Title: Encyclopaedia Britannica, 11th Edition, "Groups, Theory of" to "Gwyniad"

Author: Various

Release date: December 14, 2011 [EBook #38304]

Language: English

Credits: Produced by Marius Masi, Don Kretz and the Online Distributed Proofreading Team at http://www.pgdp.net

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THE ENCYCLOPÆDIA BRITANNICA

A DICTIONARY OF ARTS, SCIENCES, LITERATURE AND GENERAL INFORMATION

ELEVENTH EDITION

VOLUME XII SLICE VI

Groups, Theory of to Gwyniad

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GROUPS,[1] **THEORY OF.** The conception of an operation to be carried out on some object or set of objects underlies all mathematical science. Thus in elementary arithmetic there are the fundamental operations of the addition and the multiplication of integers; in algebra a linear transformation is an operation which may be carried out on any set of variables; while in geometry a translation, a rotation, or a projective transformation are operations which may be carried out on any figure. 626

In speaking of an operation, an object or a set of objects to which it may be applied is postulated; and the operation may, and generally will, have no meaning except in regard to such a set of objects. If two operations, which can be performed on the same set of objects, are such that, when carried out in succession on any possible object, the result, whichever operation is performed first, is to produce no change in the object, then each of the operations is spoken of as a *definite* operation, and each of them is called the *inverse* of the other. Thus the operations which consist in replacing x by nx and by x/n respectively, in any rational function of x, are definite inverse operations, if n is any assigned number except zero. On the contrary, the operation of replacing x by an assigned number in any rational function of x is not, in the present sense, although it leads to a unique result, a definite operation; there is in fact no unique inverse operation corresponding to it. It is to be noticed that the question whether an operation is a definite operation or no may depend on the range of the objects on which it operates. For example, the operations of squaring and extracting the square root are definite inverse operations if the objects are restricted to be real positive numbers, but not otherwise.

If O, O′, O″, ... is the totality of the objects on which a definite operation S and its inverse S′ may be carried out, and if the result of carrying out S on O is represented by O·S, then O·S·S′, O·S′·S, and O are the same object whatever object of the set O may be. This will be represented by the equations SS′ = S′S = 1. Now O·S·S′ has a meaning only if O·S is an object on which S′ may be performed. Hence whatever object of the set O may be, both O·S and O·S′ belong to the set. Similarly O·S·S, O·S·S·S, ... are objects of the set. These will be represented by $O\cdot S^2$, $O\cdot S^3$, ... Suppose now that T is another definite operation with the same set of objects as S, and that T′ is its inverse operation. Then O·S·T is a definite operation of the set, and therefore the result of carrying out S and then T on the set of objects is some operation U with a unique result. Represent by U′ the result of carrying out T′ and then S′. Then O·UU′ = O·S·T·T′·S′ = O·SS′ = O, and O·U′U = O·T′·S′·S·T = O·T′T = O, whatever object O may be. Hence UU′ = U′U = 1; and U, U′ are definite inverse operations.

If S, U, V are definite operations, and if S′ is the inverse of S, then

$$SU = SV$$

implies

$$S'SU = S'SV,$$

or

$$U = V.$$

Similarly

$$US = VS$$

implies

$$U = V.$$

Definition of a group.

Let S, T, U, ... be a set of definite operations, capable of being carried out on a common object or set of objects, and let the set contain—

(i.) the operation ST, S and T being any two operations of the set;

(ii.) the inverse operation of S, S being any operation of the set; the set of operations is then called a group.

The number of operations in a group may be either finite or infinite. When it is finite, the number is called the *order* of the group, and the group is spoken of as a *group of finite order*. If the number of operations is infinite, there are three possible cases. When the group is represented by a set of geometrical operations, for the specification of an individual operation a number of measurements will be necessary. In more analytical language, each operation will be specified by the values of a set of parameters. If no one of these parameters is capable of continuous variation, the group is called a *discontinuous group*. If all the parameters are capable of continuous variation, the group is called a *continuous group*. If some of the parameters are capable of continuous variation and some are not, the group is called a *mixed group*.

If S′ is the inverse operation of S, a group which contains S must contain SS′, which produces no change on any possible object. This is called the *identical operation*, and will always be represented by I. Since $S^pS^q = S^{p+q}$ when p and q are positive integers, and $S^pS' = S^{p-1}$ while no meaning at present has been attached to S^q when q is negative, S′ may be consistently represented by S^{-1}. The set of operations ..., S^{-2}, S^{-1}, 1, S, S^2, ... obviously constitute a group. Such a group is called a *cyclical* group.

It will be convenient, before giving some illustrations of the general group idea, to add a number of further definitions and explanations which apply to all groups alike. If from among the set of operations S, T, U, ... which constitute a group G, a smaller set S′, T′, U′, ... can be chosen which themselves constitute a group H, the group H is called a *subgroup* of G. Thus, in particular, if S is an operation of G, the cyclical group constituted by ..., S^{-2}, S^{-1}, 1, S, S^2, ... is a subgroup of G, except in the special case when it coincides with G itself.

Subgroups, conjugate operations, isomorphism, &c.

If S and T are any two operations of G, the two operations S and $T^{-1}ST$ are called *conjugate* operations, and $T^{-1}ST$ is spoken of as the result of *transforming* S by T. It is to be noted that since $ST = T^{-1}$, TS, T, ST and TS are always conjugate operations in any group containing both S and T. If T transforms S into itself, that is, if $S = T^{-1}ST$ or TS = ST, S and T are called *permutable* operations. A group whose operations are all permutable with each other is called an *Abelian* group. If S is transformed into itself by every operation of G, or, in other words, if it is permutable with every operation of G, it is called a *self-conjugate* operation of G.

The conception of operations being conjugate to each other is extended to subgroups. If S′, T′, U′, ... are the operations of a subgroup H, and if R is any operation of G, then the operations $R^{-1}S'R$, $R^{-1}T'R$, $R^{-1}U'R$, ... belong to G, and constitute a subgroup of G. For if $S'T' = U'$, then $R^{-1}S'R \cdot R^{-1}T'R = R^{-1}S'T'R = R^{-1}U'R$. This subgroup may be identical with H. In particular, it is necessarily the same as H if R belongs to H. If it is not identical with H, it is said to be *conjugate* to H; and it is in any case represented by the symbol $R^{-1}HR$. If $H = R^{-1}HR$, the operation R is said to be permutable with the subgroup H. (It is to be noticed that this does not imply that R is permutable with each operation of H.)

If $H = R^{-1}HR$, when for R is taken in turn each of the operations of G, then H is called a *self-conjugate* subgroup of G.

A group is spoken of as *simple* when it has no self-conjugate subgroup other than that constituted by the identical operation alone. A group which has a self-conjugate subgroup is called *composite*.

Let G be a group constituted of the operations S, T, U, ..., and g a second group constituted of s, t, u, ..., and suppose that to each operation of G there corresponds a single operation of g in such a way that if ST = U, then *st* = u, where s, t, u are the operations corresponding to S, T, U respectively. The groups are then said to be *isomorphic*, and the correspondence between their operations is spoken of as an *isomorphism* between the groups. It is clear that there may

be two distinct cases of such isomorphