, "The Development of the Branchial Arterial Arches in Birds, with special reference to the Origin of the Subclavians and Carotids," *Phil. Trans.* 179 B (1888), pp. 111-141; L.A. Neugebauer, "Systema venosum avium," *Nov. Act. Leopold. Carol.* xxi., 1844, pp. 517-698, 15 pls.; R. Gasch, "Beiträge zur vergl. Anatomic des Herzens der Vögel und Reptilien," *Arch. f. Naturgesch.*, 1888.

6. *Respiratory System.*

The *lungs* are small and occupy only the dorsal portion of the thoracic cavity. There is only one right and one left lobe, each traversed through its whole length by a *mesobronchium*, whence arise about ten secondary bronchia; these send off radially arranged *parabronchia*, which end blindly near the surface. The walls of these tertiary tubes send out, in all directions, *canaliculi aeriferi* which, ending in slight swellings, recall the mammalian *aveoli*.

Highly specialized air-sacs are characteristic of all birds. They are very thin-walled membranes, very poor in blood-vessels, formed by the bulged-out pleural or peritoneal covering of the lungs, through the parabronchial tubes of which they are filled with air. Their function is not quite clear. The usual suggestion, that the warm air contained within them assists the bird in flight, balloon-like, is absurd. They assist in the extremely rapid and vigorous ventilation of the lungs, the latter being capable of but very limited expansion and contraction in birds. Exchange of gas through the walls of the air-sacs, almost devoid of blood-vessels, can at best be much restricted.

There are five pairs of larger sacs belonging to the pulmonary system:—(1) prebronchial or cervical, extending sometimes far up the neck, even into the cranial cavities; the throat-bags of the prairie fowls (*Cupidonia* and *Pedioecetes*) are a further development; (2) subbronchial or interclavicular; (3 and 4) anterior and posterior thoracic or intermediate; (5) abdominal sacs. Most of these extend through narrow apertures—*foramina pneumatica*—into the hollow bones, sometimes, *e.g.* in hornbills and screamers, into every part of the skeleton, or, in the shape of innumerable pneumatic cells, even beneath the skin. There is also a naso-pharyngeal or tympanic system of air-sacs, restricted to the head (cf. the *siphonium* described in connexion with the mandible), but filling also such curious organs as the frontal excrescence of *Chasmorhynchus*, the Brazilian bell-bird, the throat-bag of the adjutant stork, and the gular pouch of the bustard.

The *trachea* or windpipe is strengthened by numerous cartilaginous, often osseous, complete rings, but in the emeu several of these rings are incomplete in the medioventral line, and permit the inner lining of the trachea to bulge out into a large neck-pouch, which is used by both sexes as a resounding bag. In humming-birds and petrels the trachea is partly divided by a vertical, longitudinal, cartilaginous septum. In some of those birds which have a peculiarly harsh or trumpeting voice, the trachea is lengthened, forming loops which lie subcutaneously (capercally, curassow), or it enters and dilates the symphysis of the furcula (crested guineafowl); or, *e.g.* in the cranes and in the hooper swan, even the whole crest of the sternum becomes invaded by the much elongated, manifolded trachea.

The *syrinx* or lower larynx is the most interesting and absolutely avine modification, although absent as a voice-producing organ (probably due to retrogression) in most Ratitae, storks, turkey buzzards (*Cathartes*) and Steganopodes. The syrinx is a modification of the lower part of the trachea and of the adjoining bronchi. Essential are vibrating membranes between the cartilaginous framework, and next, special muscles for regulating the tension. The majority of birds possess a pair of internal tympaniform membranes forming the inner or median walls of the bronchi, which are there furnished with semi-rings only. External tympaniform membranes exist, with great variations, between the specialized one or two last tracheal and some of the first bronchial rings.

According to the position of the chief sound-producing membranes, three types of syrinx are distinguishable:—(1) Tracheo-bronchial, by far the commonest form, of which the two others are to a certain extent modifications. The essential feature is that the proximal end of the inner membranes is attached to the last pair of tracheal rings; outer tympaniform membranes exist generally between the 2nd, 3rd and 4th bronchial semi-rings. This type attains its highest development in the Oscines, but it occurs also in many other orders. (2) Syrinx *bronchialis*. The outer membranes are spread out between two or more successive bronchial semi-rings, a distance from the trachea which is, in typical cases, devoid of sounding membranes; some Cuculi, Caprimulgi, and some owls. (3) Syrinx *trachealis*. The lower portion of the trachea consists of thin membranes, about half a dozen of the rings being very thin or deficient. Inner and outer membranes may exist on the bronchi. The *Tracheophonae* among the Passeriformes, the possessors of this specialized although low type of syrinx, form a tolerably well-marked group, entirely neotropical. But indications of such a syrinx occur also in *Pittidae*, pigeons and gallinaceous birds (*Gallidae*), the last cases being clearly analogous.

Whilst the type of syrinx affords no help in classification, it is very different with its muscles. These—as indicated by their

supply from a branch of the hypoglossal nerve, which descends on either side of the trachea—are, so to speak, a detached, now mostly independent colony of glosso-pharyngeal muscles. Omitting the paired tracheo-clavicular muscles, we restrict ourselves to the syringeal proper, those which extend between tracheal and bronchial rings. Their numbers vary from one pair to seven, and they are inserted either upon the middle portion of the bronchial semi-rings (*Mesomyodi*), or upon the ends of these semi-rings where these pass into the inner tympaniform membrane (*Acromyodi*). The former is morphologically the more primitive condition, and is found in the overwhelming majority of birds, including many Passeriformes. The acromyodian type is restricted almost entirely to the Oscines. Further, according to these muscles being inserted only upon the dorsal, or only upon the ventral, or on both ends of the semi-rings, we distinguish between *an-*, *kat-* and *diacromyodi*. But the distinction between such *Acromyodi* and the *Mesomyodi* is not always safe. For instance, the *Tyranninae* are anacromyod, while the closely allied Pipras and Cotingas are katacromyod; both these modifications can be shown to have been derived but recently from the weak meso- and oligomyodian condition which prevails in the majority of the so-called *Oligomyodi*. On the other hand, the diacromyodian type can have been developed only from a strong muscular basis which could split into a dorsal and a ventral mass; moreover, no Passeres are known to be intermediate between those that are diacromyodian and those that are not.

Attempts to derive the anacromyodian and the katacromyodian from the diacromyodian condition are easy on paper, but quite hopeless when hampered by the knowledge of anatomical facts and how to use them. There remains but one logical way, namely, to distinguish as follows:—(1) *Passeres anisomyodi*, in which the syrinx muscles are unequally inserted, either on the middle or on one end of the semi-rings, either dorsal or ventral. This type comprises the Clamatores. (2) *Passeres diacromyodi*, in which some of the syrinx muscles are attached to the dorsal, and some to the ventral ends, those ends being, so to say, equally treated. This type comprises the Oscines. Both types represent rather two divergent lines than successive stages, although that of the Clamatores remains at a lower level, possessing at the utmost three pairs of muscles, whilst these range in the Oscines from rarely two or three to five or seven.

This way of using the characters of the syrinx for the classification of the Passeriformes seems simple, but it took a long time to accomplish. Joh. Müller introduced the terms *Polymyodi* and *Tracheaphones*, Huxley that of *Oligomyodi*; Müller himself had, moreover, pointed out the more important characters of the mode of insertion, but it was Garrod who invented the corresponding terms of *Acro-* and *Mesomyodi* (= *Tracheophones* + *Oligomyodi*). (For further historical detail, see Ornithology). After W.A. Forbes had investigated such important genera as *Philepitta* and *Xenicus*, P.L. Sclater, A. Newton and R.B. Sharpe divided the Passeres respectively into *Oscines, Oligomyodae, Tracheophonae* and *Pseudoscines* (=*Suboscines*); *Oligomyodae, Tracheophonae* and *Acromyodae; Oscines, Oligomyodae, Tracheophonae* and *Atrichiidae*. Ignoring the fact that some *Oligomyodae* are meso- and others acromyodian, they tried to combine two irreconcilable principles, namely, mere numbers against quality.

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7. *Digestive System*.

For a general account of the digestive organs, see Alimentary Canal. Here only a few peculiar features may be mentioned.

The young pigeons are fed by both parents with a peculiar stuff, the product of the strongly proliferating epithelial cells of the crop, which cells undergo a cheese-like fatty degeneration, and mixed with mucus, perhaps also with the proventricular juice, make up a milk-like fluid. Should the young die or be removed during this period, the parents are liable to die, suffering severely from the turgid congestion of the hypertrophied walls of the crop.

The male of the hornbills, *Bucerotinae*, feeds his mate, which is imprisoned, or walled-up in a hollow tree, during the whole time of incubation, by regorging his food. This bolus is surrounded, as by a bag, by the cast-up lining of the gizzard. Since this process is repeated for many days the habitual reaction of the stomach well-nigh exhausts the male. A graphic account of this is given in Livingstone's travels.

The hoactzin, *Opisthocomus*, feeds to a great extent upon the leaves of the aroid *Montrichardia* or *Caladium arborescens*. The crop is modified into a large and very rugose triturating apparatus, while the gizzard, thereby relieved of its function, is reduced to the utmost. The large and heavy crop has caused a unique modification of the sternal apparatus. The keel is pushed back to the distal third of the sternum, whilst the original anterior margin of the keel is correspondingly elongated, and the furcula fused with the rostral portion.

In the ostrich, *Struthio*, the craze of overloading the stomach with pebbles which, when triturated into sand, are not voided, has brought about a dislocation, so that the enormously widened and stretched space between proventriculus and gizzard forms a bag, directed downwards, whilst the gizzard itself with part of the duodenum is rotated round its axis to more than 100°. A similar rotation and dislocation occurs in various petrels, in correlation with the indigestible sepia-bills, &c., which these birds swallow in great quantities. In *Plotus*, the snakebird, the pyloric chamber of the stomach is beset with a mass of hair-like stiff filaments which permit nothing but fluid to pass into the duodenum. The gizzard of various birds which are addicted to eating hairy caterpillars, *e.g. Cuculus canorus* and trogons, is often lined with the broken-off hairs of these caterpillars, which, penetrating the cuticle, assume a regular spiral arrangement, due to the rotatory motion of the muscles of the gizzard.

8. *Cloaca and Genital Organs*.

The cloaca is divided by transverse circular folds, which project from its inner walls, into three successive chambers. The innermost, the coprodaeum, is an oval dilatation of the end of the rectum, and attains its greatest size in those birds whose faeces are very fluid; it serves entirely as the temporary receptacle of the faeces and the urine. The next chamber, the urodaeum, is small, and receives in its dorso-lateral wall the ureters and the genital ducts; above and below this chamber is closed by circular folds, the lower of which, towards the ventral side, passes into the coating of the copulatory organ when such is present. The urodaeum serves only as a passage, the urine being mixed with the faeces in the chamber above. The third or outermost chamber, the proctodaeum, is closed externally by the sphincter ani; the orifice is quite circular. It lodges the copulatory organ, and on its dorsal wall lies the *bursa Fabricii*, an organ peculiar to birds. It is most developed in the young of both sexes, is of unknown function, and becomes more or less obliterated in the adult. Only in the ostrich it remains throughout life, being specialized into a large receptacle for the urine, an absolutely unique arrangement. A true urinary bladder, *i.e.* a ventral dilatation of the urodaeum, is absent in all birds. It is significant that the whole type of their cloaca much resembles that of the Crocodilia and Chelonia, in opposition to that of the Lacertilia.

The penis, and its much reduced vestige of the female, is developed from the ventral wall of the proctodaeum. It occurs in two different forms. In the Ratitae, except *Rhea*, it consists mainly of a right and left united half (*corpora fibrosa*), with a deep longitudinal furrow on the dorsal side, and much resembles the same organ in crocodiles and tortoises. It is protruded and retracted by special muscles which are partly attached to the ventral, distal end of the ilium. Another type exists in *Rhea* and in the *Anseriformes*, greatly specialized by being spirally twisted and partly reversible like the finger of a glove. This is mainly due to the greater development of an unpaired, median portion, analogous to the mammalian *corpus spongiosum*, which is much less prominent in the Ratitae; the muscles of this type are derived solely from the anal sphincter. In other Carinatae, *e.g.* tinamous and storks, the penis is very much smaller and simpler, with every appearance of a degenerated organ. In the great majority of birds it has disappeared completely and the primitive way of everting the cloaca is resorted to.

Both right and left testes are functional. They become greatly enlarged in the breeding season; in the sparrow, for instance, from the size of a mustard seed to that of a small cherry. The vas deferens descends with many undulations down the lateral side of the ureter of the same side, and opens upon a small papilla into the urodaeum. Extraordinary increase in length during the breeding season causes the vasa deferentia in some of the African weaver-birds to protrude, or to bulge out the cloacal walls beyond the vent. The spermatozoa exhibit many differences in shape, size and proportions, in the various groups of birds. They have been studied minutely by E. Ballowitz.

Only the left ovary becomes functional, with rare individual exceptions. Both present the appearance of diminutive clusters of grapes, at the anterior end of the kidneys, close to the suprarenal bodies, separated from each other by the descending aorta and by the vena cava where this is formed by the right and left *vena iliaca communis*. During the breeding season many more eggs are developed than reach maturity, amounting in most birds to several dozens. Those germs which do not ripen during the season undergo a process of resorption, and in the winter the whole ovary dwindles to often a diminutive size. In young birds both oviducts are almost equal in size, but the right soon degenerates into an insignificant strand. During every laying season the left duct increases enormously by new formation of its component fibres. For instance, in the fowl its volume increases about fifty-fold, growing from some 6 in. in length and scarcely one line in width to more than 2 ft. in length and ½ in. in thickness. The upper, wide opening of the duct is attached by elastic, peritoneal lamellae to the hinder margin of the left lung; the middle portion of the duct is glandular and thick-walled, for the deposition of the albumen; it is connected by a short, constricted "isthmus" (where the shell-membrane is formed) with a dilated "uterus" in which the egg receives its calcareous shell and eventual pigmentation.

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B. Fossil Birds

Much had naturally been expected from the study of fossil birds, but, so far as the making of classifications is concerned, they have proved rather a source of perplexities. So long as the characters of new fossils are only of specific and generic value, it is mostly possible to assign the birds to their proper place, but when these characters indicate new families or orders, for instance Hesperornithes, Ichthyornithes, Palaelodi, their owners are put outside the more tersely constructed classifications applicable to modern birds. It is no exaggeration to say that the genus, often even the species, can be determined from almost any recent bone, but in the case of Miocene, and still more, of Eocene fossils, we have often to deal with strange families, which either represent an extinct side branch, or which connect several recent groups with each other. Our artificially-established classifications collapse whilst we gain further insight into the mutual affinities of the existing groups. Of course this must be so if evolution is true. But it also follows that, if every extinct and recent bird were known, neither species, nor genera, nor families, nor orders could be defined. We should be able to construct the pedigree of every group, in other words, the gigantic natural system, but there would be no classification. Much light has also been thrown by fossil birds upon the study of geographical distribution. The key to the distribution of recent groups lies in that of the extinct forms. Not only have many absolutely new families been discovered, but many kinds of modern birds are now known to have existed also in countries which they are now extinct. There were, for instance, trogons, secretary-birds, parrots, and other now Ethiopian forms in Miocene France. Ostriches, undistinguishable from *Struthio*, have been found in Samos and in the Sivalik Hills.

The proper study of fossil birds may be said to have begun with A. Milne-Edwards, whose magnificent *Oiseaux fossiles de la France* was published from 1867 to 1871. This work deals chiefly with mid-Tertiary forms. A new impetus was given by O.C. Marsh, who, after 1870, discovered a great number of bird remains in the Cretaceous strata of North America. The most important result is the proof that, until the end of the Cretaceous epoch, most, if not all, birds were still possessed of teeth (see Odontornithes).

The oldest known bird is the *Archaeopteryx* (*q.v.*), of the upper Oolite in Bavaria. The imprints in the enormously older new red sandstone or Lower Trias of Connecticut, and originally named *Ornithichnites*, belong to Dinosaurian Reptiles.

A wide gap separates *Archaeopteryx* from the next order of fossil birds of the Cretaceous epoch, and, since freshwater deposits of that age are rare, bird remains are uncommon. Many bones formerly referred to birds have since proved to belong to Pterodactyls, *e.g. Cimoliornis* from the English Chalk. But in 1858 were discerned in the Upper Greensand of Cambridgeshire remains which are now known as *Enaliornis*. W. Dames has described bones from the Chalk of southern Sweden under the name of *Scaniornis*, probably allied to *Palaelodus*. From the Cretaceous rocks of North America a large number of birds have been described by O.C. Marsh. Of these the most interesting are *Ichthyornis* (= *Graculavus*) and *Hesperornis*, from the Cretaceous shales of Kansas. They were placed by Marsh in a distinct subclass of birds, *Odontornithes* (*q.v.*). Probably all birds of Cretaceous age were still possessed of teeth. *Baptornis*, another of Marsh's genera, seems to be allied to *Enaliornis*, *Palaeotringa* and *Talmatornis*, were by him referred to Limicoline and Passerine birds. *Laornis* from the Cretaceous marls of New Jersey was as large as a swan.

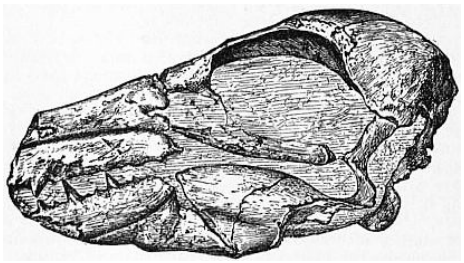


Fig. 17.—Remains of head of *Odontopteryx*, from the original in the British Museum; side view; natural size.

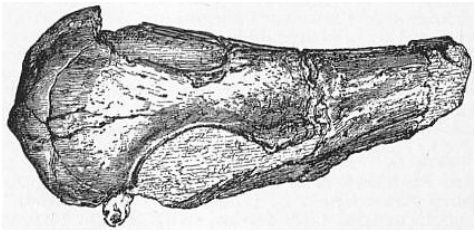


Fig. 18.—Remains of head of *Odontopteryx*, seen from above.

The lower Eocene has furnished a greater number of bird bones. Some of the largest are those of *Gastornis*, with three species from France, Belgium and England. Much difference of opinion obtains as to the affinities of these birds, which were far larger than an ostrich; they were undoubtedly incapable of flight and there are indications of teeth in the upper jaw. Provisionally this genus has been grouped with the Ratitae, which at any rate are a heterogenous assembly. Sir R. Owen's *Dasornis*, of the London Clay, known from an imperfect cranium, and E.D. Cope's *Diatryma* of New Mexico, based upon a gigantic metatarsus, may also belong there. The London Clay of South England has likewise supplied some long upper arm bones, *Argillornis*. The most remarkable specimen is a skull, *Odontopteryx toliapicus* (figs. 17, 18); the edges of the jaws were serrated like those of certain tortoises. The character of this skull and the compound rhamphotheca (known by the imprints left upon the jaws) indicate affinities with the Steganopodes. Remnants of a heron-like bird, *Proherodius*, of a gull-like creature, *Halcyornis*, a raptorial *Lithornis*; and a supposed Passerine from Glarus in Switzerland, called *Protornis = Osteornis*, complete the list.

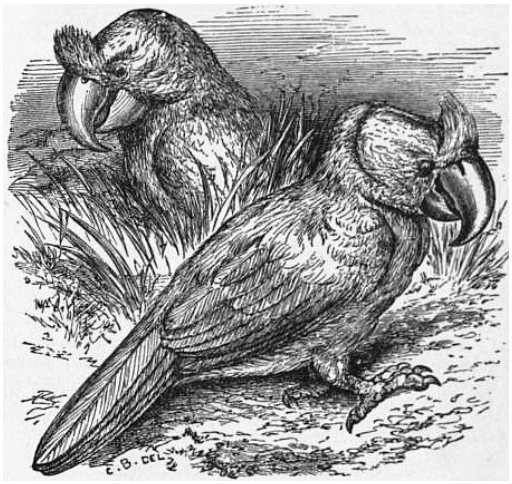
The upper Eocene has yielded many birds, most of which are at least close forerunners of recent genera, the differentiation into the leading orders and families being already well marked, *e.g.* Gallinaceous birds, stork- and crane-like waders, rails, birds of prey, cormorants, &c. Especially numerous bones have been found in the Paris basin, chiefly described by G. Cuvier, F.L.P. Gervais, E. Blanchard, and above all by A. Milne-Edwards, and in the equivalent beds of Hampshire. Others have been discovered in Wyoming; a giant penguin, *Palaecudyptes*, is known from New Zealand, and *Palaeospheniscus* from Patagonia. The Miocene has yielded by far the greatest number of bird-bones, including even eggs and imprints of feathers. For instance, from the lower Miocene beds of Allier and Puy-de-Dôme Milne-Edwards has described about 50 species. Of these *Palaelodus* was an ancestral flamingo, but with shorter legs; *Limnatornis* is referred to the hoopoes. The existing genera include *Anas, Aquila, Bubo, Columba, Cypselus, Lanius, Picus, Phalacrocorax, Sula, &c.* Very interesting is the fact that *Serpentarius, Psittacus* and *Trogon* are amongst this list of birds, which are now restricted to the tropics. A similarly mixed avifauna has been found in the mid-Miocene beds of various other parts of France, Germany and Italy. In Colorado and New Mexico Marsh has detected bones of *Meleagris, Puffinus, Sula* and *Uria*, all existing genera; but the first is especially suggestive, since it is one of the most characteristic forms of the New World.

Here may be interpolated a short account of the very peculiar avifauna found in the Tertiary strata of Santa Cruz in Patagonia. Instead of the age of lower Eocene, as had been stated originally, these beds are not older than mid-Miocene, and not a few of the bones are of a much younger, even latest Tertiary date. Discovered, and partly described, by F. Ameghino, the bones have been sumptuously monographed by F.P. Moreno and A. Mercerat, who proposed for them the name of *Stereornithes*, a new order of birds, mostly gigantic in size, and said to combine the characters of Anseres, Herodiones and Accipitres. But the whole mass of bones is in hopeless disorder, apparently without any record of association. At any rate, the "*Stereornithes*," accepted as such in Bronn's *Thierreich*, and in Newton's *Dictionary of Birds*, had to be dissolved as an unnatural, haphazard assembly. Many of these birds, to judge from the enormous size of their hind-limbs, were undoubtedly flightless, *e.g. Brontornis*, and remind us of the Eocene *Gastornis* of Europe. *Phororhacos*, the most extraordinary of all, belongs to the Gruiformes, perhaps also *Pelecyornis* and *Liornis*. On the other hand, the late Tertiary *Dryornis* is a member of the Cathartae or American vultures, and *Mesembriornis*, likewise of late Tertiary date, is a close forerunner of the recent genus *Rhea*.

Pliocene remains are less numerous than those of the Miocene. From Pikermi in Greece is known a *Gallus*, a *Phasianus* and a large *Grus*. From Samos a large stork, *Amphipelargus*, and a typical *Struthio*; from the Sivalik Hills on the southern flanks of the Himalayas also an ostrich, and another Ratite with three toes, *Hypselornis*, as well as *Leptoptilus, Pelecanus* and *Phalacrocorax*. The fossil egg of a struthious bird, *Struthiolithus*, has been found near Cherson, south Russia, and in north China. The Suffolk Crag has yielded the unmistakable bones of an albatross, *Diomedea*.

Most Pleistocene birds are generically, even specifically, identical with recent forms; some, however, have become extinct, or they have become exterminated by man. A great number of birds' bones have been found in caves, and among them some bearing marks of human workmanship. In France we have a large and extinct crane, *Grus primigenia*, but more interesting are the numerous relics of two species, the concomitants even now of the reindeer, which were abundant in that country at the period when this beast flourished there, and have followed it in its northward retreat. These are the snowy owl, *Nyctea scandiaca*, and the willow-grouse, *Lagopus albus*. A gigantic swan, *Cygnus falconeri*, is known from the Zebug cavern in Malta. From caves of Minas Geraes in Brazil, O. Winge has determined at least 126 species, of which nearly all still survive in the country. Kitchen-middens of England, Ireland and Denmark reveal the existence of the capercally, *Tetrao urogallus*, and of the great auk or gare-fowl, *Alca impennis*; both species long since vanished from those countries. In the fens of East Anglia have been found two humeri, one of them immature, of a true *Pelecanus*, a bird now no longer inhabiting middle Europe.

Until a very recent epoch there flourished in Madagascar huge birds referable to the Ratitae, *e.g. Aepyornis maximus*, which laid enormous eggs, and not unnaturally recalls the mythical "roc" that figures so largely in Arabian tales. New Zealand has also yielded many flightless birds, notably the numerous species and genera of *Dinornithidae*, some of which survived into the 19th century (see Moa); *Pseudapteryx* allied to the *Kiwi*; *Cnemiornis*, a big, flightless goose; *Aptornis* and *Notornis*, flightless rails; and *Harpagornis*, a truly gigantic bird of prey with tremendous wings and talons.



From a tracing by M.A. Milne-Edwards of the original drawing in a MS. Journal kept during Wolphart Harmanszoon's voyage to Mauritius (A.D. 1601-1602), *penes* H. Schlegel (*Proc. Zool. Soc.* 1875, p. 350). Reduced.

Fig. 19.—Extinct Crested Parrot of Mauritius (*Lophopsittacus mauritianus*).

It is, of course, quite impossible, in a survey of extinct birds, to divide them into those which are *bona fide* fossil, sub-fossil, recently extirpated and partially exterminated. Nor is it possible, except in a few cases, to decide whether they have come to an end through the agency of man or through so-called natural causes. Like other creatures birds have come, some to flourish and

stay, others to die out.

Fig. 20.—Mandible of *Aphanapteryx*, side view. (From the original in the Museum of Zoology of the University of Cambridge.)

Mauritius is famous for the dodo, killed off by man; there was also a curiously crested parrot, *Lophopsittacus* (fig. 19). In the Mare aux Songes have been found the bones of another parrot, of ducks, pigeons, rails, herons, geese and of a dwarf darter, *Plotus nanus*, all sub-fossil, now extinct. Very interesting is *Aphanapteryx* (fig. 20), a long-billed, flightless rail, practically the same as *Erythromachus* of Rodriguez and *Diaphorapteryx* of Chatham Island. Réunion possessed the peculiar starling, *Fregilupus*. Rodriguez was inhabited by *Pezophaps*, the solitaire, *Necropsittacus* and *Palaeornis exsul*, which is now probably extinct. The Antilles tell a similar tale. The great auk, once common on the British coasts, those of Denmark, the east coast of North America, then restricted to those of Newfoundland, Greenland and Iceland, has been killed by man, and the same fate has overtaken the Labrador duck, the Phillip Island parrot, *Nestor productus*, and the large cormorant of Bering Island, *Phalacrocorax perspicillatus*; and how long will the flightless cormorant, *Ph. harrisi* of the Galapagos, survive its quite recent discovery?

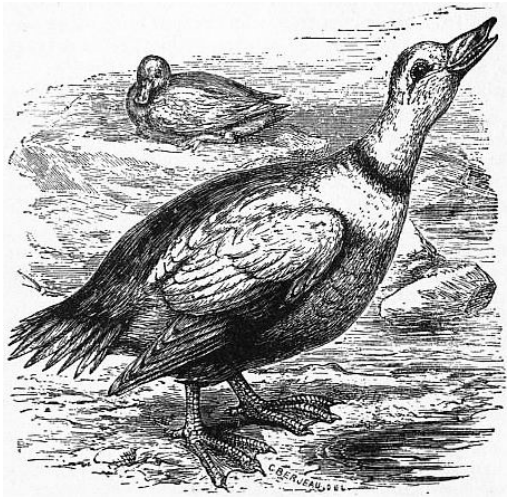


Fig. 2l.—Pied Duck (*Somateria labradora*), male and female. (From specimens in the British Museum. Reduced.)

Authorities.—A. Milne-Edwards, *Recherches anatomiques et paléontologiques pour servir à l'histoire des oiseaux fossiles de la France* (Paris, 1867-1868); F.P. Moreno and A. Mercerat, *Catalogo de los Pajaros fosiles de la Republica Argentina. Anales Mus. La Plata*, 1891, 21 pls.; O.C. Marsh, *Odontornithes: A monograph of the Extinct Toothed Birds of North America* (New Haven, Conn., 1880); R. Lydekker, article "Fossil Birds," in A. Newton's *Dictionary of Birds* (London, 1893); Cat. Foss. Birds, Brit. Museum, 1891; K. v. Zittel, *Handbuch der Palaontologie*, i. 3 (1887-1890); C.W. Andrews, "On the Extinct Birds of Patagonia," *Tr. Zool. Soc*. xv., 1899, pp. 55-86, pls. 14-17.

C. Geographical Distribution

The study of the extinct organisms of any country leads to a proper appreciation of its existing flora and fauna; while, on the other hand, a due consideration of the plants and animals which may predominate within its bounds cannot fail to throw more or less light on the changes it has in the course of ages undergone. That is to say, the distribution of forms in time is a subject so much connected with the distribution of forms in space, that the one can hardly be separated from the other. Granting this is a general truth, it must yet be acknowledged as a special fact, that in fossil birds we have as yet but scanty means of arriving at any precise results which will justify bold generalization in the matter of avine distribution. Remains of extinct birds are, compared with those of other classes of vertebrates, exceedingly scarce, and these have been found in very few, widely separated countries. The great problems involved in the study of geographical distribution must therefore be based mainly upon the other classes, both vertebrate and invertebrate, which, moreover, enjoy less great facilities of locomotion than the birds.

Yet it so happens that the great zoogeographical regions of the world, now more or less generally accepted, have been based upon the distribution of birds. The whole subject was properly introduced by Treviranus,[1] who in his large philosophical work devotes considerable space to the "geographical distribution of animals." Next we have to mention F. Tiedemann,[2] the Heidelberg anatomist, who has been generally ignored, although he surpassed many a recent zoogeographer by the wide view he took of the problem; in fact he was the first to connect distribution with environmental or bionomic factors; *e.g.* the remark on p. 481 of his work that "the countries of the East Indian flora have no kinds of birds in common with America which are vegetable feeders." L.K. Schmarda[3] divided the land into twenty-one realms, characterizing these mainly by their birds. P.L. Sclater[4] was the first to divide the world into a few great "regions," the Palaearctic, Ethiopian, Indian and Australian forming one group, the "Old World" (*Palaeogaea*); and the Nearctic and Neotropical forming a second, the New World (*Neogaea*). Birds being of all animals most particularly adapted for extended and rapid locomotion, it became necessary for him to eliminate from his consideration those groups, be they small or large, which are of more or less universal occurrence, and to ground his results on what was at that time commonly known as the order Insessores or Passeres, comprehending the orders now differentiated as Passeriformes, Coraciiformes and Cuculiformes, in other words the mass of arboreal birds. His six main divisions—practically adopted by A.R. Wallace[5] in his epoch-making work—are excellent, taken separately. They express the main complexes of land with their dependencies in well-chosen terms; for instance the "Neotropical region" stands short for South and Central America with the Antilles.

But these six divisions of Sclater and Wallace are not all equivalent, only some are of primary importance; they require co- and sub-ordination. This most important advance was made by T.H. Huxley.[6] Some of the "regions" have now to be called subregions, *e.g.* the Nearctic and the Palaearctic. The reduction of the Oriental to a subregion, with consequent "provincial" rank of its main subdivisions, will probably be objected to, but these are matters of taste and prejudice. Above all it should be borne in mind that nearly all the last subdivisions or provinces are of very little real value and most of them are inapplicable to other classes of animals.

Besides some occasional references in the text, only a few more of the general works dealing with the distribution of birds can here be mentioned. Especial attention has to be drawn to the article "Geographical Distribution," in Newton's *Dictionary of Birds*. See also A. Heilprin, *The Geographical and Zoological Distribution of Animals* (New York, 1887); W. Marshall and A.

Reichenow, two maps with much detail, although badly arranged, in Berghaus' *Physikalischer Atlas*, pt. vi. (*Atlas d. Thierverbreitung*), (Gotha, 1887); A. Reichenow, "Die Begrenzung zoogeographischer Regionen vom ornithologischen Standpunkte," *Zoolog. Jahrb.* iii., 1888, pp. 671-704, pl. xxvi.; E.L. Trouessart, *La Géographie zoologique*. (Paris, 1890).

The scheme adopted in the following account stands as follows:—

(A) Austrogaea or I. Australian Region		New Zealand	subregion.
		Australian	"
		Papuan	"
(B) Neogaea or II. Neotropical Region		Antillean	"
		Columbian	"
		Patagonian	"
(C) Arctogaea	III. Holarctic Region	Nearctic	"
		Palaearctic	"
	IV Palaeotropical Region	Ethiopian	"
		Oriental	"

In the following account the characterization of the various regions and subregions has to a very great extent been adopted from Newton's article in his *Dictionary of Birds*, and from the chapter on distribution in the article on "Birds" in the *Encyclopaedia Britannica*, 9th edition. This applies especially to those instances in which the members of families, genera and species are mentioned. The families are those which are enumerated in Garow's classification. The numbers of genera and species of birds are, of course, a matter of personal inclination. If we take a moderate computation the number of recent species may be taken at 10,000-11,000.[7] Dr R.B. Sharpe increases their number to about 15,000 in the *New Hand-List of Birds*, published by the British Museum. In the first two volumes fossil birds, occasionally based upon a fragmentary bone only, are also included.

(A) Austrogaea, the Australian region in the wider sense, with the Papuan, Australian and New Zealand subregions, including also Polynesia. We may here quote Newton (*Encyclopaedia Britannica*, 9th ed., "Birds," p. 738) on the remarkable differences between this region and the rest of the Old World:—"The prevalent zoological features of any Region are of two kinds—negative and positive. It is therefore just as much the business of the zoogeographer, who wishes to arrive at the truth, to ascertain what groups of animals are wanting in any particular locality (altogether independently of its extent) as to determine those which are forthcoming there. Of course, in the former case it would be absurd to regard as a physical feature of any great value the absence from a district of groups which do not occur except in its immediate neighbourhood; but when we find that certain groups, though abounding in some part of the vicinity, either suddenly cease from appearing or appear only in very reduced numbers, and occasionally in abnormal forms, the fact obviously has an important bearing. Now, mere geographical considerations, taken from the situation and configuration of the islands of the so-called Indian or Malay Archipelago, would indicate that they extended in an unbroken series from the shores of the Strait of Malacca to the southern coast of New Guinea, which confronts that of north Australia in Torres Strait, or even farther to the eastward. Indeed, the very name Australasia, often applied to this part of the world, would induce the belief that all the countless islands, be they large or small—and some of them are among the largest on the globe—were but a southern prolongation of the mainland of Asia. But so far from this being the case a very definite barrier is interposed. A strait, some 15 m. or so in width, and separating the two fertile but otherwise insignificant islands of Bali and Lombok, makes such a frontier as can hardly be shown to exist elsewhere. The former of these two islands belongs to the Indian Region, the latter to the Australian, and between them there is absolutely no true transition—that is, no species are common to both which cannot be easily accounted for by the various accidents and migrations that in the course of time must have tended to mingle the productions of islands so close to one another. The faunas of the two are as absolutely distinct as those of South America and Africa, and it is only because they are separated by a narrow strait instead of the broad Atlantic that they have become so slightly connected by the interchange of a few species and genera.

"Now, first, of the forms of birds which are prevalent throughout the Indian Region, but are entirely wanting in the Australian, we have at once the bulbuls (*Ixidae*), very characteristic of most parts of Africa and Asia, including the sub-group *Phyllornithinae*, which is peculiar to the Indian Region; the widely-spread families of barbets (*Megalaeminae*) and vultures (*Vulturidae*); and the pheasants (*Phasianidae*), which attain so great a development in various parts of the Asiatic continent and islands that there must their home be regarded as fixed. Some naturalists would add the finches (*Fringillidae*), rightly if we assume that the *Ploceidae* or weavers constitute a separate family. Then, of forms which are but weakly represented, we have the otherwise abundant thrushes (*Turdidae*), and, above all, the woodpeckers (*Picidae*), of which only very few species, out of 400, just cross the boundary and occur in Lombok, Celebes or the Moluccas, but are unknown elsewhere in the region."

But the Australian region is also remarkable for its ornithic singularity. All the existing Ratitae (with the exception of the ostriches of Africa and South America, belonging to the genera *Struthio* and *Rhea*, and comprising at most but five species) are found in Austrogaea and nowhere else. Of the Passeres the honey-suckers (*Meliphagidae*) are most characteristic, and, abounding in genera and species, extend to almost every part of the region, yet only one species of *Ptilotis* oversteps its limits, crossing the sea from Lombok to Bali. Other peculiar families are much more confined. But the positive characteristics of the region as a whole are not its peculiar forms alone; there are at least four families which, being feebly represented elsewhere, here attain the maximum of development. Such are the thick-headed shrikes (*Pachycephalidae*), the caterpillar-eaters (*Campephagidae*), the flower-peckers (*Dicaeidae*), and the swallow-flycatchers (*Artamidae*). Besides these, three or perhaps four groups, though widely distributed throughout the world, arrive in the Australian region at their culmination, presenting an abundance of most varied forms. These are the weaver-birds (*Ploceidae*), and the moreporks (*Podargidae*), but especially the kingfishers (*Alcedinidae*) and the pigeons (*Columbidae*), the species belonging to the two last obtaining in this region a degree of prominence and beauty which is elsewhere unequalled.

The boundaries of the subregions are not well defined.

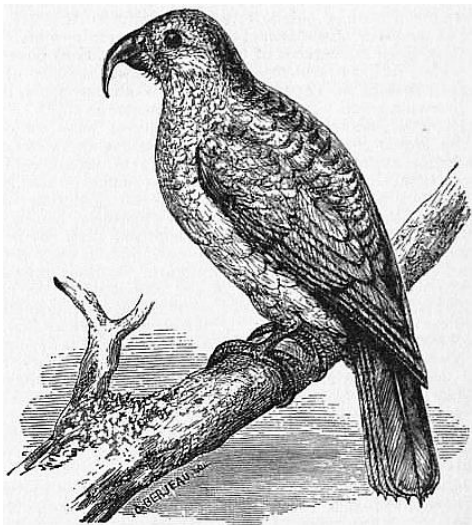


Fig. 22.—Extinct Phillip-Island Parrot (*Nestor productus*). (From specimen in the British Museum. Reduced.)

The *New Zealand Subregion*, considered by Professors Newton and Huxley and various other zoogeographers as deserving the rank of a region, is, and to all appearance has long been, more isolated than any other portion of the globe. Besides the three larger islands numerous satellites belong to the subregion, as Lord Howe, Norfolk and Kermadec islands, with the Chatham, Auckland and Macquarie groups. The main affinities of the avifauna are, of course, Australian. The most extraordinary feature is unquestionably the former existence of the gigantic Dinornithes or moas (*q.v.*) and, another family of Ratitae, the weird-looking kiwis or Apteryges, which are totally unlike any other existing birds. Of other peculiar genera it will suffice to mention only the more remarkable. *Rallidae* present the very noteworthy woodhens, *Ocydromus*, and the takahe, *Notornis*, which is almost extinct. The widely-spread plovers, *Charadriidae*, have two not less singular generic developments, *Thinornis*, and the extraordinary wrybill, *Anarhynchus*. There is an owl, type of the genus *Sceloglaux*. Of parrots, *Stringops*, the kakapo or owl-parrot, is certainly peculiar, while *Nestor* constitutes a peculiar subfamily of the brush-tongued parrots or *Trichoglossidae*. *Xenicus* and *Acanthositta* form a little family of truly mesomyodean Passeres Clamatores. Of the *Meliphagidae* the genera *Prosthemadera*, *Pogonornis* and *Anthornis* are peculiar. The starlings, *Sturnidae*, are represented by *Callaeas*, *Creadion* and the very abnormal *Heterolocha*. The gallinaceous birds are represented by a quail, *Coturnix novae zealandiae*, now exterminated. A large flightless goose, *Cnemiornis*, allied to the Australian *Cereopsis*, and the gigantic rapacious *Harpagornis*, have died out recently, with the moas. In all, there is a wonderful amount of specialization, though perhaps in a very straight line from generalized forms; but the affinity to Australian or Polynesian types is in many cases clearly traceable, and it cannot be supposed but that these last are of cognate origin with those of New Zealand. A very long period of isolation must have been required to produce the differences so manifestly to be observed, but a few forms seem at rare intervals to have immigrated, and this immigration would appear to be kept up to our own day, as shown by the instance of *Zosterops lateralis*, which is said to have lately made its first appearance, and to have established itself in the country, as well as by the fact of two cuckoos, the widely-ranging *Eudynamis taitensis* and *Chrysococcyx lucidus*, which are annual visitors.

Polynesia forms, of course, part of Austrogaea. Its extent is so vast that it necessarily contains some peculiar, outlying forms, so to say forgotten, which in their long-continued isolation have specialized themselves. For instance, the kagu (*Rhinochetus*) of New Caledonia, a queerly specialized form with Gruine affinities pointing only to South America. The toothbilled pigeon (*Didunculus*) is restricted to Samoa. Most interesting is the avifauna of the Sandwich islands; entirely devoid of Psittaci and of Coraciiformes, these islands show an extraordinary development of its peculiar family *Drepanidae*, which are probably of South or Central American descent. *Acrulocercus* is a Meliphagine, and a peculiar genus. There are a raven (*Corvus*), a coot (*Fulica*), the well-known Sandwich island goose (*Bernicla sandvicensis*), now very commonly domesticated in Europe; and some flycatchers and thrushlike birds.

The *Australian Subregion* comprises Australia and Tasmania. In the north it is influenced, of course, by its proximity to Papuasia, whence there is a considerable admixture of genera which do not proceed beyond the tropics, and of these *Casuarius* is a striking example. The Cape York peninsula practically belongs to Papuasia. As a whole, Australia is rich in parrots, of which it has several very peculiar forms, but Picarians in old-fashioned parlance, of all sorts—certain kingfishers excepted—are few in number, and the pigeons are also comparatively scarce, no doubt because of the many arboreal predaceous marsupials. The continent, however, possesses the two important genera of the *Pseudoscines*, namely the lyre-birds (*Menura*) and the scrub-birds (*Atrichia*). Among the more curious forms of other land-birds may be especially mentioned the *Megapodiidae*, *Lipoa* and *Talegallus*, the rail *Tribonyx* and *Pedionomus*, which represents the otherwise palaeotropical *Turnices* in Australia. The presence of bustards (*Eupodotis*) is a curious example of interrupted distribution, since none other of the *Otididae* are found nearer than India. The Ratitae are represented by two species of emeu (*Dromaeus*), besides the cassowary of Cape York peninsula, and the extinct *Dromornis* and *Genyornis* with its enormous skull.

The *Papuan Subregion*, chiefly New Guinea with its dependencies, the Timor group of islands, the Moluccas and Celebes. On the whole its avifauna presents some very remarkable features. Its most distinctive characteristic is the presence of the birds of paradise, which are almost peculiar to it; for, granting that the bower-birds, *Chlamydodera* and others, of Australia, belong to the same family, they are far less highly specialized than the beautiful and extraordinary forms which are found, within very restricted limits, in the various islands of the subregion. Another chief feature is the extraordinary development of the cassowaries, the richness and specialization of the kingfishers, parrots, pigeons, honey-suckers and some remarkable flycatchers. It has several marked deficiencies compared with Australia, among which are the babblers (*Timeliidae*), weaver birds (*Ploceidae*), the *Platycercinae* among parrots, diurnal birds of prey and the emeus. As a whole, the birds of Papua are remarkable for their brilliance of plumage, or their metallic colouring. The birds of paradise, the racquet-tailed kingfishers, *Tanysiptera*, the largest and smallest of parrots, *Calyptdrhynchiis* and *Nasiterna*, and the great crowned pigeons, *Goura*, are very characteristic; and so are the various Megapodes.

(B) Neogaea, or the *Neotropical region.*—Excepting towards the north, where, in Mexico, it meets, and inosculates with the Nearctic subregion, the boundaries of the Neotropical region are simple enough to trace, comprehending as it does the whole of South America and all Central America; besides including the Falkland islands to the south-east and the Galapagos under the equator to the west, as well as the Antilles or West India islands up to the Florida channel.

Owing to the comparatively scanty number of harmful mammalian types, the birds play a considerable part in this large region, and some authorities consider its avifauna the richest in the world. The entire number of species amounts to about 3600. Of these 2000, or a good deal more than half, belong to the order Passeriformes. But the characteristic nature of the avifauna is more clearly brought out when we learn that of the 2000 species just mentioned only about 1070 belong to the higher suborder of Oscines, that means to say, nearly one-half belong to the lower suborder Clamatores. This is a state of things which exists nowhere else; for except in Australia, where a few indigenous and peculiar low non-Oscines are found, and in the Nearctic country, whither one family of Clamatores, viz. the *Tyrannidae*, has evidently been led by the geographical continuity of its soil with that of the Neotropical region, such forms do not occur elsewhere. Accordingly their disproportionate prevalence in South America points unerringly to the lower rank of the avifauna of the region as a whole, and therefore to the propriety of putting it next in order to that of the Australian region, the general fauna of which is admittedly the lowest in the world. Huxley has urged with his wonted perspicuity the alliance of these two regions as *Notogaea*, basing his opinion, besides other weighty evidence,

in great measure on the evidence afforded by the two main sections of the Galli, viz. the *Peristeropodes* and the *Alectoropodes*, the former composed of the families *Megapodiidae*, almost wholly Australian, and the *Cracidae*, entirely Neotropical. (Cf. *P.Z.S.*, 1868. pp. 294-319.)

Leaving, however, this matter as in some degree hypothetical, we have as genera, families, or perhaps even larger groups, a great many very remarkable forms which are characteristic of, or peculiar to, the Neotropical region in part, if not as a whole. Of families we find twenty-three, or maybe more, absolutely restricted thereto, besides at least eight which, being peculiar to the New World, extend their range into the Nearctic region, but are there so feebly developed that their origin may be safely ascribed to the southern portion of America. First in point of importance comes the extraordinarily beautiful family of humming-birds (*Trochilidae*), with nearly 150 genera (of which only three occur in the Nearctic region) and more than 400 species. Then the tyrants (*Tyrannidae*), with more than seventy genera (ten of which range into the northern region), and over 300 species. To these follow the tanagers (*Tanagndae*), with upwards of forty genera (only one of which crosses the border), and about 300 species; the piculules (*Dendrocolaptidae*), with as many genera, and over 200 species; the ant-thrushes, (*Formicariidae*), with more than thirty genera, and nearly 200 species; together with other groups which, if not so large as those just named, are yet just as well defined, and possibly more significant, namely, the tapaculos (*Pteroptochidae*), the toucans (*Rhamphastidae*), the jacamars (*Galbulidae*), the motmots (*Monotidae*), the todies (*Todidae*), the trumpeters (*Psophiidae*), and the screamers (*Palamedeidae*); besides such isolated forms as the seriema (*Cariama*), and the sun-bittern (*Eurypyga*).

The nature of the South American avifauna will perhaps become still more evident if we arrange the characteristic members as follows:—

1. Birds which are restricted to, probably indigenous of the region: *Rhea*; *Palamedea* and *Chauna*, the screamers; *Tinami*; *Psophia, Dicholophus, Eurypyga, Heliornis* of the Gruiform assembly; *Thinocorys* and *Attagis; Cracidae; Opisthocomus*; of parrots *Ara* and *Conurus* with their allies; *Monotidae*, incl. *Todus; Steatornis; Galbulinae* and *Bucconinae; Rhamphastidae; Formicariidae, Pteroptochidae*, and of the *Tyrannidae* the *Cotinginae*.

2. Birds which are indigenous, but extend far into North America: *Cathartae, Trochilidae, Tyrannidae*.

3. Birds which are originally immigrants from North America: *Podicipedidae*, with the flightless *Centropelma* on Lake Titicaca; *Ceryle*, the only genus of kingfishers in the New World; all the *Oscines*.

More or less cosmopolitan groups like herons, *Falconidae, Anseres, Columbae, &c.*, and circumtropical families like *Parridae, Trogonidae, Capitonidae*, are to be excluded from these lists as indifferent. The differences between the Neotropical avifauna and that of North America are fundamental and prove the independence or superior value of the Neotropical region as one of the principal realms.

It is difficult to subdivide the Neotropical region into subregions; the best suggestion is that of Newton: *Antillean*, with the exception of the islands of Trinidad and Tobago, as well as those which lie on the northern coast of South America; *Patagonian*, including Chile and part of Peru; *Columbian*, comprising the rest of the continent and also Central America.

The *Antillean Subregion* is in many respects one of the most suggestive and interesting, comparatively small though it be. For narrow as are the channels between Cuba and the opposite coast of Central America, between the Bahamas and Florida, and between Grenada and Tobago, the fauna of the Antillean chain, instead of being a mixture of that of the almost contiguous countries, differs much from all, and exhibits in some groups a degree of speciality which may be not unfitly compared with that of oceanic islands. Except such as are of coral formation, the Antilles are hilly, not to say mountainous, their summits rising in places to an elevation of 8000 ft., and nearly all, prior to their occupation by Europeans, were covered with luxuriant forest, which, assisting in the collection and condensation of the clouds brought by the trade winds, ensured its own vitality by precipitating frequent and long-continued rains upon the fertile soil. Under such conditions we might expect to find an extremely plentiful animal population, one as rich as that which inhabits the same latitudes in Central America, not many degrees farther to the west; but no instance perhaps can be cited which shows more strikingly the difference between a continental and an insular fauna, since, making every allowance for the ravages of cultivation by civilized man, the contrary is the case, and possibly no area of land so highly favoured by nature is so poorly furnished with the higher forms of animal life. Here, as over so large a portion of the Australian region, we find birds constituting the supreme class—the scarcity of mammals being accounted for in some measure as a normal effect of insularity.

There is one peculiar subfamily, *Todinae*, represented by only four species of *Todus*. We note the absence of *Ratitae, Tinami, Cracidae, Rhamphastidae*, and any of those gruiform genera which are so characteristic of the continent. There is no family of birds common to the Nearctic area and the Antillean subregion without occurring also in other parts of the Neotropical region, a fact which proves its affinity to the latter.

The *Patagonian Subregion*, most extratropical, is naturally devoid of a good many typically tropical birds, or these are but poorly represented, for instance *Caerebidae, Mniotiltidae, Tanagridae, Vireonidae*. On the other hand some of the most characteristic features of the whole region are here well represented, *e.g. Rhea, Tinami, Chauna, Dicholophus, Attagis, Pteroptochidae*, and indeed therein we find some of the best evidence of the antiquity of its population, both recent and extinct (cf. the numerous fossils of the Santa Cruz formation), and also the nearest resemblance to the fauna of Austrogaea.

(C) Arctogaea is Huxley's well-chosen term for all the rest of the world (including the Nearctic, Palaearctic, Indian and Ethiopian regions of P.L. Sclater) in opposition to Notogaea. Faunistically, although not geographically, the Nearctic and Palaearctic areas must form the two subdivisions of one great unit, for which the "Holarctic region" is now the generally accepted term.

The Holarctic Region, comprising North America and the extratropical mass of land of the Old World, may from an ornithological point of view be characterized by the Colymbi, *Alcidae, Gallidae* or Alectoropodous Galli, and the Oscines, which have here reached their highest development; while Ratitae, Tinami, Psittaci, and non-Oscine Passeres (with the exception of *Tyrannidae* extending into North America and *Conurus carolinensis*) are absent.

Nearctic Subregion.—The close affinity of North America with the Palaearctic avifauna becomes at once apparent if we exclude those groups of birds which we have good reason to believe have their original home in the Neotropical region, notably numerous *Tyrannidae*, humming-birds and the turkey-buzzards.

The following groups may be mentioned as characteristic and typically American, and, since we consider them as comparatively recent immigrants into the Neotropical region, as originally peculiar to the Nearctic area: *Mniotiltidae, Vireonidae, Icteridae, Meleagris* and various *Tetraoninae*. Restricted to and peculiar to the sub-region is only the little Oscine family of *Chamaeidae*, restricted to the coast district of California. "More than one-third of the genera of Nearctic birds are common also to the Palaearctic subregion. If we take the number of Nearctic species at 700, which is perhaps an exaggeration, and that of the Palaearctic at 850, we find that, exclusive stragglers, there are about 120 common to the two areas. Nearly 20 more are properly Palaearctic, but occasionally occur in America, and about 50 are Nearctic, which from time to time stray to Europe or Asia. This, however, is by no means the only point of resemblance. Of many genera, the so-called species found in the New World are represented in the Old by forms so like them that often none but an expert can distinguish them, and of such representative 'species' about 80 might be enumerated" (Newton, *Dict. Birds*, p. 335).

Of the many attempts to subdivide the Nearctic subregion, the same authority favours that of Dr S.F. Baird, who distinguishes between *Canadian, Alleghanian, Middle* or Missourian, *Californian* and *Alaskan* provinces. Dr Hart Merriam takes the broad point of view "that the whole of extratropical North America consists of but two primary life regions, a *Boreal* region, which is circumpolar, and a *Sonoran* or Mexican tableland region which is unique." The first of these supports Newton's contention of the essential unity of the Nearctic and Palaearctic areas. In any case the various Nearctic subdivisions completely merge into each other, just as is to be expected from the physical configuration and other bionomic conditions of the Nort American continent.

The *Palaearctic Subregion* is, broadly speaking, Europe and Asia, with the exception of India and China. The propriety of comprehending this enormous tract in one zoological "region" was first shown by Dr P.L. Sclater, and as regards the

distribution of most classes of animals there have been few to doubt that it is an extremely natural one. Not indeed altogether so homogeneous as the Nearctic area, it presents, however, even at its extreme points, no very striking difference between the bulk of its birds. Though Japan is far removed from western Europe, and though a few generic forms and still fewer families inhabit the one without also frequenting the other, yet there is a most astonishing similarity in a large portion of their respective birds. In some cases the closest examination has failed to detect any distinction that may be called specific between the members of their avifauna; but in most it is possible to discover just sufficient difference to warrant a separation of the subjects. Nevertheless, it is clear that in Japan we have, as it were, a repetition of some of our most familiar species—the redbreast and the hedge-sparrow, for example—slightly modified in plumage or otherwise, so as to furnish instances of the most accurate representation, *e.g. Cyanopica cooki* of Portugal and Spain, and *C. cyana* of Amoorland and Japan.

Like the Nearctic the Palaearctic subregion seems to possess but one single peculiar family of land birds, the *Panuridae*, represented by the beautiful species known to Englishmen as the bearded tit-mouse, *Panurus biarmicus*. The entire number of Palaearctic families are, according to Newton, 67, and of the genera 323. Of these 128 are common to the Nearctic subregion. Species of 51 more seem to occur as true natives within the Ethiopian and Indian regions, and besides these 18 appear to be common to the Ethiopian without being found in the Indian, and no fewer than 71 to the Indian without occurring in the Ethiopian. To compare the Palaearctic genera with those of the Australian and Neotropical regions would be simply a waste of time, for the points of resemblance are extremely few, and such as they are they lead to nothing. It will therefore be seen from the above that next to the Nearctic are the Palaearctic has a much greater affinity to any other, a fact which might be expected from geographical considerations.

Having shown this much we have next to deal with the peculiarities of the vast Palaearctic subregion. At the lowest computation 37 genera seem to be peculiar to it, though it is certain that species of several are regularly wont to wander beyond its limits in winter seeking a southern climate. Of the peculiar genera only a few examples may be mentioned: *Eurynorhynchus*, the spoon-billed sandpiper of Siberia; *Syrrhaptes*, the sandgrouse of central Asia; *Musicicapa* of Europe.

We distinguish between a *Siberian, Mongolian, Mediterranean* and *European province*, none of which can be well defined. The islands of the Canaries, Madeira and the Azores belong to the Mediterranean province, and offer some peculiarities of great interest. The Azores have been monographed by F.D. Godman (*Nat. Hist. of the Azores or Western Islands*, London, 1870). There is a general tendency among these insular birds to vary more or less from their continental representatives, and this is especially shown by the former having always darker plumage and stronger bills and legs. In one instance the variation is so excessive that it fully justifies the establishment of a specific distinction. This is the case of the bullfinch of the more western of these islands (*Pyrrhula murina*), the male of which, instead of the ruddy breast of its well-known congener (*P. vulgaris*), has that part of a sober mouse-colour. A similar sombre hue distinguishes the peculiar chaffinch of the Canary Islands (*Fringilla teydea*), but to these islands as well as the Azores and Madeiras there belongs in common another chaffinch (*F. tintillon*) which, though very nearly allied to that of Mauritania (*F. spodogenia*) is perfectly recognizable, and not found elsewhere. Madeira has also its peculiar golden-crested wren (*Regulus maderensis*), and its peculiar pigeon (*Columba trocaz*), while two allied forms of the latter (*C. laurivora* and *C. bollii*) are found only in the Canaries. Further on this subject we must not go; we can only state that Godman has shown good reason for declaring that the avifauna of all these islands is the effect of colonization extending over a long period of years, and going on now.

Palaeotropical Region.—Much can be said in favour of combining the mostly tropical portion of the great mass of land of the Old World (excluding, of course, Austrogaea or the Australian region) into one region, for which Oscar Drude's well-chosen term "palaeotropical" has been adopted (cf. Bronn's *Thierreich, System Part.* p. 296, 1893). This region naturally comprises the African and Indian areas, conformably to be called subregions.

Both subregions possess, besides others, the following characteristic birds: Ratitae, viz. *Struthio* in Africa and Arabia, fossil also in the Sivalik Hills, and *Aepyornithidae* in Madagascar; *Pittidae, Bucerotinae* and *Upupinae*, of which *Upupa* itself in India, Madagascar and Africa; *Coraciidae; Pycnonotidae* or bulbuls; *Trogonidae*, of which the Asiatic genera are the less specialized in opposition to the Neotropical forms; *Vulturidae; Leptoptilus, Anastomus* and *Ciconia* among the storks; *Pteroclidae; Treroninae* among pigeons. Of other families which, however, extend their range more or less far into the Australian realm, may be mentioned *Otididae*, the bustards; *Meropidae* or bee-eaters; *Muscicapidae* or flycatchers; *Sturnidae* or starlings.

The *Ethiopian Subregion* comprises the whole of Africa and Madagascar, except the Barbary States, but including Arabia; in the north-east the subregion melts into the Palaearctic between its limits still farther to the eastwards, through Beluchistan and even beyond the Indus.

So large a portion of the Ethiopian subregion lies between the tropics that no surprise need be expressed at the richness of its fauna relatively to that of the last two subregions we have considered. Between fifty and sixty so-called families of land birds alone are found within its limits, and of them at least nine are peculiar; the typical genera of which are *Buphaga, Euryceros, Philepitta, Musophaga, Irrisor, Leptosoma, Colius, Serpentarius, Struthio, Aepyornis*. It is singular that only the first three of them belong to the order *Passeriformes*, a proportion which is not maintained in any other tropical region. The number of peculiar genera, besides those just mentioned, is too great for them to be named here; some of the most remarkable on the continent are: *Balaeniceps*, the whale-headed heron; *Balaearica*, the crowned crane; *Podica*, finfoot; *Numida* and allied genera of guinea fowls.

The natural division of the subregion is that into an African and a Madagascar province. Subdivision of the continental portion is beset with great difficulties, and none of the numerous attempts have proved long-lived. The forest-clad basin of the Congo, with the coastal districts of the bay of Guinea, seem to form one domain in opposition to the rest.

The Malagasy province comprises, besides Madagascar, the Mascarene, Comoro and Seyehelle islands. It may be safely deemed the most peculiar area of the earth's surface, while from the richness and multifariousness of its animal, and especially of its ornithic population, New Zealand cannot be compared with it. In A. Grandidier's magnificent *Histoire physique, naturelle et politique de Madagascar*, vol. xii. (Paris, 1875-1884), are enumerated 238 species as belonging to the island, of which 129 are peculiar to it, and among those are no fewer than 35 peculiar genera. *Euryceros* of the Oscines, and *Philepitta* of the Clamatores, are remarkable enough to form the types of Passeriform families, and *Mesites* half-way between Galli and Gruiformes is of prime importance. The Passerine *Falculia*, with its recently extinguished allies *Fregilupus* and *Necropsar* of the Mascarenes; the Coraciine *Brachypteracias*, *Atelornis* and *Geobiastes*, are very abundant, while *Heliodilus* is an owl belonging to that subfamily which is otherwise represented only by the widely-spread barn owl, *Strix flammea*. Lastly must be noted the extinct tall Ratite species of *Aepyornis* with its several fancy genera. But, as Newton charmingly puts it (*Dict Birds*, p. 353), the avifauna of Madagascar is not entirely composed of such singularities as these. We have homely genera, even among the true *Passeres*, occurring there—such as *Alauda, Acrocephalus, Motacilla* and *Pratincola*, while the *Cisticola madagascariensis* is only distinguishable from the well-known fan-tailed warbler, *C. schoenicola* of Europe, Africa and India by its rather darker coloration. But there are also species, though not Passerine, which are absolutely identical with those of Britain, the barn owl, common quail, pigmy rail, and little grebe or dabchick, all of them common and apparently resident in the island. Mauritius had the dodo (*q.v.*), *Lophopsittacus* and *Aphanapteryx*. Rodriguez had the solitaire, *Necropsittacus* and *Necropsar*. Bourbon or Réunion had *Fregilupus*.

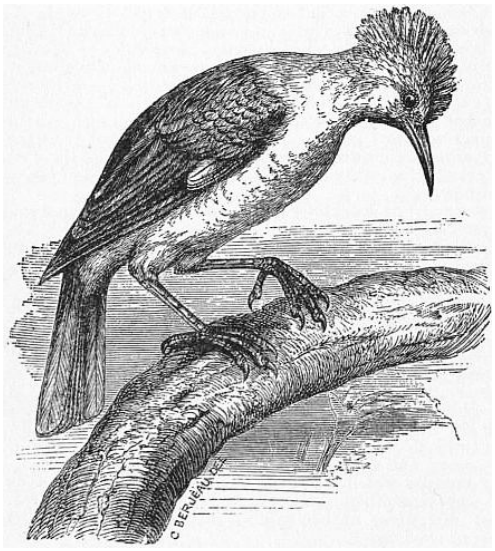


Fig. 23.—Extinct Starling of Reunion (*Fregilupus varius*), adapted from figures by Daubenton, Levaillant and others. Reduced.

Some of the Malagasy avifauna is certainly ancient, aboriginal, and even points to India; other forms indicate clearly their African origin; while, lastly, such strikingly characteristic Indo-African birds as hornbills are unaccountably absent.

The *Oriental Subregion* comprises all the countries and numerous islands between the Palaearctic and Australian areas; it possesses upwards of seventy families, of which, however, only one is peculiar, but this family, the *Eurylaemidae* or broadbills, is of great importance since it represents all the *Subclamatores*. Of the many characteristic birds may be mentioned *Pycnonotidae* or bulbuls, of which the *Phyllornithinae* are peculiar, *Campephagidae* or cuckoo shrikes, *Dicruridae* or drongos, *Nectariniidae* or sunbirds; pheasants, together with *Pavo* and *Gallus*. Some of the similarities to the Ethiopian and the great differences from the Australian avifauna have already been pointed out. Naturally no line whatever can be drawn between the Oriental and the Palaearctic subregions, and many otherwise essentially Indo-Malayan families extend far into the Australian realm, far across Wallace's line, whilst the reverse takes place to a much more moderate extent. Certainly the Oriental area, in spite of its considerable size, cannot possibly claim the standing of a primary region. It is a continuation of the great Arctogaea into the tropics.

Following H.J. Elwes we subdivide the whole subregion into a Himalo-Chinese, Indian and Malayan province. These divisions had the approval of W.T. Blanford, who proposed the terms Cis- and Trans-gangetic for the two first. The Himalo-Chinese or Trans-gangetic province shows the characteristics of its avifauna also far away to the eastward in Formosa, Hainan and Cochin China, and again in a lesser degree to the southward in the mountains of Malacca and Sumatra. Indo-China is especially rich in *Eurylaemidae*, China proper and the Himalayas in pheasants.

The Indian or Cisgangetic province is the least rich of the three so far as peculiar genera are concerned.

The Malayan province comprising the Malay islands, besides the Malay peninsula, and the very remarkable Philippines, possess an extraordinary number of peculiar and interesting genera.

The influence of the Australian realm is indicated by a Megapode in Celebes, another in Borneo and Labuan, and a third in the Nicobar islands (which, however, like the Andamans, belong to the Indian province), but there are no cockatoos, these keeping strictly to the other side of Wallace's line, whence we started on this survey of the world's avifauna.

D. Classification of Birds

Fürbringer's great work, published in the year 1888 by the *Natura Artis Magistra* Society of Amsterdam, enabled Gadow not only to continue for the next five years the same lines of morphological research, but also further to investigate those questions which were still left in abeyance or seemed to require renewed study. The resulting "classification is based on the examination, mostly autoptic, of a far greater number of characters than any that had preceded it; moreover, they were chosen in a different way, discernment being exercised in sifting and weighing them, so as to determine, so far as possible, the relative value of each, according as that value may vary in different groups, and not to produce a mere mechanical 'key' after the fashion become of late years so common" (Newton's *Dictionary of Birds*, Introduction, p. 103). It is not the quantity but the quality of the anatomical and bionomic characters which determines their taxonomic value, and a few fundamental characters are better indications of the affinities of given groups of birds than a great number of agreements if these can be shown to be cases of isomorphism or heterophyletic, convergent analogy. Nature possesses three great educational or developmental schools—terrestrial, aquatic and aerial life. Each of these affords animal, vegetable or mixed diet. Animal diet implies the greatest variety with regard to locality and the modes of procuring the food. Each of these schools impresses its pupils, in the case of the birds, with its own stamp, but there are many combinations, since in the course of phyletic development many a group of birds has exchanged one school for another. Originally terrestrial groups have taken to an entirely aquatic life, and *vice versâ*; others, originally endowed with the power of flight, have become, or are transforming themselves into, absolutely cursorial forms; some members of one group live entirely on seeds, while others have become fierce fishers, and so forth. Only by the most careful inquiry into their history can their relationship or pedigree be unravelled. A statement may now be given of Gadow's classification of birds, in which the extinct forms have been intercalated so far as possible. The few characters assigned to the various groups are sufficiently diagnostic when taken together, although they are not always those upon which the classification has been established:—

Class AVES

I. Sub-class **Archaeornithes.**—The three fingers and their metacarpals remain separate, each with a claw. Well-developed remiges. Both jaws with alveolar teeth. Amphicoelous. Caudal vertebrae more than thirteen, without a pygostyle, but with about twelve pairs of rectrices. *Archaeopteryx, A. lithographica, s. macroura*, two specimens from the upper Oolite of Solenhofen, Bavaria.

II. Sub-class **Neornithes.**—Metacarpals fused. Second finger the longest. Not more than thirteen caudal vertebrae.

I. Division Ratitae.—Terrestrial, flightless. Without sternal keel. Quadrate bone with single proximal knob. Without pygostyle. Coracoid and scapula fused. Compound rhamphotheca. Adult without apteria. With copulatory organ. A collective polyphyletic or heterogeneous group, originally cosmopolitan; with certainty existing since the Miocene.

1. Order **Struthiones.**—With pubic symphysis. Two toes only, third and fourth. *Struthio*, ostrich, Pliocene of Samos and of north-west India, now Africa and Arabia.

2. Order **Rheae.**—With long ischiadic symphysis. Three toes. *Mesembriornis*, Miocene or Pliocene of Argentina. Rhea, South

America.

3. Order **Casuarii.**—Three toes. Aftershaft as long as the other half. *Casuarius* and *Dromaeus*, Australian. *Hypselornis*, Pliocene of Sivalik Hills.

4. Order **Apteryges.**—Four toes. Bill long and slender. *Apteryx*, New Zealand.

5. Order **Dinornithes.**—Three or four toes. Bill short. Anterior limbs extremely reduced. *Dinornis*, numerous species, recently extinct, New Zealand.

6. Order **Aepyornithes.**—*Aepyornis*, recently extinct, Madagascar.

To the Ratitae belong possibly also the imperfectly known *Diatryma*, Eocene of New Mexico, *Gastornis* and *Dasornis*, Eocene of Europe, *Genyornis*, Pleistocene of Australia.

II. Division Odontolcae.—Marine, flightless, without sternal keel. Upper and lower jaws with teeth in furrows. Cretaceous epoch. *Enaliornis*, England, vertebrae chiefly biconcave; *Hesperornis*, North America, vertebrae heterocoelous.

III. Division Carinatae.—With keeled sternum.

1. Order **Ichthyornithes.**—Power of flight well developed. Vertebrae still amphicoelous. With small pygostyle. Incisura ischiadica. With alveolar teeth. Cretaceous of Kansas. *Ichthyornis, Apatornis*.

2. Order **Colymbiformes.**—Plantigrade, nidifugous, aquatic. All toes webbed, fourth largest, hallux short; metatarsus laterally compressed; tibia with high, pyramidal crest. Bill straight, pointed, with simple sheath.

   Sub-order 1. Colymbi, Divers. Front toes completely webbed. Holarctic. *Colymbus*.

   Sub-order 2. Podicipedes, Grebes. Toes lobated. Cosmopolitan.

3. Order **Sphenisciformes.**—Nidicolous, marine. Flightless, wings transformed into rowing paddles. Sphenisci, penguins. Antarctic and southern temperate coasts. Since the Eocene.

4. Order **Procellariiformes.**—Well flying, pelagic, nidicolous. Hallux absent or vestigial. Rhamphotheca compound. Cosmopolitan. Tubinares, petrels and albatrosses.

5. Order **Ciconiiformes.**—Swimmers or waders. Desmognathous, without basipterygoid processes; with one pair of sterno-tracheal muscles.

   Sub-order 1. Steganopodes.—Well flying, aquatic, nidicolous; with all the four toes webbed together. Rhamphotheca compound; cosmopolitan. *Phaëthon*, tropic-bird; *Sula*, gannet; *Phalacrocorax*, cormorant and *Plotus*, snake-bird; *Fregata*, frigate-bird; Pelecanus. Here also *Pelagornis*, Miocene of France; *Argillornis* and probably *Odontopteryx* from the London Clay.

   Sub-order 2. Ardeae.—Piscivorous, nidicolous, waders; with complicated hypotarsus and with long cervical apteria. *Ardeidae*, cosmopolitan; including *Cancroma*, Neotropical, *Balaeniceps, Scopidae*, Ethiopian. *Proherodius*, Eocene of England.

   Sub-order 3. Ciconiae.—Zoophagous, nidicolous, waders; with simple hypotarsus and without cervical apteria. Cosmopolitan. *Ciconiidae*, storks. *Ibidae*, ibises and spoonbills. *Propelargus*, Oligocene.

   Sub-order 4. Phoenicopteri.—Flamingos. Nidifugous, waders; with simple hypotarsus and without cervical apteria. Front toes completely webbed; hallux very short or absent; feed chiefly on small aquatic invertebrates. *Phoenicopterus*, cosmopolitan. Oligocene *Elornis* and, allied, *Palaelodus*.

6. Order **Anseriformes.**—Desmognathous, nidifugous; with two pairs of sterno-tracheal muscles, with complete basipterygoid processes and with a penis.

   Sub-order 1. Palamedeae.—Screamers. Ribs without uncinate processes. Hypotarsus simple. Neotropical. *Chauna, Palamedea*.

   Sub-order 2. Anseres.—Family *Anatidae*. Hypotarsus complex. *Anser, Anas, Cygnus*, since Miocene. *Cnemiornis*, Pleistocene, New Zealand, flightless.

7. Order **Falconiformes.**—Birds of prey. Carnivorous, desmognathous, nidicolous, without functional caeca. Terrestrial, aerial.

   Sub-order 1. Cathartae.—American vultures. With nares perviae. *Cathartes*, turkey buzzards, *Sarcorhamphus gryphus*, condor *Gypagus papa*, king vulture.

   Sub-order 2. Accipitres.—With nares imperviae. *Serpentariidae*, secretary-bird, Ethiopian; Miocene, France. *Vulturidae*, Old World vultures, excluding Australia. *Falconidae*, cosmopolitan, since the Eocene. *Harpagornis*, Pleistocene, New Zealand; *Lithornis*, Eocene, England. *Pandionidae*, ospreys or fish hawks, cosmopolitan.

8. Order **Tinamiformes.**—Nidifugous, with incisura ischiadica, without pygostyle. Herbivorous, terrestrial, neotropical. *Crypturi*, tinamous.

9. Order **Galliformes.**—Schizognathous, herbivorous, terrestrial. With ten functional remiges. With strong spinae sterni.

   Sub-order 1. Mesites.—Without basipterygoid processes, and with large spina interna. *Mesites*, Madagascar.

   Sub-order 2. Turnices.—Hemipodes or button-quails. Nidifugous; vomer large; sternum without processus obliqui. Hallux absent or vestigial. Old World. *Turnix, Pedionomus*.

   Sub-order 3. Galli.—With large spina communis, and with large processus obliqui. Hallux functional. *Megapodiidae*, Australian region. *Cracidae*, curassows and guans, neotropical. *Gallidae*, cosmopolitan.

   Sub-order 4. Opisthocomi.—Arboreal, with long spina externa; without basipterygoid processes. *Opisthocomus* hoatzin, Guiana, Venezuela and Amazon countries.

10. Order **Gruiformes.** Legs of the wading type. Without basipterygoid processes. Without spina interna. Nidifugous. Essentially Schizognathous. *Rallidae*, cosmopolitan, since Oligocene. *Rallus, Fulica, Ocydromus*, &c., *Gallinula nesiotis*, Tristan d'Acunha, flightless. *Notornis*, New Zealand, flightless, nearly extinct. *Aptornis*, New Zealand, flightless, extinct. *Aphanapteryx* (Mauritius) = *Erythromachus* (Rodriguez) = *Diaphorapteryx* (Chatham Island), flightless and recently extinct. *Gypsornis*, upper Eocene, France. *Gruidae*, cranes, cosmopolitan, allied *Phororhacos*, Tertiary of Argentina. *Dicholophidae*, cariamas, neotropical. *Otididae*, bustards, Old World. *Rhinochetidae*, kagus, New Caledonia. *Eurypygidae*, sun-bittern, neotropical. *Heliornithidae*, finfoots, tropical.

11. Order **Charadriiformes.**—Schizognathous. With eleven remiges, of which the terminal very short. Aquinto-cubital. Spinae sterni short, separate.

   Sub-order 1. Limicolae.—Nidifugous, without spina interna sterni. Hypotarsus complicated. *Charadriidae*, plovers. *Chionididae*, sheath-bill. *Glareolidae*, wading swallows and coursers. *Thinocorythidae*, seed-snipes. *Oedicnemididae*, thick-knees. *Parridae*.

   Sub-order 2. Lari.—Aquatic, vomer complete. Without basipterygoid processes. Front toes webbed; hallux small or absent. Large supraorbital glands. Since Miocene. *Laridae*, gulls, cosmopolitan. *Alcidae*, auks, northern half of periarctic region.

Sub-order 3. Pterocles.—Sand-grouse. Nidifugous. Vomer vestigial. With large crop and caeca. Hallux vestigial or absent since Oligocene. Africa to India, and Siberia. *Pterocles* and *Syrrhaptes*.

Sub-order 4. Columbae.—Pigeons. Nidicolous. Vomer vestigial. With large crop, vestigial caeca. *Columbidae*, cosmopolitan, since Miocene. *Dididae*, flightless, recently extinct. *Didus*, dodo, Mauritius. *Pezophaps*, solitaire, Rodriguez.

12. Order **Cuculiformes.**—Desmognathous, nidicolous; zygodactylous, or with the outer toe reversible.

Sub-order 1. Cuculi.—Cuckoos. Quinto-cubital. *Cuculidae*, cosmopolitan. *Musophagidae*, plantain-eaters and touracos, Ethiopian since Miocene.

Sub-order 2. Psittaci.—Parrots. Zygodactylous; aquinto-cubital. Cosmopolitan, chiefly tropical. *Trichoglossidae*, lories, Austro-Malayan. *Nestor*, New Zealand. *Cyclopsittacus, Eos, Lorius*, &c. *Psittacidae*, tongue smooth, incl. *Stringops*.

13. Order **Coraciiformes.**—Nidicolous. Nares imperviae, holorhinal. Downs restricted to the apteria or absent. Thirteen to fifteen cervical vertebrae. Mostly desmognathous. Deep plantar tendons connected with each other.

Sub-order 1. Coraciae.—Either (1) with long spina externa sterni, *Coraciidae*, rollers, Old World. *Momotidae*, neotropical, motmots and todies. *Alcedinidae*, kingfishers, cosmopolitan or (2) with long spina communis. *Meropidae*, bee-eaters, Old World. *Upupidae, Upupinae*, hoopoes: palaearctic and palaeotropical. *Bucerotinae*, hornbills, palaeotropical; *Irrisorinae*, woodhoopoes, Ethiopian.

Sub-order 2. Striges.—Owls. Outer toe reversible. Schizognathous. Long caeca. Flexor tendons normal. Hypotarsus simple. Cosmopolitan.

Sub-order. 3. Caprimulgi.—Nightjars. Nocturnal. With gaping mouth. Ten remiges and ten rectrices. Spinae sterni vestigial. Caeca functional. *Steatornithidae, Steatornis*, oil-bird or guacharo, South America. *Podargidae*, Australasian, *Caprimulgidae*, cosmopolitan.

Sub-order 4. Cypseli.—Tenth terminal remex the longest. With short spinae sterni. Without caeca. *Cypselidae*, swifts, cosmopolitan. *Trochilidae*, humming-birds, American.

Sub-order 5. Colii.—Mouse-birds. First and fourth toes reversible. Ethiopian.

Sub-order 6. Trogones.—Trogons. Heterodactyle, first and second toes directed forwards, third and fourth backwards. Tropical. *Trogon gallicus*, Miocene of France.

Sub-order 7. Pici.—Zygodactylous. Tendon of the flexor hallucis longus muscle sending a strong vinculum to that of the flexor profundus muscle, the tendon of which goes to the third toe only. *Galbulidae*, puff-birds and jacamars, neotropical. *Capitonidae*, barbets, tropical. *Rhamphastidae*, toucans, neotropical. *Picidae*, woodpeckers, cosmopolitan, excepting Madagascar and Australian region. 978

14. Order **Passeriformes.**—Nidicolous. Aegithognathous, without basipterygoid processes. Spina externa sterni large, spina interna absent. Quinto-cubital, toes normal. Apparently since the upper Eocene.

Sub-order 1. Passeres Anisomyodae.—Syrinx muscles entirely lateral or attached to the dorsal or ventral corners of the bronchial semi-rings, (1) *Subclamatores*. Deep plantar tendons connected by a vinculum. *Eurylaemidae*, broadbills, Indian and Indo-Malayan. (2) *Clamatores*. Deep flexor tendons not connected. *Pittidae*, palaeotropical. *Xenicidae*, New Zealand. *Tyrannidae*, American, *Formicariidae*, *Pteroptochidae*, neotropical.

Sub-order 2. Passeres Diacromyodae.—Syrinx muscles of either side attached to the dorsal and ventral corners of the rings. Hallux strong, with a large claw, (1) *Suboscines* with *Menura*, lyre-bird, and *Atrichia*, scrub-bird, in Australia. (2) *Oscines*, the true singing-birds, with more than 5000 recent species, are mostly divided into some thirty "families," few of which can be defined.

The fourteen orders of the Carinatae are further congregated into four "Legions":—

I. COLYMBOMORPHAE = **Ichthyornithes** + **Colymbiformes** + **Sphenisciformes** + **Procellariiformes.**

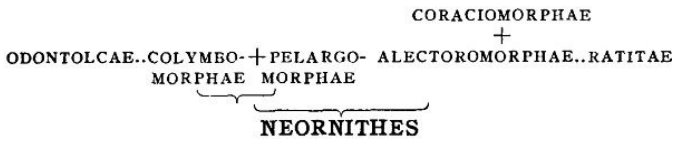
II. PELARGOMORPHAE = **Ciconiiformes** + **Anseriformes** + **Falconiformes.**

III. ALECTOROMORPHAE = **Tinamiformes** + **Galliformes** + **Gruiformes** + **Charadriiformes.**

IV. CORACIOMORPHAE = **Cuculiformes** + **Coraciiformes** + **Passeriformes.**

These four legions are again combined into two "Brigades," the first of which comprises the first and second legions, while the second brigade contains the third and fourth legions.

Thus the whole classification becomes a rounded-off phylogenetic system, which, at least in its broad outlines, seems to approach the natural system, the ideal goal of the scientific ornithologist. The main branches of the resultant "tree" may be rendered as follows:—



The Odontolcae seem to be an early specialized offshoot of the Colymbo Pelargomorphous brigade, while the Ratitae represent a number of side branches of early Alectoromorphae. The Ratitae branched off, probably during the Eocene period, from that still indifferent stock which gave rise to the Tinami + Galli + Gruiformes, when the members of this stock were still in possession of those archaic characters which distinguish Ratitae from Carinatae. It follows that new groups of Ratitae can no longer be developed since there are no Carinatae living which still retain so many low characters, *e.g.* configuration of the palate, precoracoid, pelvis, intestinal convolutions, copulatory organ, &c. Loss of the keel is co-ordinated with the power of using the forelimbs for locomotion; although a "Ratite" character, it is not sufficient to turn a *Notornis, Cnemiornis* or *Stringops*, not even a *Phororhacos* into a member of the Ratitae.

Another branch of the Alectoromorphae, in particular of the Galliformes, when these were still scarcely separated from the Gruiformes, especially rail-like birds, leads through Opisthocomi to the Cuculiformes. These are, again in an ascending direction, connected with the Coraciiformes, out of which have arisen the Passeriformes, and these have blossomed into the Oscines, which, as the apotheosis of bird life, have conquered the whole inhabitable world.

(H. F. G.)

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1 Treviranus, *Biologie oder Philosophie der lebenden Natur*, vol. ii. cap. 4, § 2 (Göttingen, 1803).

2 F. Tiedemann, *Anatomie und Naturgeschichte der Vögel*, vol. ii §§ 127-255 (Heidelberg, 1814).

3 L.K. Schmarda, *Die geographische Verbreitung der Thiere* (Wien, 1853).

4 P.L. Sclater on the general geographical distribution of the members of the class "Aves," 2. *Linn. Soc.* ii. pp. 130-145, 1858.

5 A.R. Wallace, *The Geographical Distribution of Animals, with a study of the Relations of Living and Extinct Faunas as elucidating the*

Past Changes of the Earth's Surface, 2 vols. (London, 1876).

6 T.H. Huxley, "On the Classification and Distribution of the Alectoromorphae," *P.Z.S.*, 1868, pp. 313-319.

7 The following old-fashioned rough computation may serve as an indication of the relative size of the orders and suborders of recent birds:—

Ratitae	20	Gruiformes	250	
Colymbiformes	20	Charadriiformes	650	(incl. Columbae 350)
Sphenisciformes	15	Cuculiformes	600	(incl. Psittaci 400)
Procellariiformes	90	Coraciiformes	1600	(incl. Trochili and Pici)
Ciconiiformes	150	Passeres Clamatores	1000	
Anseriformes	150	Passeres Oscines	5000	
Falconiformes	360		———	
Tinamiformes	40	Total about	10,300	species
Galliformes	370			

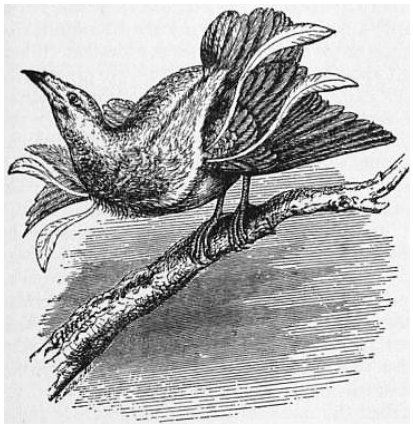
BIRD-LOUSE, any small flat degenerate wingless neuropterous insect of the group Mallophaga, parasitic upon birds and mammals and feeding upon dermal excretions or upon the softer parts of hair and feathers. The term "biting-lice" is sometimes given to these parasites, in allusion to the mandibulate character of their mouth-parts, which serves to distinguish them at once from the true lice of the order Rhynchota in which the jaws are haustellate.

BIRD'S-EYE, a name applied to various small bright flowers, especially those which have a small spot or "eye" in the centre. The primula is thus spoken of, on account of its yellow centre, also the adonis, or "pheasant's eye," and the blue veronica, or germander speedwell. The word is also applied to a sort of tobacco, in which the stalks (of a mottled colour) are cut up together with the leaves. From a similar sense comes the phrase "bird's-eye maple," a speckled variety of maple-wood, or the "bird's-eye handkerchief" mentioned in Thackeray's novels.

BIRDSNESTING, a general term for the pursuit of collecting and preserving birds' eggs, with or without the nests themselves. The nests and eggs of wild birds are nowadays protected by local laws almost everywhere in both Great Britain and the United States. By law they may be taken for scientific purposes only, by special licence. In order not to interfere seriously with breeding it is customary to take but one egg from a nest, and, if the nest itself be taken, to wait until the young birds have left it. Every egg, unless "hard-set," should be blown as soon as removed from the nest. This is done by opening a small hole in its side by means of a drill with a conical head, manufactured for the purpose, a minute hole for the insertion of the drill-head having first been made in the shell with a needle, which is then used to stir up the contents, so that they shall flow easily. A blow-pipe with a curved mouth is then inserted, the egg is held hole downwards, and the contents blown out. The old-fashioned method of making two holes in the egg is thus superseded. Should the egg be "hard-set" a somewhat larger hole is made and its edges reinforced with layers of paper pasted round them. Minute forceps are then introduced and the embryo cut into pieces small enough to pass through the hole. The inside of the egg is then rinsed out with clean water, and also before being placed in the cabinet, with a solution of corrosive sublimate, which prevents decay and consequent discoloration of the inner membrane. Finally the egg is placed with the hole downwards upon a sheet of white blotting-paper to dry. The authentication of the eggs is the most important duty of an egg-collector, next to identifying the specimens. According to some the best method is to mark with a fine pen on the egg itself the variety, scientific name, locality of nest, date of taking and the initials of the collector, as well as a reference to his note-book or catalogue. Others advocate keeping the authentication separate with only a numbered reference on the egg itself. Eggs should not be transported in bran or sawdust, but in strong wool-lined boxes. The best cabinets are fitted with drawers, pulled out to inspect the eggs, but at other times closed to preserve them from the light, which is injurious to their delicate colouring. When an entire nest is taken it should be disinfected with hyposulphite of soda or insect-powder.

See *Birdnesting and Bird-Skinning*, by E. Newman (London, 1888); *The Young Collector's Handbook of British Birds' Nests and Eggs*, by W.H. Bath (London, 1888); *Birds' Nests, Eggs and Egg-Collecting*, by R. Kearton (London, 1890); *British Birds' Eggs and Nests*, by J.C. Atkinson (London, 1898); *Nests and Eggs of North American Birds*, by Ernest Ingersoll (1880-1881).

BIRDS OF PARADISE, a group of passerine birds inhabiting New Guinea and the adjacent islands, so named by the Dutch voyagers in allusion to the brilliancy of their plumage, and to the current belief that, possessing neither wings nor feet, they passed their lives in the air, sustained on their ample plumes, resting only at long intervals suspended from the branches of lofty trees by the wire-like feathers of the tail, and drawing their food "from the dews of heaven and the nectar of flowers." Such stories obtained credence from the fact that so late as the year 1760, when Linnaeus named the principal species *apoda*, or "footless," no perfect specimen had been seen in Europe, the natives who sold the skins to coast traders invariably depriving them of feet and wings. The birds now usually included under this name belong to the family *Paradiseidae*, closely allied to the crows. The largest is the great emerald bird (*Paradisea apoda*), about the size of the common jay. Its head and neck are covered with short thick-set feathers, resembling velvet pile, of a bright straw colour above, and a brilliant emerald green beneath. From under the shoulders on each side springs a dense tuft of golden-orange plumes, about 2 ft. in length, which the bird can raise at pleasure, so as to enclose the greater part of its body. The two centre tail feathers attain a length of 34 in., and, being destitute of webs, have a thin



Standard Wing Bird of Paradise (*Semioptera wallacei*).

wire-like appearance. This splendid plumage, however, belongs only to the adult males, the females being exceedingly plain birds of a nearly uniform dusky brown colour, and possessing neither plumes nor lengthened tail feathers. The young males at first resemble the females, and it is only after the fourth moulting, according to A.R. Wallace, who has studied those birds in their native haunts, that they assume the perfect plumage of their sex, which, however, they retain permanently afterwards, and not during the breeding season only as was formerly supposed. At that season the males assemble, in numbers varying from twelve to twenty, on certain trees, and there disport themselves, so as to display their magnificent plumes in presence of the females. Wallace in his *Malay Archipelago*, vol. ii., thus describes the attitude of the male birds at one of those "sacaleli," or dancing parties, as the natives call them; "their wings," he says, "are raised vertically over the back, the head is bent down and stretched out, and the long plumes are raised up and expanded till they form two magnificent golden fans striped with deep red at the base, and fading off into the pale brown tint of the finely-divided and softly-waving points; the whole bird is then overshadowed by them, the crouching body, yellow head, and emerald green throat, forming but the foundation and setting to the golden glory which waves above." It is at this season that those birds are chiefly captured. The bird-catcher having found a tree thus selected for a "dancing party," builds a hut among the lower branches in which to conceal himself. As soon as the male birds have begun their graceful antics, he shoots them, one after the other, with blunt arrows, for the purpose of stunning and bringing them to the ground without drawing blood, which would injure their plumage; and so eager are those birds in their courtship that almost all the males are thus brought down before the danger is perceived. The natives in preparing the skins remove both feet and wings, so as to give more prominence to the commercially valuable tuft of plumes. They also remove the skull, and the skin is then dried in a smoky hut. The great emerald bird, so far as yet known, is only found in the Aru Islands. The lesser bird of paradise (*Paradisea minor*), though smaller in size and somewhat less brilliant in plumage, in other respects closely resembles the preceding species. It is also more common, and much more widely distributed, being found throughout New Guinea and the neighbouring islands. Its plumes are those most generally used as ornaments for ladies' head-dresses. Both species are omnivorous, feeding voraciously on fruits and insects. They are strong, active birds, and are believed to be polygamous. The king bird of paradise (*Cicinnurus regius*) is one of the smallest and most brilliant of the group, and is specially distinguished by its two middle tail feathers, the ends of which alone are webbed, and coiled into a beautiful spiral disk of a lovely emerald green. In the red bird of paradise (*Paradisea rubra*) the same feathers are greatly elongated and destitute of webs, but differ from those in the other species, in being flattened out like ribbons. They are only found in the small island of Waigiu off the coast of New Guinea. Of the long-billed paradise birds the most remarkable is that known as the "twelve-wired" (*Seleucides alba*), its delicate yellow plumes, twelve of which are transformed into wire-like bristles nearly a foot long, affording a striking contrast to the dark metallic tints of the rest of its plumage.

(A. N.)

BIRDWOOD, SIR GEORGE CHRISTOPHER MOLESWORTH (1832-), Anglo-Indian official and writer, son of General Christopher Birdwood, was born at Belgaum, in the Bombay presidency, on the 8th of December 1832. He was educated at Plymouth grammar-school and Edinburgh University, where he took his M.D. degree. Entering the Bombay Medical Service in 1854, he served in the Persian War of 1856-57, and subsequently became professor at the Grant Medical College, registrar of the university, curator of the museum, and sheriff at Bombay, besides acting as secretary of the Asiatic and Horticultural societies. His work on the *Economic Vegetable Products of the Bombay Presidency* reached its twelfth edition in 1868. He interested himself prominently also in the municipal life of the city, where he acquired great influence and popularity. He was obliged by ill-health in 1868 to return to England, where he entered the revenue and statistics department of the India Office (1871-1902). Whilst engaged there he published important volumes on the industrial arts of India, the ancient records of the India Office, and the first letter-book of the East India Company. He devoted much time and energy to the encouragement of Indian art, on various aspects of which he wrote valuable monographs, and his name was identified with the representation of India at all the principal international exhibitions from 1857 to 1901. (See *Journal of Indian Art*, vol. viii. "The Life and Work of Sir George Birdwood.") His researches on the subject of incense (*Trans. Linn. Soc.* xxvii., 1871; *Ency. Brit.* 9th ed., "Incense," 1881; revised for the present edition by him), a good example of his mastery of detail, have made his historical and botanical account of this subject a classic. Nor can his lifelong association with journalism of the best sort be overlooked. From boyhood he was a diligent contributor of special information to magazines and newspapers; in India he helped to convert the *Standard* into the *Times of India*, and edited the Bombay *Saturday Review*; and after his return to London he wrote for the *Pall Mall, Athenaeum, Academy*, and *Times*; and with Chenery, the editor of *The Times*, and others he took the initiative (1882) in celebrating the anniversary of Lord Beaconsfield's death as "Primrose Day" (April 19). He kept up his connexion with India by constant contributions to the Indian press; and his long friendships with Indian princes and the leading educated native Indians made his intimate knowledge of the country of peculiar value in the handling of the problems of the Indian empire. In 1887 he was created a K.C.I.E.; and, besides being given his LL.D. degree by Cambridge, he was also made an officer of the Legion of Honour and a laureate of the French Academy.

BIREJIK (Arab. *Bir*; classical, *Apamea-Zeugma*), a town of North-West Mesopotamia, in the Aleppo vilayet, altitude 1170 ft., built on a limestone cliff 400 ft. high on the left bank of the Euphrates. Pop. about 10,000, three-quarters Moslem. It is situated at one of the most important crossings of the Euphrates, where there was, in ancient times, a bridge of boats, and is now a ferry on the road from Aleppo to Urfa, Diarbekr and Mosul. Birejik corresponds actually to Apamea, which lay opposite Zeugma, and commanded the bridge with its strong castle (Kala Beda) now much ruined. The place seems to have had a pre-Seleucid existence as *Birtha*, a name which revived under Roman rule (we hear of the emperor Julian resting there on his march into Mesopotamia, A.D. 363), and is preserved to this day. The ferry over an unusually deep and narrow part of the Euphrates has been used from time immemorial in the passage from North Syria to Haran (Charrae), Edessa and North Mesopotamia, and was second in importance only to that at Thapsacus, by which crossed the route to Babylon and South Mesopotamia. Birejik was the scene of an unusually cruel massacre and persecution of Armenians in 1895.

BIREN (or BÜHREN), **ERNST JOHANN** (1690-1772), duke of Courland, was the grandson of a groom in the service of Duke Jacob III. of Courland, who bestowed upon him a small estate, which Biren's father inherited and where Biren himself was born. He received what little education he had at the academy of Königsberg, from which he was expelled for riotous conduct. In 1714 he set out to seek his fortune in Russia, and unsuccessfully solicited a place at the shabby court of the princess Sophia Charlotte, the consort of the tsarevich Alexius. Returning to Mittau, he succeeded in gaining a footing at court there through one of his sisters, who was the fancy of the ruling minister, Peter Bestuzhev, whose established mistress was no less a person than the young duchess Anne Ivanovna. During his patron's absence, Biren, a handsome, insinuating fellow, succeeded in

supplanting him in the favour of Anne, and procuring the disgrace and banishment of Bestuzhev and his family. From henceforth to the end of her life Biren's influence over the duchess was paramount. On the elevation of Anne to the Russian throne in 1740, Biren, who had in the meantime married a Fräulein von Treiden, came to Moscow, and honours and riches were heaped upon him. At the coronation (19th May) he was made grand-chamberlain, a count of the empire, on which occasion he is said to have adopted the arms of the French ducal house of Biron, and was presented with an estate at Wenden with 50,000 crowns a year. He soon made himself cordially detested by Russians of every class. He was not indeed the monster of iniquity he is popularly supposed to have been. His vices were rather of the sordid than of the satanic order. He had insinuating manners and could make himself very agreeable if he chose; but he was mean, treacherous, rapacious, suspicious and horribly vindictive. During the latter years of Anne's reign, Biren increased enormously in power and riches. His apartments in the palace adjoined those of the empress, and his liveries, furnitures and equipages were scarcely less costly than hers. Half the bribes intended for the Russian court passed through his coffers. He had landed estates everywhere. A special department of state looked after his brood mares and stallions. The magnificence of his plate astonished the French ambassador, and the diamonds of his duchess were the envy of princes. The climax of this wondrous elevation was reached when, on the extinction of the line of Kettler, the estates of Courland, in June 1737, elected him their reigning duke. He was almost as much loathed in Courland as in Russia; but the will of the empress was the law of the land, and large sums of money, smuggled into Courland in the shape of bills payable in Amsterdam to bearer, speedily convinced the electors. On her death-bed Anne, very unwillingly and only at his urgent entreaty, appointed him regent during the minority of the baby emperor, Ivan VI. Her common-sense told her that the only way she could save the man she loved from the vengeance of his enemies after her death was to facilitate in time his descent from his untenable position. Finally, on the 26th of October 1740, a so-called "positive declaration" signed by 194 dignitaries, in the name of the Russian nation, conferred the regency on Biren.

Biren's regency lasted exactly three weeks. At midnight of the 19th of November 1740 he was seized in his bedroom by his ancient rival, Field Marshal Münnich. The commission appointed to try his case condemned him (11th of April 1741) to death by quartering, but this sentence was commuted by the clemency of the new regent, Anna Leopoldovna, the mother of Ivan VI., to banishment for life at Pelin in Siberia. All Biren's vast property was confiscated, including his diamonds, worth £600,000. For twenty-two years the ex-regent disappeared from the high places of history. He re-emerges for a brief moment in 1762, when the philo-German Peter III. summoned him to court. He was now too old to be in any one's way, and that, no doubt, was the reason why Catherine II. re-established him (1763) in his duchy, which he bequeathed to his son Peter. Misfortune had chastened him, and the last years of his rule were just and even benevolent, if somewhat autocratic. He died at Mittau, his capital, on the 28th of December 1772.

See Robert Nisbet Bain, *The Pupils of Peter the Great* (London, 1897); Christoph Hermann von Manstein, *Memoirs* (Eng. ed., London, 1856); Claudius Rondeau, *Diplomatic Dispatches from Russia* (St Petersburg, 1889-1892).

(R. N. B.)

BIRETTA (Ital. *berretta*, Med. Lat. *biretum, birettum*, dim. of *birrus*, "a hooded cloak"; from the Fr. form *barrette* is derived the Eng. "barret-cap"), a cap worn by the Catholic clergy. It is square and stiff, being made of a framework of cardboard covered with cloth or silk; on the top, along the sutures of the stuff, are three or four raised, board-like, arched ridges, at the junction of which in the centre is a knob or tassel (*floccus*). Its colour varies with the rank of the wearer, that of the pope being white, of the cardinals red, of bishops purple, and of the lower clergy black. It is not in the strictest sense a liturgical head-dress, its use not being confined to liturgical functions. In these functions, moreover, its use is strictly limited; *e.g.* it is worn at low masses by the priest only when he goes to and from the altar, at high masses also when the celebrant sits during the singing of the *Kyrie, Gloria* and Creed, and at processions when these take place outside the church and are not sacramental, and so on.

Though the form of the biretta, devised in the 17th century, is peculiar to the Roman Church, it is but a variant of the original *biretum*, which developed in various countries into head-coverings of different shapes and significance. At the outset there was little to distinguish the *biretum* from the *pileus* or *pileolus* (skull-cap), a non-liturgical cap worn by dignitaries of the Church under the mitre and even under the biretta. When the word *biretum* first appears in the 13th century, it practically means no more than "cap," and is used as a synonym of *pileus*. As an ecclesiastical vestment the cap can be traced, under the name of *pileus*, to the 12th century; under that of *infula*, to the end of the 10th. It would seem to have been worn by the cantors as a protection against cold. The same utilitarian reason led to its introduction among the clergy generally. Thus in 1243 Pope Innocent IV. granted leave to the Benedictines of St Augustine's at Canterbury, and to those of Winchester, to wear the *pileus* in choir. With the extension of its use, too, the custom grew up (*c.* 1300) of investing clerks with the *biretum* as the symbol of the transfer of a benefice, a custom which survives, in Roman Catholic countries, in the solemn delivery of the red biretta by the head of the state to newly created cardinals, who afterwards go to Rome to receive the red hat. This red biretta is called the *zucchetto*.

This use of the *biretum* as a symbol of office or dignity was not confined to the clergy. With various modifications of form it was worn by all persons of standing, *e.g.* barons, judges, and doctors and masters of the universities. The *biretum* was also used in the investiture of laymen with office, *e.g.* a duke or the prefect of the city of Rome (Du Cange, *Gloss.* s.v. *birretum*). The "cap of maintenance" or "cap of estate," still borne before the British sovereign on state occasions, is a barret-cap of the type of the 14th and 15th centuries; it is of crimson velvet, turned up with ermine. By the 16th century the barret-cap had become the common head-gear of all people of substance, men and women. It was flat, square or round, sometimes with edges that could be turned up or down according to convenience, and was often elaborately decorated. By the 17th century it had given place in ordinary civil life to the brimmed hat; but in various shapes it still survives as official head-gear in many European countries: the *Barett*, worn in church by the Lutheran clergy, in the courts by German lawyers, and by the deans and rectors of the universities, the *barrette* of French judges and barristers, the "black cap" of the English judge, and the "college cap" familiar in English and American universities, and vulgarly known as the "mortar-board."

Meanwhile the ecclesiastical developments of the *biretum* are not without interest and significance. Originally this had been a round cap, low or moderately high, slightly bulging out at the top, and ornamented with a round knob. By the 16th century, both in England and on the continent, a tendency had begun to emphasize the ridges of the sutures and thus produce a square shape. Henceforth the evolution followed different lines. In England, in the 17th century, the square flat top began to be enlarged, forming a rim of thick stuff projecting beyond the close-fitting cap. This was the "square cap" so virulently denounced by the Puritans as a symbol of High Church Erastianism. With the triumph of High Church principles at the Restoration it was natural that a loyal clergy should desire to emphasize this squareness, and the consequent exaggeration of the square top of the cap necessitated a further stiffening. In the 18th century, accordingly, the top began to be made of a board of wood or card covered with cloth, the close-fitting cap proper retired farther from the edges, the knob developed into a long tassel, and the evolution of the modern "college cap" was complete (see fig. 1).

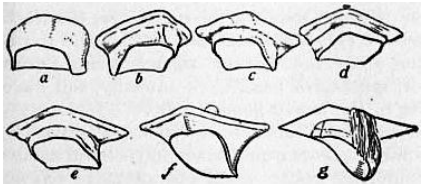
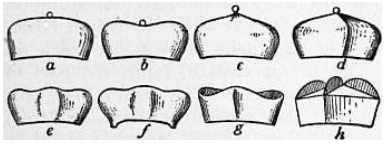


FIG. 1.

a, *Pileus* of Archbishop Warham (d. 1532).
b, Square cap of Archbishop Cranmer (d. 1556).
c, Square cap of Archbishop Parker (d. 1575).
d, Square cap of Archbishop Whitgift (d. 1583).
e, Square cap of Archbishop Laud (d. 1645). All these are from portraits at Lambeth.
f, Square cap of George Morley, bishop of

On the continent, meanwhile, in the Roman Catholic Church, the *biretum* had also developed into its present characteristic form, and by a very similar process. By the end of the 16th century the square shape was everywhere prevalent; at the beginning of the 17th century cardboard was introduced to stiffen the sides and emphasize the squareness, and the actual form of the biretta, as described above, had become fixed (see fig. 2). Only in Spain has the biretta continued to be worn without the raised ridges.



(Redrawn from Braun's *Liturgische Gewandung*.)

FIG. 2.—Illustrations of the *biretum* from monuments in the cathedrals of—

a, Brandenburg (1281).
b, Augsburg (1342).
c, Bamberg (1483).
d, Regensburg (1550).
e, Würzburg (1521).
f, Regensburg (1564).
g, *ib.* (1605?).
h, Bamberg (1626).
Winchester (d. 1684).
g, Modern college cap.

The use of the Roman biretta has been introduced by a certain number of the clergy into the Anglican Church. It is clear that there is no historical justification for this; for though both college cap and biretta are developed from the same "square cap," the biretta in its actual shape is strictly associated with the post-Reformation Roman Church, and its actual ceremonial use is of late growth. Braun (*Liturgische Gewandung*, p. 513) thinks that the symbolism of the cross may have had some influence in fixing and propagating the square shape, and he quotes a decree of the synod of Aix (1585) ordering the clergy to wear a biretta sewn in the form of a cross (*biretum in modum crucis consutum, ut ecclesiasticos homines decet*). So far as the legality of the use of the biretta in the Church of England is concerned, this was pronounced by Sir R. Phillimore in the Court of Arches (*Elphinstone* v. *Purchas*, 1870) to be legal "as a protection to the head when needed," but this decision was reversed on appeal by the judicial committee of the privy council (*Hebbert* v. *Purchas*, 1871). Of late years the old square cap of soft padded cloth or velvet has been revived in the Anglican Church by some dignitaries.

See J. Braun, S.J., *Die liturgische Gewandung* (Freiburg-i-B., 1907); *Hierurgica Anglicana*, part ii. (London, 1903); H. Druitt, *Costume on Brasses* (London, 1906).

(W. A. P.)

BIRGER (?-1266), Swedish statesman, nephew of Birger Brosa, and the most famous member of the ancient noble family of the Folkungeätten, which had so much to say for itself in early Swedish history, was created jarl of Bjälbo by King Erik Eriksson in 1248 and married the king's sister. On Erik's death (1250) Birger's son Valdemar was elected king while his father acted as regent. During the sixteen years of his sway Sweden advanced greatly in fame and prosperity. In 1249 he led an expedition to Finland, built the fortress of Tavastehus, and thus laid the foundations of Sweden's oversea empire. He also built Stockholm, and enriched it by making it the chief mart for the trade of Lübeck, with which city he concluded a commercial treaty. As a lawgiver also Birger laboured strenuously in the interests of civilization. In his old age he married the daughter of King Abel. There is a fine statue of the great jarl in the Riddarholm church at Stockholm, erected by Fogelberg at the expense of the Stockholm magistracy in 1884. He is also the central figure of Fr. Hedberg's drama *Brollopet på Ulfåsa* (1865).

See *Sveriges Historia*, vol. i. (Stockholm, 1879-1883).

BIRIBI, or CAVAGNOLE, a French game of chance, prohibited by law since 1837. It is played on a board on which the numbers 1 to 70 are marked. The players put their stakes on the numbers they wish to back. The banker is provided with a bag from which he draws a case containing a ticket, the tickets corresponding with the numbers on the board. The banker calls out the number, and the player who has backed it receives sixty-four times his stake; the other stakes go to the banker. In the French army "to be sent to Biribi" is a cant term for being sent to the disciplinary battalion in Algeria.

BIRJEND, the capital of Káïn, a sub-province of Khorasan in Persia, in 32° 53′ N. 59° 10′ E., and at an elevation of 4550 ft. Pop. about 25,000. It is situated 328 m. from Meshed by the direct road, in a fertile valley running east and west, of which the southern boundary is a lofty range of barren hills known as Kuh i Bakeran. Through the valley runs the Khusp river, which loses itself in the desert towards the west; it is, however, generally dry. The water-supply of the town and of the 70 or 80 villages under its jurisdiction is very scanty. On the east of the town at the foot of a hill stands a dilapidated fort. Birjend has six good caravanserais, a college and some mosques; post and telegraph offices were established there in 1902.

BIRKBECK, GEORGE (1776-1841), English physician and philanthropist, was born at Settle in Yorkshire on the 10th of January 1776. He early evinced a strong predilection for scientific pursuits; and in 1799, after graduating as doctor of medicine, he was appointed to the chair of natural philosophy at the Andersonian Institution of Glasgow. In the following year he delivered, for the benefit of the working-classes, a gratuitous course of scientific lectures, which were continued during the two following years and proved eminently successful. He removed to London in 1804, and there he endeavoured to prosecute his philanthropic schemes, at first without much encouragement, but ultimately with marked success. In 1823 he contributed to found the Mechanics' Institute, the name of which was afterwards changed to Birkbeck Institution or College, in honour of its founder. He was appointed director of the institute, which he had originally endowed with the sum of £3700, and held the office till his death on the 1st of December 1841. The sphere of usefulness of the institution was gradually enlarged, and an enlargement of the buildings was carried out in 1883-1885. The college now holds day and evening classes in many of the sciences, in literature, languages and art.

BIRKENFELD, a town of Germany, capital of the principality of the same name, on the Zimmerbach, 25 m. S.E. of Trier and on the main line of railway from Bingerbrück to Neunkirchen. Pop. 2500. Close by, on an eminence, lie the ruins of the castle of Birkenfeld, dating from the 14th century, once the residence of the counts palatine of Zweibrücken. The town has an Evangelical and a Roman Catholic church, a grand-ducal high school and a hospital. Besides brewing and tanning, its industries include the manufacture of tobacco and chicory. There is also a considerable trade in cattle.

The Principality of Birkenfeld is hilly and well-forested; agriculture prospers on the cleared lands, and fruit is grown in the valley of the Nahe, the principal stream. Ironstone and roofing slates are quarried, and there is some industry in agate-polishing and the manufacture of trinkets. The principality has an area of 312 sq. m. and a population (1900) of 43,409, chiefly Protestants. It is formed out of the former lordships of Dachstuhl and Oberstein, of part of the ancient countship of Sponheim, and sections of the duchy of Jülich, which were granted to the grand-duke of Oldenburg by the congress of Vienna in 1815. It is entirely an *enclave* in Prussian territory, and though it is represented in the Oldenburg diet, it is governed by a separate *Regierungskollegium*, consisting of a president and two members, who are responsible to the Oldenburg ministry.

BIRKENHEAD, a municipal, county and parliamentary borough, and seaport of Cheshire, England, on the river Mersey, 195 m. N.W. of London. Pop. (1901) 110,915. It lies opposite Liverpool, on the east shore of the peninsula of Wirral, and is served by the Birkenhead (London & North-Western and Great Western joint) and the Wirral railways. It is wholly of modern growth, although the name of Byrkhed is traced to the forest which is believed to have extended between the mouths of the Dee and the Ribble in Lancashire. A Benedictine monastery was founded (*c.* 1150) by Hamon de Mascy, third baron of Dunham Massey, and dedicated to St Mary and St James. It drew its main revenues from tolls levied at the Mersey ferry; and its prior sat in the parliament of the earls of Chester, enjoying all the dignities and privileges of a Palatinate baron. A fine crypt, along with remains of the prior's lodging, refectory and chapel, may still be viewed, as the priory was purchased by private subscription and handed over to the municipality in 1896.

The rise of Birkenhead, from a hamlet of some 50 inhabitants in 1818 to its present importance, was due in the first place to the foresight and enterprise of William Laird, who purchased in 1824 a few acres of land on the banks of a marshy stream, known as Wallasey Pool, which flowed into the Mersey about 2 m. west of the village. Among other engineers, Telford and Stephenson favoured the project of converting Wallasey Pool into a great basin for shipping; but, largely owing to the fears of Liverpool lest a formidable rival should thus be created, it was not until 1843 that parliamentary powers were obtained, and the work entrusted to James Rendel, who finished it in less than five years. The docks, which covered an area of 7 acres, were opened in 1847, and after thrice changing hands were made over in 1858 to the Mersey Docks and Harbour Board, a body created by act of 1857, to control the harbourage on both sides of the river.

Meanwhile, the town itself grew rapidly. In 1833 an act was passed for paving, watching, cleansing and improving the streets; as well as for the regulation of police, and the establishment of a market. The Improvement Commissioners constituted by this act included the mayor, bailiffs and four aldermen of Liverpool, under whose care the main streets were laid out on a regular plan, intersecting one another at right angles; and the first iron tramway in England was laid down. Electricity was subsequently applied to the tramway system. Noteworthy public buildings are St Aidan's College, a large brick building in Tudor style, for the use of Anglican students in theology; the market hall (1843); town hall, a free library with branches, borough hospital, built at the cost of Sir John Laird; and many schools both public and private, including the industrial schools built as a memorial to Albert, prince consort, at the cost of Sir W. Jackson, and the school of art, given by Sir John Laird. There are many handsome modern churches, all built since 1821. Roman Catholics are especially numerous, owing to the presence of a large Irish population. The town is well furnished with open spaces. Birkenhead Park was opened in 1847, Mersey Park in 1885; while a tract of moorland 6 m. distant in the township of Thurstaston, was allotted to the borough of Birkenhead in 1887; and Meols Common, comprising over 50 acres of pastureland on the shores of Liverpool Bay, was made over to the corporation in 1900.

The increase of railway accommodation has been swift. In 1878 the old Monks Ferry station on the Great Western system was superseded by the opening of the Woodside passenger station, and a few years later the Birkenhead town station was opened. In 1886 the Mersey tunnel, connecting Birkenhead with Liverpool, was opened by the prince of Wales. The system extends from Rock Ferry and Park stations on the Cheshire side to the low-level at Central Station in Liverpool, and has connexions on the Cheshire side with the Great Western, North-Western, Wirral and various local lines. The Wrexham, Mold & Connah's Quay railway, which was taken over by the Great Central company in 1905, helped to bring the mineral wealth of Flint and North Wales generally into the Birkenhead docks.

Woodside Ferry may still be regarded as the principal entrance to Birkenhead and the Wirral from Liverpool. The exclusive right of ferryage was granted to the priory in 1332. In 1842 the Birkenhead Commissioners purchased it, under an act of parliament, from the lord of the manor, Mr F.R. Price. In 1897 the corporation further acquired the rights over the Rock Ferry and the New Ferry at the southern end of the town. Despite competition from the Mersey tunnel, these ferries continue to transport millions of passengers annually, and have a considerable share in the heavy goods traffic.

Though at the outset a mere commercial offshoot of Liverpool, Birkenhead has acquired a large export trade in coal and manufactured articles, importing guano, grain and cattle in return. Iron foundries, breweries, oil-cake and seed mills also exist side by side with such immense engineering and shipbuilding works as the Britannia Works, Canada Works, and, above all, Laird's shipbuilding works, where several early iron vessels were built, and many cruisers and battleships have been launched. Huge warehouses and sheds have been erected along the quays for the storage of freight. In 1847 the Birkenhead Dock Warehousing Company opened its first warehouse, capable of holding 80,000 tons of goods. A line called the Dock Extension railway was carried round the whole, and the company erected, for their workmen, the Dock Cottages. This entire property is now under the authority of the Mersey Docks and Harbour Board. The pile of buildings known as the corn warehouses are traversed by a canal which gives access to its several departments, and are provided with mechanical grain-elevators. There are also extensive lairages for live-stock, and cold storage for dead meat. On the north and north-east, and partly on the east, Birkenhead is bounded by its docks, which extend, for a distance exceeding 2 m., from the landing-stage at Woodside Ferry to the Wallasey Bridge. Of these the principal are the Egerton, Morpeth, Morpeth Branch and Wallasey Docks; while the Alfred Dock, with its three entrances, nineteen pairs of lock-gates, 8 acres of water, and 460 lin. yds. of quay-space, fulfils the part of an entrance-lock to the whole system. The great Float, now occupying the site of Wallasey Pool, separates Birkenhead from Poulton-cum-Seacombe in the parish of Wallasey. It forms an immense dock of 120 acres, with a quay-space of about 5 m.; and communicates on the E. with a low-water basin of about 14 acres and with the Alfred Dock; on the S.E. with the Morpeth, Morpeth Branch and Egerton Docks. The Morpeth Dock (about 11 acres, quay-space 1299 lin. yds.) is in communication with the Morpeth Branch Dock (about 3½ acres, quay-space 600 lin. yds.); both being set apart for the use of steamers. The total water-space of these docks amounts to 165 acres, and the lineal quay-space is about 9½ m. The entrances to the Birkenhead Docks are capable of docking the largest class of steamers afloat. The massive iron bridges across the dock entrances are opened and closed by hydraulic power, which is likewise applied to the cranes, coal-hoists, warehouse-lifts and other machinery about the docks. At the extreme western end of the West Float are three large graving docks, two about 750 ft. in length, and 130 and 80 ft. respectively in width; while the largest measures about 900 ft. in length and 130 ft. in width.

In 1861 Birkenhead was created a parliamentary borough, returning one member. In 1877 it received a municipal charter, the boundaries of the borough including the suburban townships of Tranmere, Claughton, Oxton and part of Higher Bebington.

The borough is under a mayor, 14 aldermen and 42 councillors. Area, 3848 acres.

BIRMINGHAM, a city and the county-seat of Jefferson county, Alabama, U.S.A., in the north-central part of the state, 96 m. N.W. of Montgomery, at an altitude of 600 ft. It is served by the Southern, the Louisville & Nashville, the Seaboard Air Line, the Central of Georgia, the Alabama Great Southern (of the Queen & Crescent Route), the Illinois Central, the Atlanta, Birmingham & Atlantic, the Birmingham Southern (for freight only), and the Kansas City, Memphis & Birmingham (Frisco system) railways. Pop. (1890) 26,178; (1900) 38,415, of whom 16,575 were of negro descent, and 1776 were foreign-born; (1910) 132,685. Birmingham is situated in Jones Valley, between two mountains which lie south-east and north-west of the city. Its streets are wide and well constructed, and there are sixteen public parks, three of which, East Lake, Lakeview and Capitol, are particularly attractive. Among the principal buildings are the First National bank, the immense Union station and the Saint Vincent hospital; besides several fine office and school buildings (including the beautiful manual training high school) and churches. Although the state constitution restricts municipal investments, a Waring or “Separate” sewage system has been established. The most important educational institutions are the Birmingham medical college and college of pharmacy; the Birmingham dental college; a school of art and a conservatory of music. At East Lake station, in the north-east of the city, is Howard College (Baptist; founded at Marion, Perry county, in 1841 as an academy; granted first collegiate degrees in 1848; opened in East Lake in 1887); and 2 m. west of the city is the North Alabama Conference College (Methodist Episcopal South), opened in 1897.

Birmingham, situated in an immensely rich iron, coal and limestone region, is the principal manufacturing centre in the state, and the most important centre for the production and manufacture of iron in the southern states. In the decade 1890-1900 the value of the products of Birmingham’s manufactories increased 78.9% from $7,064,248 to $12,581,066; in 1900 establishments under the “factory system” produced goods valued at $8,599,418, in 1905 at $7,592,958, a decrease of 11.7%.

Immediately outside the city limits in 1905 there were many large manufactories, including the repair shops of the Southern railroad; iron and steel, car wheels and cotton-oil were among the products of the suburban factories. In Jefferson county there were in 1900 more than 300 mining and manufacturing establishments, engaged, chiefly, in the production of iron, coal and coke, and a majority of these are in Birmingham and its suburban towns. A short distance south of the city is Red Mountain, 25 m. long and about 225 ft. high, rich in hematite iron ore; valuable limestone deposits are found some 30 m. distant, and in the vicinity are three great coalfields, the Warrior, the Coosa and the Cahaba. These natural advantages make possible the production of pig iron at an unusually low cost. In 1900 the Birmingham district produced six-sevenths of the total pig iron exported from the United States, and in 1902 nine-tenths of Alabama’s coal, coke and pig iron; in 1905 Jefferson county produced 67.5% of the total iron and steel product of the state, and 62.5% of the pig iron produced by the state. The first steel plant in the southern states was established at Birmingham in 1897; in 1902, at Ensley, one of the suburbs, there were 10 furnaces controlled by one company. The city has also a large trade in cotton, the annual receipts averaging about 100,000 bales. Among the manufactures are cotton goods, cotton-seed oil, yarn, furniture and machinery. Birmingham also has important lumber interests.

The city is a product of the industrial transformation in the southern states since the Civil War. In 1870 the site was a cotton field, where two railways, the South & North, and the Alabama & Chattanooga, now part respectively of the Louisville & Nashville and the Southern System, met, 2 m. from Elyton. In 1871 a land company, promoted by railway officials, founded Birmingham. Within four months the population was 1200; by 1873 it was 2500; in 1880 it was 3086; and in 1890 it had reached 26,178.

BIRMINGHAM, a city and a municipal, county, and parliamentary borough, the metropolis of one of the greatest industrial districts in England. Pop. (1901) 522,204. It lies in the north-west of Warwickshire, but its suburbs extend into Staffordshire on the north and west, and into Worcestershire on the south. It is 113 m. north-west from London by the London & North-Western railway, lying on the loop line between Rugby and Stafford; it is also served by the northern line of the Great Western, and by the north and west (Derby-Bristol) line of the Midland railway.

Site.—Birmingham, built upon the New Red Sandstone, is situated in the valleys of the Rea and other small feeders of the river Tame, near their sources, and upon the rising ground between these valleys. The site is, therefore, boldly undulating, varying from 200 to 600 ft. above sea-level, steadily rising towards the north and west, while the well-marked line of the Lickey hills skirts the site on the south-west, extending thence south-eastward. From the high ground to the south-east Birmingham thus presents the appearance of a vast semicircular amphitheatre, the masses of houses broken by innumerable factory-chimneys; the whole scene conveying a remarkable impression of a community of untiring industrial activity. The area of the town is nearly 20 sq. m., the greatest length from north to south 7 m., and the greatest breadth about 4 m. Yet Birmingham is a fraction only of an industrial district, of which it forms the south-eastern extremity, which itself resembles one vast city, and embraces such famous manufacturing towns as Dudley, Wolverhampton, Walsall, Wednesbury and many others. This is the district commonly known as the “Black Country,” which forms part of the South Staffordshire industrial district. Birmingham, however, does not lie actually within the “Black Country” properly so-called.

Streets and Buildings.—The plan of the town, as dictated by the site, is irregular; the streets are mostly winding, and often somewhat narrow. In the centre are several fine thoroughfares, containing nearly all the most important buildings. New Street, Corporation Street and Colmore Row are the chief of these. At the western end of New Street is a fine group of buildings, including the council house and art gallery, the town hall and post office. The council house and art gallery, begun in 1874 and completed in 1881, is in Renaissance style, and the material is Darley Dale, Spinkwell and Wrexham stone. The entrance is surmounted with a pediment filled with groups of excellent sculpture. The erection of that part which forms the art gallery was the work of the gas committee, to whom the council granted the site on condition that they would build such a gallery over their own office, the council having no powers at the time to raise the required funds. The art gallery contains a fine collection of modern paintings, including masterpieces of David Cox, Millais, Hunt, Henry Moore, Albert Moore, Briton-Riviere and Burne-Jones. In the industrial hall are rich stores of Oriental metal work, Limoges enamel, English and foreign glass and Japanese ceramics. In the side galleries are various textiles, and Persian, Rhodian, Grès de Flandres and other pottery. There is a remarkable collection of Wedgwood. Notable also is the collection of arms, which is probably the most complete in existence. The purchase of pictures has been made from time to time by means of an art gallery purchase fund of £12,000, privately contributed and placed under the control of the corporation. Many valuable works of art are the gift of individuals. In 1906 plans were obtained for additional municipal offices and another art gallery on a site on the opposite side of Edmund Street from the council house. The town hall, completed in 1850, is severely classic, modelled upon a Greek temple. The lower stage consists of a plinth or basement, 23 ft. high, upon which is reared a facade of peripteral character, with eight Corinthian columns (36 ft. high) at the two principal fronts, and thirteen columns on each side. These columns (imitated from those of the temple of Jupiter Stator at Rome) support a bold and enriched cornice, finished at each end with a lofty pediment and entablature. The exterior of the hall is built of Anglesea marble. The interior consists chiefly of a regularly-built room, designed specially for meetings and concerts, with an orchestra containing a fine organ. The hall seats upwards of 2000 persons, but

when cleared of benches, as is the case at great political meetings, over 5000 may find standing room. The Midland Institute, adjacent to the town hall on the west, has a fine lecture theatre. To the south lie the post office, the inland revenue office and Queen's College. To the north is the Gothic building of Mason College, an institution merged in the university. The Central free library, adjoining the Midland Institute, was rebuilt in 1879, after a fire which destroyed the fine Shakespeare library, the Cervantes collection, and a large series of books on, and antiquities of, Warwickshire, known as the Staunton collection. The Shakespeare series was as far as possible replaced, and the whole forms one of the largest reference and lending libraries in England. Edmund Street and Colmore Row are fine thoroughfares running parallel in a north-easterly direction from either side of the council house; in the first the principal building is the school of art, in the second are several noteworthy private buildings. Both terminate at Snow Hill station, that of the Great Western railway. New Street station, that of the London & North Western and Midland railways, lies close to the street of that name, fronted by the Queen's hotel. The station is nearly a quarter of a mile in length. The roof of the older portion consists of a vast arch of glass and iron, carried on pillars on each side, and measuring 1100 ft. in length, 80 ft. in height, and 212 ft. in width in a single span. The building of the Royal Society of Artists fronts New Street itself with a fine classic portico; here are also the exchange (Gothic) and the grammar school of King Edward VI., a Perpendicular building dating from 1840, designed by Sir Charles Barry. Corporation Street was the outcome of a great "Improvement scheme" initiated in 1875, with the object of clearing away a mass of insanitary property from the centre of the town and of constructing a main thoroughfare from the centre to the north-eastern outlet, starting from New Street, near the railway station to Bull Street, and thence continuing to the Aston Road. The scheme received parliamentary sanction in 1876, and was finished in 1882 at a cost of £1,520,657. This led to an almost total extinction of the residential quarter in the centre of the town. The finest building in this handsome street is the Victoria assize courts. The foundation stone was laid by Queen Victoria in 1887, after Birmingham had been created an assize district; the building was completed in 1891. There is a handsome entrance, and within is a great hall, 80 ft. by 40, with a series of stained-glass windows. The exterior is red, and highly ornamented in the style of the Renaissance.

Among other noteworthy buildings are the county court, education offices and military drill hall. Among a fine series of statues and monuments may be mentioned the statue of Nelson by Richard Westmacott, in the Bull Ring; those of Joseph Sturge, at the Five Ways, and of Thomas Attwood, the founder of the Political Union, in Stephenson Place, both by J.E. Thomas; James Watt, a singularly beautiful work, in Ratcliff Place, by Alexander Munro; Sir Robert Peel, in New Street, by Peter Hollins; Albert, prince consort, in the council house, by J.H. Foley; and Queen Victoria, by Thomas Woolner; Sir Rowland Hill, in the hall of the post office, by Matthew Noble; and Dr Priestley, in New Street, by F.J. Williamson. There is also a fountain behind the town hall, commemorative of the mayoralty of Mr Joseph Chamberlain, and flanked by statues of Sir Josiah Mason, and George Dawson, who took active part in the municipal reform movement previous to Mr Chamberlain's years of office. Sir Francis Chantrey's famous statue of James Watt is in a special chapel at Handsworth church.

Suburbs.—The principal streets radiating from central Birmingham to the suburbs are served by electric tramways worked by the corporation, and also by motor omnibuses. The principal suburbs are as follows. Edgbaston and Harborne lie south-west of the centre of the city, being approached by Broad Street. These form a residential district principally inhabited by the richer classes, and owing to the enforcement of strict rules by the ground landlord, retain a remarkable semi-rural character, almost every house having a garden. Here, moreover, are Calthorpe Park, the botanical gardens, and the large private grounds attached to Edgbaston Hall, also the Warwickshire county cricket ground. To the south of Edgbaston, however, are the growing manufacturing districts of Selly Oak and Bourneville, and south of these, Northfield and King's Norton, in Worcestershire. The districts to the east of central Birmingham are Balsall Heath, Sparkbrook, Small Heath and Saltley. On the south-east is the residential suburb of Moseley, and on the east that of Yardley. Between Moseley and King's Heath to the south, is Highbury, the seat of Mr Joseph Chamberlain, whose active interest in the affairs of the town, both during his mayoralty (1873-1876) and at other times, was a principal factor in such works as the municipalization of the gas and water supply, the Corporation Street improvement, and the foundation of Birmingham University. On the east side the transition from town to country is clearly marked. This, however, is not the case on the west side, where the borough of Smethwick adjoins Birmingham, and the roads through West Bromwich and towards Oldbury and Dudley have the character of continuous streets. On this side are Soho and Handsworth, which gives name to a parliamentary division of Staffordshire. To the north lies Aston Manor, a municipal borough of itself, with Perry Bar beyond. To the north-east a populous district extends towards the town of Sutton Coldfield. Aston Hall is a fine Jacobean mansion standing in an extensive park. Aston Lower Grounds is an adjacent pleasure-ground. Besides these and the Edgbaston grounds the chief parks are Summersfield Park, towards Smethwick; Soho Park; Victoria Park, Handsworth; Adderley Park, towards Saltley; and Victoria Park, Small Heath. There is a race-course at Castle Bromwich, 3 m. east of the town.

Churches and Religion.—Birmingham is not rich in ecclesiastical architecture. It became a bishopric under the Bishoprics of Southwark and Birmingham Act 1904, including the archdeaconry of Birmingham and the rural deanery of Handsworth, previously in the diocese of Worcester. Before 1821 it was in the diocese of Lichfield. There were formerly a religious house, the priory of St Thomas the Apostle, and a Gild of the Holy Cross, an association partly religious and partly charitable, having a chantry in the parish church. The possessions of the priory went to the crown at the dissolution, and the building was destroyed before the close of the 16th century. The lands of the Gild of the Holy Cross were granted by Edward VI. to trustees for the support of the free grammar school. Until 1715 there was but one parish church, St Martin's, a rectory, having the tithes of the entire parish of Birmingham. St Martin's was erected about the middle of the 13th century, but in the course of ages was so disfigured, internally and externally, as to present no traces, except in the tower and spire, of its former character. In 1853 the tower was found to be in a dangerous condition, and together with the spire was rebuilt. In 1873 the remaining part of the old church was removed without disturbing the monuments, and a larger edifice was erected in its place. St. Philip's, a stately Italian structure, designed by Archer, a pupil of Wren, was the next church erected. It was consecrated in 1715, enlarged in 1884, and became the pro-cathedral on the foundation of the diocese. It contains a rich series of stained-glass windows by Burne-Jones. Then followed St Bartholomew's in 1749, St Mary's in 1774, St Paul's in 1779, St James's, Ashted, in 1791, and others. St Alban's is a good example of J.L. Pearson's work, and Edgbaston church is a picturesque Perpendicular structure.

Under the Commonwealth Birmingham was a stronghold of Puritanism. Clarendon speaks of it and the neighbourhood as "the most eminently corrupted of any in England." Baxter, on the other hand, commending the garrison of Coventry, says it contained "the most religious men of the parts round about, especially from Birmingham." The traditional reputation for Nonconformity is maintained by the town, all varieties of dissenters being numerous and influential. The Unitarians, the oldest body established here, have among their chapels a handsome structure in Bristol Road, the Old Meeting, which in 1885 replaced the building in which the congregation was formed on the Presbyterian model by a number of ministers ejected under the Act of Uniformity. Another chapel, the New Meeting, in Moor Street, is memorable as having been the place of Dr Joseph Priestley's ministerial labours from 1780 onwards. In 1862 the Unitarians removed from this place to a new Gothic edifice, called the church of the Messiah, in Broad Street, where they preserve a monument of Priestley, with a medallion portrait in profile, and an inscription written by Priestley's friend, Dr Parr. The first meeting-house of the Society of Friends dates from about 1690. Among Independent chapels, that of Carr's Lane had John Angell James and Robert William Dale as ministers. The Baptists first erected a chapel in Cannon Street in 1738. The Wesleyan Methodists were established in Birmingham by John Wesley himself in 1745, when he was roughly handled while preaching on Gosta Green. In 1903 a very fine central hall, with lofty tower, was opened by this body, in the style of the Renaissance, fronting upon Corporation, Ryder and Dalton streets. The Presbyterians have also places of worship, and the Jews have a synagogue. From the revolution of 1688 until 1789 the Roman Catholics had no place of worship here; but Birmingham is now a Roman Catholic bishopric. The cathedral of St Chad was built from the designs of A.W. Pugin. At Erdington, towards Sutton Coldfield, is a large Benedictine Abbey (1897) of the Beuron congregation, founded as a monastery in 1876; and in the vicinity, at Oscott, is St Mary's College, where the chapel is a fine example of Pugin's work. Cardinal Newman was superior of the Oratory of St Philip Neri from its foundation in 1851.

Administration.—The government of the town resided originally in the high and low bailiffs, both officers chosen at the court

of the lord of the manor, and acting as his deputies. The system was a loose one, but by degrees it became somewhat organized, and crown writs were addressed to the bailiffs. In 1832, when the town was enfranchised, they were made the returning officers. About the beginning of the 19th century, however, a more regular system was instituted, by an act creating a body of street commissioners, who acted for the parish of Birmingham, the hamlets outside its boundaries having similar boards of their own. The annoyance and difficulty caused by these bodies, thirteen in number, led to a demand for the incorporation of Birmingham as a borough; and a charter was accordingly granted by the crown in 1838, vesting the general government in a mayor, sixteen aldermen and forty-seven councillors. The powers of this body were, however, unusually restricted, the other local governing bodies remaining in existence. It was not until 1851 that an act of parliament was obtained, abolishing all governing authorities excepting the town council, and transferring all powers to this body. Another local act was obtained in 1862, and in 1883 these various acts were combined into the Birmingham Corporation Consolidation Act. In 1889 Birmingham was created a city, and a grant made of an official coat of arms carrying supporters. The title of lord mayor was conferred on the chief magistrate in 1897. The city council consists of eighteen aldermen and fifty-four councillors, selected from eighteen wards; it is divided into seventeen committees, most of which consist of eight members. The corporation is the largest employer of labour in the borough, and is also a large landowner.

The gas, electric and water supplies are in its hands. The gas supply was taken over in 1875, and the electric in 1900 for £420,000. The local sources of water-supply are the rivers Bourne and Blythe, the Plant Brook and the Perry Stream, and eight deep wells. These works can provide 20 million gallons daily in dry weather. A large area outside the city boundaries is supplied, and in 1891, the demand having risen to nearly 17 millions a day, new sources had to be considered, and it was determined to seek an entirely new supply in Wales. By an act of 1892 power was given to acquire the watershed of the rivers Elan and Claerwen, tributaries of the Wye, lying west of Rhyader in Wales, and to construct the necessary works, the capital authorized being £6,000,000. About £5,900,000 had been spent when, on the 21st of July 1904, King Edward VII. formally opened the supply. Two reservoirs on the river Elan, formed by masonry dams from 98 to 128 ft. above the river-bed, were then completed, the construction of the three planned on the Claerwen being deferred until necessity should arise. Nearly a mile below the confluence of the rivers the great Caban Coch dam, 122 ft. high, and the same in thickness at the base, and 600 ft. long at the top, holds up the water for over 4 m. in the Elan, and over 2 in the Claerwen, having a capacity of 1500 million gallons. A series of thirty filter beds is included in the original scheme; and the water travels 73.3 m. from the source to Birmingham by gravity alone with a fall of about 170 ft. The area of the gathering ground is 45,562 acres, the mean annual rainfall in the district being 63 in. The complete scheme provided water for fifty years in advance, and a maximum of 75 million gallons a day was taken into account, in addition to 27 million gallons for compensation water to the river. The part of the works opened in 1904 provided about 27 million gallons of supply daily to the city. The corporation is obliged by the act to supply towns within 15 m. of the line of the aqueduct. A village for the accommodation of workmen was established near the Caban Coch dam; and the corporation adopted a modified form of the Gothenburg system in respect of the supply of intoxicating liquors, permitting no publican to open a licensed house.

The administration of the poor-law is vested in a board of guardians of sixty members for the parish of Birmingham. The parish of Edgbaston (wholly within the borough) is in the poor-law union of King’s Norton, and that part of the parish of Aston included in the borough is in the Aston Union. There are three workhouses—that for Birmingham parish, situated at Birmingham Heath, is capable of receiving over 2000 inmates. In 1882 a superintendent relieving officer was appointed, and a system of cross-visitation started for the purpose of checking abuses of outdoor relief. Workhouses, infirmaries and cottage homes are managed by the board, on which women first sat in 1880. The administration of justice was performed from 1838 to 1884 by a court of quarter sessions, with a recorder, and a court of petty sessions. In 1884 Birmingham was made an assize district of Warwickshire. In 1905 a special juvenile offenders’ court was initiated. The borough gaol is at Winson Green towards Smethwick. The drainage system is managed by the Birmingham, Tame and Rea District drainage board, constituted in 1877, and consisting of members from the city council and from districts outside the municipal area.

Birmingham was enfranchised in 1832, when two representatives were assigned to it, and Thomas Attwood and Joshua Scholefield, leaders of the Political Union, were elected. In 1867 three members were assigned, and in 1885 the number was increased to seven, and a corresponding number of parliamentary divisions created, namely Bordesley, Central, East, Edgbaston, North, South and West. By the Provincial Local Government Board Act of 1891 four local board districts were added to the city of Birmingham for local government—Harborne (Staffordshire), Balsall Heath (Worcestershire), Saltley and the rural hamlet of Little Bromwich (Warwickshire). These districts were by the act declared to be in the county of Warwick, though still remaining in their respective counties for the exercise of freehold votes. By this act the boundaries of the city were made conterminous for parliamentary, municipal and school board purposes. The area is 12,639 acres.

The population of Birmingham in 1700 was about 15,000. In 1801 it was 73,000, and it increased rapidly through the century. In 1891 it was 478,113 and in 1901, 522,204.

Education.—The oldest educational institution is the grammar school of King Edward VI., founded in 1552 out of the lands of the Gild of the Holy Cross, then of the annual value of £21. The endowments now yield upwards of £37,000. The principal school included in the foundation is the boys’ high school, held in the building in New Street. It has a classical and a modern side, and educates about 500 boys. Adjoining it, in a new building opened in 1896, is a large high school for girls, with 300 pupils. There are also on the foundation seven middle schools, called grammar schools, four for girls and three for boys, situated in different parts of the city, and containing about 1900 pupils altogether. The schools have numerous scholarships tenable at the schools as well as exhibitions to the universities and other places of higher education. Queen’s College, founded in 1828 as a school of medicine, subsequently embraced other subjects, though in 1882 only the medical and theological departments were maintained. In 1882 a large part of the scientific teaching, hitherto done by special professors in Queen’s College, was taken over by Mason College, and in 1892 the whole medical department was removed to the same institution under an order from the court of chancery. This change helped to advance the Birmingham medical school to a position of high repute. The theological students (Church of England) of Queen’s College are few. The idea of developing Queen’s College into a university had long existed. But it was destined to be realized in connexion with Mason College, founded by Sir Josiah Mason in 1870. Subsequent deeds (1874 and 1881) added Greek and Latin to the practical, mechanical and artistic curriculum of the original foundation, and provided that instruction may be given in all such other subjects as the trustees may from time to time judge necessary, while once in every fifteen years the provisions of the deed may be varied to meet changing needs—theology only being definitely excluded. In 1897 a new act was passed at the instance of the trustees, creating a court of 180 members, and removing the theological restriction. A measure of popular control is given through the appointment by the city council of five out of the eleven trustees. In 1898 a public meeting carried a resolution in favour of creating a university. It was estimated that a quarter of a million was needed to endow and equip a university on the scale proposed. Including £50,000 offered by Mr Andrew Carnegie, an equal amount from an anonymous donor, and the rest from local subscribers, in the autumn of 1899, £325,000 had been subscribed, and the privy council was at once petitioned for a charter, which was granted. The draft provided for the incorporation of the university of Birmingham with faculties of science, arts, medicine and commerce, with power to grant degrees, and for its government by a court of governors (of which women may be members), a council and a senate. Mason College was merged in the university. The faculty of commerce constitutes a distinctive feature in the scheme of the university, the object being to bring its teaching into close touch with the industrial life of the city, the district and the kingdom. In 1905 Sir Edward Elgar (who resigned in 1908) became the first occupant of a chair of music, founded owing to the liberality of Mr Richard Peyton. From the same year great strides were made in the development of the scientific departments of the university. A site at Edgbaston was given by Lord Calthorpe, and the erection of a complete and costly set of buildings was undertaken.

University.

The Municipal School of Art was formed by the transference to the corporation in 1885 of the then existing school of art and the society of arts, and by the erection of the building in Margaret Street, the site having already been given and a portion of the cost provided by private donors. There are one central school and two branch schools. Evening classes are also held in some

of the provided schools. The Midland Institute, the building of which was founded in 1855, and enlarged subsequently, includes a general literary and an industrial department. A marked development took place in 1885, when, fresh room having been provided by the removal of the school of art hitherto held in the building, the industrial department was greatly enlarged, resulting in the creation of one of the best metallurgical schools in the kingdom. The Municipal Technical School was established in 1893 in the building of the Midland Institute, and in 1895 was housed in a fine building of its own, in Suffolk Street, whither the whole of the scientific teaching of the institute was transferred. It contains metallurgical and engineering workshops and laboratories, lecture theatres for the teaching of chemistry and physics, a women's department, and rooms for the teaching of machine drawing and building construction. Among other educational foundations may be mentioned a number of industrial schools, reformatories and private schools of a good class.

The principal libraries are the Birmingham library, founded in 1798 by Dr Priestley, in a modern building, the Central free library, and other free libraries in different parts of the city, each with a lending department and a reading room.

Charities.—The general hospital, the foundation of Dr Ash, an eminent local physician, was opened in 1779. The old building was replaced in 1897 by a splendid new one in St Mary's Square, costing £206,000. The Queen's hospital, Bath Row, the other large hospital of the town, was founded in 1840 by W. Sands Cox, F.R.S., an eminent local surgeon, who also founded the Queen's College as a medical school. The general dispensary, the officers of which visit patients at their own homes, relieves about 8000 yearly. The children's hospital (free) established in 1864 by Dr Heslop, has two establishments—for out-patients (a handsome Gothic building) in Steelhouse Lane, and an in-patient department in Broad Street. There is also a women's hospital (free) for the special diseases of women; a lying-in charity; special hospitals for diseases of the eye, the ear, bodily deformities, and the teeth; and a homoeopathic hospital. The parish of Birmingham maintains a large infirmary at the workhouse (Birmingham Heath), and a dispensary for out-patients in Paradise Street. The majority of the hospitals and dispensaries are free. Nearly all these medical charities depend upon subscriptions, donations, legacies and income from invested property. There are two public organizations for aiding the charities, both of which were begun in Birmingham. One is a simultaneous collection in October in churches and chapels, on the Sunday called Hospital Sunday, established in 1859; the other is the Saturday Hospital collection, made by the work-people in March, which was established in 1873. A musical festival is held triennially in aid of the general hospital. There is a sanatorium at Blackwell, near the Lickey Hill, 10 m. south of Birmingham, common to all the hospitals. Amongst the non-medical charities the principal are the blind institution and the deaf and dumb asylum, both at Edgbaston; and Sir Josiah Mason's orphanage at Erdington. There are also in the town numerous almhouses for aged persons, the chief of which are Lench's Trust, the James Charities, and the Licensed Victuallers' asylum. Besides the general benefit societies, such as the Oddfellows', Foresters', &c., which are strongly supported in Birmingham, the work-people have numerous clubs of a charitable kind, and there are several important local provident societies of a general character, with many thousand members.

Commerce.—From an early period Birmingham has been a seat of manufactures in metal. Hutton, the historian of the town, claims for it Saxon or even British antiquity in this respect, but without foundation. The first direct mention of Birmingham trades is to be found in Leland's *Itinerary* (1538). He writes:—"I came through a pretty street as ever I entered into Bermingham towne. This street, as I remember, is called Dirtey [Deritend]. In it dwell smiths and cutlers. There be many smithes in the towne that use to make knives and all manner of cutlery tooles, and many lorimers that make bittes, and a great many naylors, so that a great part of the towne is maintained by smithes, who have their iron and sea-cole out of Staffordshire." The cutlers no longer exist, this trade having gone to Sheffield; but the smiths remain, and the heavier cutting tools are still largely made here. The wide importance of Birmingham as a centre of manufactures began towards the close of the 17th century, one great source of it being the absolute freedom of the town, there being no gilds, companies or restrictions of any kind; besides which the easy access to cheap coal and iron indirectly helped the development. It is remarkable that two important trades, now located elsewhere, were first established here. Steel was made in Birmingham until 1797, but then ceased to be so for about seventy years, when an experiment in steel-making was made by a single firm. Cotton-spinning was begun in Birmingham by John Wyatt, Lewis Paul and Thomas Warren as early as 1730; but the speculation was abandoned before the end of the century. The great staple of Birmingham is metal-working in all its various forms. The chief variety is the brass-working trade. Iron-working, though largely carried on, is a much less important trade, works of this kind being chiefly established in the Staffordshire district. Jewelry, gold, silver and gilt come next to brass. The remarkable development of this branch of industry is demonstrated by the increase in the amount of gold and silver marked, as recorded by the Assay office—the figures of 48,123 oz. of gold and 84,323 oz. of silver in 1870 had been increased to 363,000 oz. of gold and nearly 3,000,000 oz. of silver by the end of the century. Then follow "small arms" of all kinds. Until 1906 a Royal Small Arms factory was maintained by the government at Sparkbrook, but it was then transferred to the Birmingham Small Arms Company, which had already extensive works in the district. Buttons, hooks and eyes, pins and other articles used for dress, constitute a large class of manufactures. Glass, especially table glass, is a renowned staple of the town. Screws, nails, &c., are made in enormous quantities; indeed, Birmingham has a monopoly of the English screw trade. Steel pens are also a specialty, the name best known in this connexion being that of Sir Josiah Mason. Electro-plating, first established in 1841 by the firm of Elkington, is one of the leading trades. Among other branches of manufacture are wire-drawing, bell founding, metal rolling, railway-carriage building (a large and important industry), the manufacture of cutting implements and tools of all kinds, die-sinking, papier-maché making and a variety of others. In 1897 there was a sudden development of cycle manufacturing, followed in 1899 by an almost equally sudden collapse, but this industry is maintained and accompanied by the manufacture of motor cars, tyres and accessories, for which Birmingham is one of the principal centres in Great Britain.

Birmingham may claim as her own the perfection of the steam engine, through the genius of James Watt and the courage of Matthew Boulton. The memory of the great Soho factory is one of the most precious heritages of the town, and Watt's own private workshop continues just as he left it, with no single article disturbed, carefully preserved in the garret of his house at Heathfield. The mention of Watt and of Soho recalls the memories of distinguished inventors and others who have been connected with Birmingham. Here John Baskerville, the printer, carried on his work. An institution called the Lunar Society, which met each month about the time of full moon, brought together a brilliant company—Watt, Boulton, Joseph Priestley, Josiah Wedgwood, Erasmus Darwin, Samuel Parr, Dr William Withering, Richard Lovell Edgeworth, Sir Joseph Banks, Sir William Herschel, Dr Solander, John Roebuck, James Keir and many others. William Murdock, the inventor of gas, was a Soho man, and first used his invention to light the Soho factory at the peace of Amiens in 1802. The series of inventors is continued by the names of Gillott, Elkington, Chance, Mason and others. Thomas Rickman, the reviver and historian of Gothic architecture, practised as an architect in Birmingham. William Hutton, the antiquary and historian, carried on his bookselling business here. Many of the best engravers were Birmingham men, notably James Tibbitts Willmore and John Pye, the special translators of Turner's marvellous creations. Attwood, Joseph Parkes, John Bright and Joseph Chamberlain speak for Birmingham in the region of politics and statesmanship.

One of the most marked features of social life in Birmingham is the fact that contrasts in the distribution of wealth are less strongly marked than in most other great cities. The distance between the poorest and the richest is bridged over by a larger number of intermediate gradations. Colossal fortunes are few; on the other hand there is a numerous class of rich men. These, however, for the greater part are actually engaged in trade or manufactures, and hold their place in local life rather on account of industry pursued than of wealth possessed. The number of the leisured class, enjoying large incomes without participating in any local industry, is relatively small, but is said to be on the increase. There are many manufacturing companies, but great private firms are also numerous. In regard to labour conditions, the system of small masters holds its own in the manufactures of Birmingham, and shows no signs of extinction. One effect of this condition is that capital and labour are not brought into enmity, and consequently strikes and disputes are infrequent. As regards the condition of the working classes it may be noted that Birmingham was the birthplace of the freehold land and building societies, by which workmen are enabled on easy terms to acquire houses of their own. The risk of an overcrowded population is consequently minimized; the houses, moreover, are generally well situated as regards light and air, and many have small gardens. Among industrial communities where peculiar

attention is paid to the housing of workmen and their families, that of Bourneville, occupied by the *employés* of Messrs Cadbury, chocolate manufacturers, is well known.

History.—Owing to its rapid expansion, and the consequent newness of most of the public and other buildings, Birmingham is often supposed to be a modern town. It was, however, in existence as a community in the Saxon period. Proof of this was given in 1309 by William de Bermingham, then lord of the manor, who showed in a law-suit that his ancestors had a market in the place and levied tolls before the Conquest. Some authors have endeavoured to identify the town with the supposed Roman station called Bremenium, but this claim has long been abandoned as fabulous. A Roman road runs north and south across the site of the town, but no remains have been found other than a very few coins. The origin of the name is untraceable; the spelling itself has passed through about 100 different forms. Dugdale, the historian of Warwickshire, adopts Bromwycham, and regards it as of Saxon derivation. Hutton, the historian of Birmingham, has the fanciful etymology of *Brom* (broom), *wych* (a descent), and *ham* (a home), making together the home on the hill by the heath.

In *Domesday Book* Birmingham is rated at four miles of land with half a mile of woods, the whole valued at £203. Two hundred years later the family of de Bermingham, the owners of the place, come into sight, one of them, William, being killed at the battle of Evesham, in 1265, fighting with Simon de Montfort and the barons against Henry III. The son of this William afterwards took part in the French war, and was made prisoner; his father's estates, forfeited by treason, were restored to him. Thenceforward the family engaged in various local and other offices, but seemingly abstained from politics. They held the place until 1527, when Edward de Bermingham was deprived of his property by means of John Dudley, duke of Northumberland, who trumped up a pretended charge of riot and robbery against him and procured Birmingham for himself. On the attainder of Dudley the manor passed to the crown, and was granted to Thomas Marrow, of Berkswell, from whom by marriage and descent it went to Christopher Musgrave, and finally, as regards the only valuable part—the market tolls—by purchase to the town itself. In the Wars of the Roses it does not seem that Birmingham took any part; but energy revived in the Civil War under Charles I., when the town sided actively with the Parliamentarians. In 1642, when Charles was marching from Shrewsbury to relieve Banbury, the Birmingham people seized part of his baggage, including much plate, money and wine, which they sent to the Parliamentary garrison at Warwick. Before the battle of Edgehill Charles rested for two nights at Aston Hall, near the town, as the guest of Sir Thomas Holte. The Birmingham people resented this by helping the Parliamentarians to cannonade the Hall and to levy a fine upon Sir Thomas Holte. They also supplied the Parliamentary army with 15,000 sword blades, refusing to make a single blade for the Royalists. These manifestations of hostility were avenged in April 1643 by Prince Rupert, who, with 2000 men and several pieces of artillery, attacked the town, planting his cannon on an eminence near Sparkbrook, still known as Camphill. The townspeople resisted, but were beaten, many persons being killed or wounded. Amongst the former was Lord Denbigh, one of the Royalist officers. Having captured the place, Prince Rupert allowed his troops to plunder it, to burn about eighty houses and to set their prisoners to ransom. He also levied a fine of £30,000, equal to at least £100,000 of the present value of money. This bitter lesson kept Birmingham quiet during the rest of the Civil War, though the sympathies of the people with the Parliamentarians were unabated. In 1665 Birmingham suffered heavy losses by the plague, great numbers of dead being buried in the Pest Field, at Ladywood, then a lonely place far outside the town, but long since thickly covered with buildings. In 1688 the Revolution provoked a temporary outbreak of Protestant feeling. James II. had given timber from the royal forest of Needwood, near Burton, to build a Roman Catholic chapel and convent in a place still called Mass-house Lane. This edifice the mob promptly destroyed when James gave place to William and Mary. Rather more than a century of quiet prosperity ensued, and then occurred the serious and most lamentable outbreak of popular fury known as the Church and King riots of 1791. For some years there had been much political activity in Birmingham, the dissenters, particularly the Unitarians, being desirous of relief from the political and religious disabilities under which they laboured. The leader in these movements was the famous Dr Priestley, who kept up an active controversy with the local clergy and others, and thus drew upon himself and his co-religionists the hatred of the more violent members of the Church and Tory party. The smouldering fire broke out on the occasion of the French Revolution. On the 14th of July a dinner of Birmingham Liberals was held at the Royal hotel to celebrate the destruction of the Bastille. This was the signal of a popular outbreak. A Church and King mob, encouraged and organized by leaders of better station, who were too cowardly to show themselves, began an attack upon the Unitarians. Priestley was not present at the dinner, but his house at Fair Hill, Sparkbrook, was one of the first to be sacked and burnt—his library and laboratory, with all his manuscripts, the records of lifelong scientific and philosophical inquiries, perishing in the flames. The house and library of Hutton the historian were also destroyed. The Unitarian chapel was burnt, and several houses belonging to members of the sect were sacked and burnt. The riot continued until a strong body of troops was marched into the town, but before their arrival damage to the amount of more than £60,000 had been done. Some of the rioters perished in the burning buildings, in the cellars of which they drank themselves into stupefaction. Others were tried and imprisoned, and four of the prisoners were hanged. The persecuted Unitarians recovered a small part of their losses from the county; but Priestley himself, owing in a great measure to the unworthy prejudice against him, was forced to remove to the United States of America, where he spent the rest of his life. A late atonement was made by the town to his memory in 1873, by the erection of a statue in his honour in front of the town hall and the foundation of a Priestley scholarship at the Midland Institute.

As if ashamed of the excesses of 1791, Birmingham thenceforth became, with one or two exceptions, a peaceful town. In the dismal period from 1817 to 1819, when the manufacturing districts were heavily distressed and were disturbed by riots, Birmingham remained quiet. Even when some of the inhabitants were tried and punished for demanding parliamentary representation, and for electing Sir Charles Wolseley as their delegate, there was no demonstration of violence—the wise counsels of the leaders inducing orderly submission to the law. The same prudent course was observed when in the Reform agitation of 1831-1832 the Political Union was formed, under the leadership of Thomas Attwood, to promote the passing of the Reform Bill. Almost the whole town, and great part of the surrounding district, joined in this agitation; vast meetings were held on Newhall Hill; there was much talk of marching upon London 100,000 strong; but, owing to the firmness and statesmanship of Attwood and his associates, there was no rioting or any sign of violence. Ultimately the Political Union succeeded in its object, and Birmingham helped to secure for the nation the enfranchisement of the middle classes and other political reforms. One exception to the tranquillity of the town has to be recorded—the occurrence of riots in 1839, during the Chartist agitation. Chartism took a strong hold in Birmingham, and, under the influence of Feargus O'Connor and some of his associates, nightly meetings of a threatening character were held in the Bull Ring. The magistrates resolved to put these down, and having obtained the help of a detachment of the metropolitan police—the town then having no local police force—a meeting was dispersed, and a riot ensued, which resulted in injury to several persons and required military force to suppress it. This happened on the 4th of July. On the 15th of the same month another meeting took place, and the mob, strongly armed and numbering many thousands, set fire to several houses in the Bull Ring, some of which were burned to the ground and others were greatly damaged. The military again interfered, and order was restored, several of the ringleaders being afterwards tried and imprisoned for their share in the disturbance. There was another riot in 1867, caused by the ferocious attacks of a lecturer named Murphy upon the Roman Catholics, which led to the sacking of a street chiefly inhabited by Irishmen; but the incident was comparatively trivial and further disorders were prevented by the prompt action of the authorities.

See W. Hutton, *History of Birmingham* (2nd ed., Birm., 1783); J.A. Langford, *A Century of Birmingham Life, 1741-1841* (Birm., 1868), and *Modern Birmingham and its Institutions, 1841-1871* (Birm., 1873); J.T. Bunce, *History of the Corporation of Birmingham* (Birm., 1885).

BIRNEY, JAMES GILLESPIE (1792-1857), American reformer, leader of the conservative abolitionists in the United States from about 1835 to 1845, was born in Danville, Kentucky, of a family of wealth and influence, on the 4th of February 1792. He

graduated at the College of New Jersey (now Princeton University) in 1810. In 1814, after a course of legal study, he began the practice of the law at Danville. He entered immediately, as a Democrat, into Kentucky politics, and political ambition caused his removal in 1818 to northern Alabama, near Huntsville. There was at that time in the south-west much anti-slavery sentiment. Birney's father was among those who advocated a "free state" constitution for Kentucky, and the home environment of the boy had thus fostered a questioning attitude towards slavery, though later he was himself a slave-holder. In the general assembly of Kentucky in 1816, and in that of Alabama in 1819, he opposed inter-state rendition of fugitive slaves and championed liberal slave-laws. His career as a lawyer in Alabama was exceptionally brilliant; but his political career was abruptly wrecked by his opposition in 1819 to Andrew Jackson, whose friends controlled the state. His tariff and anti-slavery views, moreover, carried him more and more away from the Democratic party and toward the Whigs.

About 1826 he began to show an active interest in the American Colonization Society, and in 1832-1833 served as its agent in the south-west. In 1833 he returned to Danville, and devoted himself wholly to the anti-slavery cause. He freed his own slaves in 1834. Convinced that gradual emancipation would merely stimulate the inter-state slave trade, and that the dangers of a mixed labour system were greater than those of emancipation in mass, he formally repudiated colonization in 1834; moreover, gradualism had become for him an unjustifiable compromise in a matter of religion and justice. At this time also he abandoned the Whig party. He delivered anti-slavery addresses in the North, accepted the vice-presidency of the American Anti-Slavery Society and announced his intention to establish an anti-slavery journal at Danville (1835). For this he was ostracized from Kentucky society; his anti-slavery journals were withheld in the mails; he could not secure a public hall or a printer. In these circumstances, he removed to Cincinnati, Ohio, and there, in January 1836, founded the *Philanthropist*, which, in spite of rancorous opposition, became of great influence in the north-west. Birney soon relinquished its active control in order to serve the Anti-Slavery Society as secretary and as a lecturer. He favoured immediatism, but he differed sharply from the Garrisonian abolitionists, who abhorred the federal Constitution and favoured secession. He always wrote, spoke and laboured for the permanent safety of the Union. The assaults of the South in defence of slavery upon free speech, free press, the right of petition and trial by jury, he pronounced "exorbitant claims ... on the liberties of the free states"; the contest had become, he said, "one not alone of freedom for the blacks but of freedom for the whites." Twenty-three years before William H. Seward characterized as an "irrepressible conflict" the antagonism between freedom and slavery, Birney proclaimed: "There will be no cessation of conflict until slavery shall be exterminated or liberty destroyed"—"liberty and slavery cannot both live in juxtaposition" (1835). The ends being political, so also, thought Birney, must be the means; as parties in the south were fusing, he laboured to re-align parties in the north, and advocated the formation of an independent anti-slavery party. After the separation of the Garrisonian and the political abolitionists in 1840 the new party was formed, and in 1840, and again in 1844, as the Liberty party (*q.v.*), it made Birney its candidate for the presidency. In 1840 he received 7069 votes; in 1844, 62,263. A fall from his horse in 1843 made him a hopeless invalid, and completely removed him from public life. He died at Perth Amboy, New Jersey, on the 25th of November 1857.

Two of Birney's sons, William Birney (1810-1907) and David Bell Birney (1825-1864), were prominent as officers on the Federal side during the Civil War in America.

See *James G. Birney and His Times* (New York, 1890), by his son, William Birney; and his principal writings: *On the Sin of Holding Slaves* (1834). *Letter on Colonization* (1834), *Vindication of Abolitionists* (1835), *American Churches the Bulwark of American Slavery* (1840, 3rd ed. 1885); *Speeches in England* (1840); and *Case of Strader et al.* v. *Graham* (1852).

BIRON, ARMAND DE GONTAUT, Baron de (1524-1592), a celebrated French soldier of the 16th century. His family, one of the numerous branches of the house of Gontaut, took its title from the territory of Biron in Perigord, where on a hill between the Dropt and the Lide still stands the magnificent castle begun by the lords of Biron in the 11th century. As a page of the queen of Navarre Biron attracted the notice of the marshal de Brissac, with whom he saw active service in Italy. A wound received by him in his early years made him lame for life, but he did not withdraw from the military career, and he held a command in Guise's regiment of light horse in 1557. A little later he became chief of a cavalry regiment, and in the wars of religion he repeatedly distinguished himself.

His great services to the royal cause at Dreux, St Denis, Jarnac and Moncontour were rewarded in 1569 by his appointment as a privy councillor of the king and grand master of artillery. He commanded the royal forces at the siege of La Rochelle in 1572, and four years later was made a marshal of France. From 1576 to 1588 he was almost continuously employed in high command. From 1589 he supported the cause of Henry of Navarre, but was suspected of prolonging the civil wars in his own interest. Biron was killed by a cannon-ball at the siege of Epernay on the 26th of July 1592. He was a man of considerable literary attainments, and used to carry a pocket-book, in which he noted everything that appeared remarkable. Some of his letters are preserved in the Bibliothèque Nationale and in the British Museum; these include a treatise on the art of war.

His son, Charles de Gontaut, duc de Biron (1562-1602), fought brilliantly for the royal party against the League. He was made admiral of France in 1592, and marshal in 1594; governor of Burgundy in 1595, he took the towns of Beaune, Autun, Auxonne and Dijon, and distinguished himself at the battle of Fontaine-Francaise. In 1596 he was sent to fight the Spaniards in Flanders, Picardy and Artois. After the peace of Vervins he discharged a mission at Brussels (1598). From that time he was engaged in intrigues with Spain and Savoy, and, notwithstanding, directed the expedition sent against the duke of Savoy (1599-1600). After fulfilling diplomatic missions for Henry IV. in England and Switzerland (1600), he was accused and convicted of high treason and was beheaded in the Bastille on the 31st of July 1602.

His collateral descendant, Armand Louis de Gontaut, due de Lauzun, afterwards duc de Biron (1747-1793), is known for the part he played in the War of American Independence and the revolutionary wars. Until 1788, when he succeeded to the duchy of Biron on the death of his uncle,—Louis Antoine de Gontaut, duc de Biron (1700-1788)—he bore the title of duc de Lauzun, which had passed, on the death of Antoine Nompas de Caumont, duc de Lauzun (1633-1723), to his niece, the wife of Charles Armand de Gontaut, duc de Biron (1663-1756). After for a while wasting his fortune in dissipation in various parts of Europe, he attracted attention by an essay on the military defences of Great Britain and her colonies (*État de défense d'Angleterre et de toutes ses possessions dans les quatres parties du monde*). This led to his appointment to a command against the English in 1779, in which he gained several successes. In the following year he took a conspicuous part in the War of American Independence, and on his return to France was made *maréchal de camp*. In 1789 he was returned as deputy to the states-general by the *noblesse* of Quercy, and attached himself to the revolutionary cause. In 1791 he was sent by the Constituent Assembly to receive the oath of the army of Flanders, and subsequently was appointed to its command. In July 1792 he was nominated commander of the army of the Rhine, with the duty of watching the movements of the Austrians. In May 1793 he was transferred to the command of the army of La Rochelle, operating against the insurgents of La Vendée. He gained several successes, among them the capture of Saumur and the victory of Parthenay; but the insubordination of his troops and the intrigues of revolutionary agents made his position intolerable and he sent in his resignation. He was thereupon accused by the notorious Carrier of *incivisme* and undue leniency to the insurgents, deprived of his command (July), imprisoned in the Abbaye and condemned to death by the Revolutionary Tribunal. He was guillotined on the 31st of December 1793. Some *Mémoires*, which come down to 1783, were published under his name in 1822 (new ed. 1858), and in 1865 letters said to have been written by him in 1789 to friends in the country, describing the states-general.

BIRR, or Parsonstown, a market-town of King's county, Ireland, on an acclivity rising above the Birr, and on a branch of the Great Southern & Western railway by which it is 87 m. W.S.W. from Dublin. Pop. of urban district (1901) 4438. Cumberland Square, in which there is a Doric column surmounted by a statue of the duke of Cumberland, to commemorate the battle of Culloden, is the point from which the several principal streets diverge in regular form. The fine castle of Birr, beside its historical interest, has gained celebrity on account of the reflecting telescope erected here (1828-1845) by William, third earl of Rosse. This is 56 ft. in length and weighs 3 tons; and there is another smaller instrument. Among institutions the model and preparatory schools of the Brothers of the Presentation Order are noteworthy. There is a bronze statue by Foley of Lord Rosse (d. 1867). Some trade is carried on in corn and timber, and in brewing and distilling.

An abbey was founded at Birr by St Brendan (d. 573), to whom the present parish church is dedicated. The district formed part of Ely O'Carroll, and was not included in King's county till the time of James I. A great battle is said to have been fought near Birr in the 3rd century between Cormac, son of Cond of the Hundred Battles, and the people of Münster. The castle was the chief seat of the O'Carrolls. In the reign of James I. it and its appendages were assigned to Lawrence Parsons, brother of Sir William Parsons, surveyor-general. From him the alternative name of the town is derived. The castle was more than once besieged in the time of Cromwell, and was taken by Ireton in 1650. It also suffered assault in 1688 and 1690.

BIRRELL, AUGUSTINE (1850-), English author and politician, son of a Nonconformist minister, was born near Liverpool on the 19th of January 1850. He was educated at Amersham Hall school and at Trinity Hall, Cambridge. He went to the bar, and gradually obtained a good practice; in 1893 he became a K.C., and he was professor of law at University College from 1896 to 1899. But it was as a literary critic of unusually clever style and an original vein of wit, that he first became known to the public, with his volume of essays entitled *Obiter Dicta* (1884). In 1889 he was returned to parliament for West Fifeshire as a Liberal. In the House of Commons his light but pointed humour gradually led to the coining of a new word, "barrelling," and his literary and oratorical reputation grew apace. Whether he was writing miscellaneous essays or law-books, his characteristic style prevailed, and his books on copyright and on trusts were novelties indeed among legal textbooks, no less sparkling than his literary *Obiter Dicta*. A second series of the latter appeared in 1887. *Res Judicatae* in 1892 and various other volumes followed, for he was in request among publishers and editors, and his easy charm of style and acute grasp of interesting detail gave him a front place among contemporary men of letters. Mr Birrell was first married in 1878, but his wife died next year, and in 1888 he married Mrs Lionel Tennyson, daughter of the poet Frederick Locker (Locker-Lampson). At the general election of 1900 he preferred to contest the N.E. division of Manchester rather than retain his seat in Fifeshire, but was defeated. He did valuable service, however, to his party by presiding over the Liberal Publication Department, and at the general election of 1906 he was returned for a division of Bristol. He had been included in Sir Henry Campbell-Bannerman's cabinet, and as minister for education he was responsible for the education bill which was the chief government measure in their first session. But the prolonged controversy over the bill, and its withdrawal in the autumn owing to the refusal of the government to accept modifications made by the House of Lords in the denominational interest, made his retention of that office impossible, and he was transferred (January 1907) to the post of chief secretary for Ireland, which he subsequently retained when Mr Asquith became prime minister in 1908. In the session of 1907 he introduced an Irish Councils bill, a sort of half-way house to Home Rule; but it was unexpectedly repudiated by a Nationalist convention in Dublin and the bill was promptly withdrawn. His prestige as a minister, already injured by these two blows, suffered further during the autumn and winter from the cattle-driving agitation in Ireland, which he at first feebly criticized and finally strongly denounced, but which his refusal to utilize the Crimes Act made him powerless to stop by the processes of the "ordinary law"; and the scandal arising out of the theft of the Dublin crown jewels in the autumn of 1907 was a further blot on the Irish administration. On the other hand his scheme for a reconstituted Irish Roman Catholic university was very favourably received, and its acceptance in 1908 did much to restore his reputation for statesmanship.

BIRTH (a word common in various forms to Teutonic languages from the root of the verb "to bear"), the act of bringing forth a child, or the fact of its being born; so also a synonym for descent or lineage. In law, a child not actually born, but *en ventre sa mère*, is supposed for many purposes to be actually born, and may take any benefit to which it would have been entitled if actually born, *i.e.* it may take as legatee or devisee, or even as next-of-kin or heir, but none of these conditions will take effect, unless the child is born alive (see Medical Jurisprudence). The given year of age of a child is gained at the first instant of the day preceding the birthday, and no account is taken of parts of a day, *e.g.* a child born at 11.59 on the night of the 2nd-3rd of May 1900, would be of age the first moment after midnight of the 1st-2nd of May 1921. In English law, by the Offences against the Person Act of 1861, it is a misdemeanour punishable by a maximum of two years' imprisonment with hard labour, to endeavour to conceal the birth of a child by any secret disposition of its dead body, whether the child died before, after or at its birth.

Registration of Births.—The registration of baptisms is said to have been first introduced by Thomas Cromwell when vicar-general in 1538, but it is only in comparatively modern times that registration has been fully carried out. The law relating to the registration of births was consolidated for England by the Births and Deaths Registration Act 1874, and for Ireland by the Births and Deaths Registration Act (Ireland) 1880. In Scotland it depends upon the Registration of Births, Deaths and Marriages (Scotland) Act 1854, as amended by later acts. Previously to the passing of the Births and Deaths Registration Act 1836, the records of the births were compiled from parish registers, which were formerly a part of the ecclesiastical organization, and continued to be attached, more or less, to the church till the passing of the act of 1836. That act provided a far more complete machinery than that before existing for the exact record of all births. The new system relieved the clergy from all functions previously thrown upon them, and finally, after improvement by subsequent acts, was made compulsory in 1874. The act of 1836 established a general register office in London, presided over by an officer called the registrar-general, with general superintendence over everything relating to registration. The registrar-general is appointed under the Great Seal. Every poor-law union or parish is divided into districts, each of which is called by a distinct name, and is in charge of a registrar, who is a local officer appointed by the guardians of the union. Over each union is a superintendent registrar, who has supervision over the registrars within his district. The office of superintendent registrar is usually filled by the clerk to the guardians of the union. He receives quarterly from every registrar within his district certified copies of the births registered by him and having verified their correctness, transmits them to the registrar-general. He takes charge of the register-books within the district, when filled. Every registrar is required to inform himself carefully of every birth which happens within his sub-district and register the same, with the various particulars required, according to the forms laid down for the purpose. It is the duty of the father or mother of any child born alive, or in their default, then of the occupier of the house (if he knows of the birth) or of any person present at the birth or having charge of the child, to give to the registrars, within forty-two days after the day of the birth, information of the particulars required to be registered concerning the birth, and in the presence of the registrar to sign the register. Every person required to give information concerning any birth who wilfully refuses to answer questions put to him by the registrar concerning the particulars required to be registered, or who refuses or fails without reasonable excuse to give information of any birth, becomes liable to a penalty of forty shillings. After three months a birth can only be registered in the presence of the superintendent registrar, and after the expiration of twelve months a birth can only be registered with the written authority of the registrar-general. In the case of an illegitimate child, no person as the father of such

child is required to give information, nor is the name of any one entered in the register as the father of such a child, unless at the joint request of the mother and the person who acknowledges himself to be the father. An additional duty is placed upon the father by the Notification of Births Act 1907. By that act it is the duty of the father of a child if he is actually residing in the house where the birth takes place at the time of its occurrence to give notice in writing of the birth to the medical officer of health of the district in which the child is born within thirty-six hours of the birth. The same duty is also imposed upon any person in attendance (*i.e.* medical practitioner or midwife) upon the mother at the time of or within six hours after the birth. The medical officer of health is then in a position to take such steps, by advice or otherwise, as may, in his opinion lead to the prevention of infant mortality. Notice under the act is given by posting a prepaid letter or postcard to the medical officer of health giving the necessary information. Failure to give notice entails on summary conviction a penalty not exceeding twenty shillings. The act is optional to local authorities, but may be enforced within any area by the Local Government Board. By the Births and Deaths Registration Act 1874 and the Merchant Shipping Act 1894, commanding officers of ships trading to or from British ports must, under a penalty, transmit returns of all births occurring on board their ships to the registrar-general of shipping, who furnishes certified copies of such returns to the registrars-general for England, Scotland and Ireland. These returns of births (and deaths) constitute the "Marine Register Book."

Registration is very efficiently carried out in practically every European country, with the exceptions of Turkey and Russia. In the United States laws requiring registration vary in the different states.

Tax on Birth.—In 1694 an act was passed in England for "granting to His Majesty certain rates and duties upon marriages, births and burials, upon bachelors and widowers for the term of five years, for carrying on the war against France with vigour." The taxes were graduated, rising from four shillings on the burial of the humblest person to £50 in the case of a duke or duchess. The duty on births varied according to the rank of the parents. A duke paid £30 on the birth of an eldest son, and £25 for every other child; a baronet or knight, £5 for an eldest son, and £1 each for other children. An archbishop or bishop, or a doctor of divinity, law or physic paid £1 for every child; a gentleman having a personal estate of £600 or a real estate worth £50 per annum, paid ten shillings on the birth of each child. Every other person not receiving alms paid a tax of two shillings on the birth of each child. This measure, however, was only temporary, and passed for revenue purposes solely.

See also articles Illegitimacy; Infanticide; Legitimacy and Legitimation; Population; Succession; Obstetrics, &c.

BĪRŪNĪ [Abū-r-Raiḥān Muḥammad al-bīrūnī] (973-1048), Arabian scholar, was born of Persian parentage in Khwārizm (Khiva), and was a Shi'ite in religion. He devoted his youth to the study of history, chronology, mathematics, astronomy, philosophy and medicine. He corresponded with Ibn Sīnā (see Avicenna), and the answers of the latter are still preserved in the British Museum. For some years he lived in Jurjān, and then went to India, where he remained some years teaching Greek philosophy and learning Indian. In 1017 he was taken by Mahmud of Ghazni to Afghanistan, where he remained until his death in 1048. His *Athār ul-Bākiya* (Vestiges of the Past) was published by C.E. Sachau (Leipzig, 1878), and a translation into English under the title *The Chronology of Ancient Nations* (London, 1879). His *History of India* was published by C.E. Sachau (London, 1887), and an English translation (2 vols., London, 1888). Other works of his, chiefly on mathematics and astronomy, are still in manuscript only.

See C. Brockelmann, *Geschichte der arabischen Litteratur* (Weimar, 1898), vol. i. pp. 475-476.

(G. W. T.)

BISALTAE, a Thracian people on the lower Strymon (Struma; Karasu, "black water"), in the district between Amphipolis and Heraclea Sintica on the east and Crestonice on the west. They also made their way into the peninsulas of Acte and Pallene in the south, beyond the river Nestus in the east, and are even said to have raided Cardia. Under a separate king at the time of the Persian wars, they were annexed by Alexander I. (498-454 B.C.) to the kingdom of Macedonia. At the division of Macedonia into four districts by the Romans after the battle of Pydna (168) the Bisaltae were included in Macedonia Prima (Livy xlv. 29).

Their country was rich in figs, vines and olive trees; the silver mines in the mountain range of Dysorum brought in a talent a day to their conqueror Alexander. The Bisaltae are referred to by Virgil (*Georgics*, iii. 461) in connexion with the treatment of the diseases of sheep. The fact that their eponymus is said to have been the son of Helios and Ge points to a very early settlement in the district.

See Smith's *Dict. of Greek and Roman Geography*; M. Ihm in Pauly-Wissowa's *Realencyclopädie*, iii. part i. (1897); W. Tomaschek, *Die alien Thraker* (Vienna, 1893); and for the coins of the Bisaltic kings, B.V. Head, *Historia Numorum*, p. 178.

BISCAY (*Vizcaya*), a maritime province of northern Spain; bounded on the N. by the Bay of Biscay, E. by Guipúzcoa, S. by Álava and W. by Burgos and Santander. Pop. (1900) 311,361; area, 836 sq. m. A small strip of isolated territory within the borders of Biscay, on the west, is officially included in the province of Santander. Biscay is one of the Basque Provinces, and its name is occasionally employed as geographically equivalent to Basque, in that case including the three provinces of Biscay proper, Guipúzcoa and Álava. The coast-line, which extends from Ondarroa to a short distance east of Castro Urdiales, is bold and rugged, and in some places is deeply indented. The surface of the country is for the most part very mountainous, being traversed towards the south by the great Cantabrian chain; but at the same time it is diversified with numerous narrow valleys and small plains. Some of the mountains are almost entirely composed of naked calcareous rock, but most of them were formerly covered to their summits with forests of oaks, chestnuts or pine trees, now destroyed to provide fuel. Holly and arbutus are common, and furze and heath abound in the poorer parts. The only river of any size is the Nervion, Ansa or Ibaizabal, on which Bilbao is situated; the others, which are numerous, are merely large mountain streams. The climate is rather inclement and variable; but the thermometer seldom drops below freezing-point, nor does snow fall frequently in winter except on the highest summits. The rainfall is on an average greater than in any province except those of the extreme north-west. The soil, though not very fertile, except in some of the valleys and sheltered hillsides, produces wheat, maize, barley, rye, flax, grapes, peaches, apples and other fruits. The mountainous slopes of Biscay are studded with the traditional Basque *caserio*, or farm-house, in which the peasantry live on the *métayer* system, dividing the profits of the soil with absentee landlords. The farms are generally small, and are for the most part tilled by manual labour. The fisheries are actively prosecuted along the coast by a hardy race of fishers, who were the first of their craft in Europe to pursue the whale, formerly abundant in the Bay of Biscay. Cod, bream, tunny and anchovy are the principal fish taken. The fishing fleet consists of several hundred boats, manned by nearly 5000 men and boys. Biscay is very rich in minerals. Iron of the finest quality is found in almost every part, and forms a main article of export. At the beginning of the 20th century an average of about 5,000,000 tons

was produced every year, and many large foundries were at work. Lead and zinc are mined in much smaller quantities, alum and sulphur are also present, and marble, lime and sandstone are abundant. Another very important industry is the manufacture of dynamite and other explosives at Baracaldo, closely connected with the mining interests. There are also potteries, paper, soap and shoe factories, flour mills and breweries, and the many mineral springs and spas are frequented by people from all parts of Spain. The mining and industrial interests of Biscay were very materially assisted by the quick and important development of means of communication of every kind. The provincial and parish roads, kept up by the local government, are excellent. No province in Spain had at the beginning of the 20th century such a complete network of railways, all built since 1870.

Bilbao (pop. 83,306), the capital and principal port, and Baracaldo (15,013), an important industrial town, are described in separate articles. Sestao (10,833) is the only other town of more than 10,000 inhabitants; the port of Bermeo (9061) is the chief fishing station; Durango (4319), on the river of the same name, was founded by the early kings of Navarre in the 10th century, obtained the rank of a countship in 1153, and contains one of the oldest churches in the Basque Provinces, San Pedro de Tavira; Guernica (3250), a picturesque village on the river Mondaca, was until 1876 the meeting-place of the provincial parliament. The deputies assembled under an old oak-tree, celebrated by the Basque poet, José Maria Iparraguirre, in a song which is regarded by the Spanish Basques almost as a national anthem. For the history of the Basques, see Basque Provinces; for their origin, language and customs, see Basques. The inhabitants of Biscay are intelligent, enterprising and well-educated; and, owing to the uniformly high birth-rate, low death-rate, and very slight loss by emigration, their numbers increased rapidly during the latter part of the 19th century, until in 1900 the density of population (372.4 per sq. m.) was greater than in any other Spanish province.

BISCAY, BAY OF (Fr. *Golfe de Gascogne*; Sp. *Golfo de Vizcaya*), an inlet of the Atlantic Ocean; bounded on the E. and N.E. by France, as far as the island of Ushant, and on the S. by Spain as far as Cape Ortegal. The Bay of Biscay is the *Sinus Aquitanicus*, *Sinus Cantabricus* or *Cantaber Oceanus* of the Romans; hence it is sometimes known as the Cantabrian Sea. Its modern English name is a corrupt form of the Spanish *Vizcaya*. The bay forms a fairly regular curve, broken on the French seaboard only by the estuaries of the Loire, Garonne, Adour and other rivers. The rugged Spanish coast is indented by many fjord-like inlets, especially in the west, where navigation is sometimes difficult and dangerous; but its rivers are comparatively unimportant. The exposed position of the bay, and the diversity of its currents, have rendered it notorious for its storms.

BISCEGLIE (perhaps anc. *Natiolum*), a seaport and episcopal see of Apulia, Italy, on the E.S.E. coast, in the province of Bari, from which it is distant 21½ m. by rail. Pop. (1901) 30,885. Two towers, one some 90 ft. high, of a once strong Norman castle still remain; the cathedral belongs to the same period. The church of S. Margherita, founded in 1197, has fine canopied Gothic tombs of the Falcone family.

BISCHOFSWERDA, a town of Germany, in the kingdom of Saxony, on the Wesenitz, and at the junction of the Dresden-Görlitz and Bischofswerda-Zittau railways in the governmental district of Bautzen. Pop. (1905) 7465. There are cloth, artificial flower, and cigar factories, glass-works, potteries, and in the neighbourhood large granite quarries. It is famous as the scene of a battle, on the 12th of May 1813, between the French and the Allies after Napoleon's retreat from Moscow. It was the residence of Benno, bishop of Meissen, in the 11th century, and the "Bishop's Road" still runs from here to Meissen.

BISCHWEILER, a town of Germany, in the imperial territory of Alsace-Lorraine, district of Lower Alsace, 23 m. by rail N. by E. from Strassburg. Pop. (1900) 7897. It has manufactures of jute and machinery, brewing and iron-founding.

BISCUIT (pronounced according to the old spelling "bisket," a Fr. form from Lat. *bis*, twice, and *coctum*, cooked, in reference to the original method of preparation; cf. Ital. *biscotto*, Sp. *bizcocho*, &c.), a form of unvesiculated bread (*q.v.*) which is made in thin cakes of various shapes and baked in such a way as to be crisp and short. In the United States of America biscuits of this kind are usually called crackers, but the word biscuit is used there, as also in the north of England, for vesiculated bread baked in little flat loaves or cakes. Earthenware, porcelain, &c., which has undergone its first baking and is ready to be glazed is also known as biscuit or bisque.

The raw material chiefly used in biscuit manufacture is flour, but many other substances, such as butter, sugar, salt, various flavouring essences, &c., are also employed. The flour used by the biscuit-maker differs somewhat from that preferred by the bread-baker. In the main the bread-baker wants flour of some strength, that is to say, flour capable of absorbing a considerable proportion of water and of making a loaf of more or less volume. For biscuits flour strength is not such a desideratum, and as a matter of fact such moisture as is used to make the dough is largely evaporated by the oven; but, except for the commoner kind of biscuits, colour is most essential, as well as sweetness of flavour. In a large biscuit factory several hundred different kinds of biscuits are made, ranging from plain water biscuits to the daintiest fancy biscuits glistening in sugar and piping. The storage required for such an establishment is extensive, but lifts serve to handle both raw material and finished products with a minimum of labour. The flour used by a firm which has a reputation to maintain is sifted as a precaution against the presence of bits of string or other foreign bodies which will make their way into flour sacked by the most careful of millers, and like the butter, sugar and other raw materials, is carefully inspected and tested before being accepted. After blending it is run through a shoot or sleeve to the mixers, which may be of any type used in bakehouses (see Bread). From the mixers or kneaders the dough is delivered on a flat table, or it may go direct to a pair of rolls. These consist of iron rollers with a reversing motion, between which the dough is rolled backwards and forwards into sheets of uniform thickness. The next stage is the feeding of

portions of this slab of dough to a cutting and panning machine. In details this apparatus differs as supplied by different makers, but the broad principle is the same in every case. The dough, after first passing through a pair of gauging rollers, which still further thin out the sheet and are capable of regulating its thickness with the utmost nicety, is received by an endless conveyor-band of webbing or similar material. By this band it is carried forward by intermittent motion to a set of punches or stamps which descend on it in quick succession, and serve to mould the surface and cut the edges to the required pattern. This operation completed, the moulded dough passes forward on the same endless band. The dough has now been cut into two distinct divisions, the moulded biscuits and the unworked portion which forms a continuous sheet of a sort of scrap. The latter is separated from the moulded dough, and is carried upwards by another band, which delivers it on a tray or box whence it is returned to the rollers to be reworked. The moulded dough intended for the oven is carried along by the first band and is gently deposited on trays of sheet iron or woven wire. These trays are taken from the machine by boys and placed on the travelling-chains at the oven, or the trays may be automatically moved forward by a travelling-band and placed on the oven. The oven used for biscuit-baking is quite unlike any bread oven. It is much longer and is provided with sets of endless chains moving in parallel lines, and travelling over sprocket-wheel terminals and intermediate supports. The chains have special attachments on which the trays of biscuits are rested, and thus pass them through the oven, and discharge them at the opposite end. Some ovens are provided with a sort of endless belt of iron plates on which the biscuits are placed. These travelling bands are used chiefly for ship and also for dog biscuits, but the most usual type is the oven in which trays are moved on the travelling chains already described. The exact rate of travel, or the time during which the biscuits are in the oven, can be easily adjusted by means of countershafts and leather belts running on cone pulleys fitted at the discharging end. The heat of the oven as well as the rate of travel is varied according to the kind of biscuit, some varieties requiring a gentle heat and a comparatively long sojourn in the oven, while others must be exposed to a fierce heat, but only for a few minutes. The ovens, fired by coke, may be 38 to 50 ft. in length. Their temperature is not generally raised above 500 degrees, but the speed of travel of the trays ranges between 3½ and 25 minutes. The whole process of biscuit-making is thus rapid and continuous. The dough is kneaded in the mixers in a few minutes, and when discharged on the dough table is rapidly moulded into the required form by the cutter and panner. By means of endless bands the material is kept moving forwards, whether on the cutter, or in the oven. For certain fancy biscuits special processes are used. Piping and sugar decoration is still necessarily done by hand, and the glaze on some fancy biscuits is imparted by spraying the moulded biscuit with very fine jets of fresh milk. Cracknels are made from a very stiff dough, and when cut out are thrown into coppers of boiling water. They speedily float to the top, remaining apart and not forming into groups. From these coppers they are taken out in trays pierced so as to drain off the water. Then they go into vats of cold water, from which they are again removed, and after being strained of their moisture are panned and baked in a fierce oven.

(G. F. Z.)

BISECTRIX (fem., of Lat. *bisector*, from *bi-*, two, *secare*, to cut), in geometry, the same as bisector, *i.e.* a point which divides a line, or a line which divides an angle, into two equal parts; in crystallography it denotes the bisector of the angle between the optic axes.

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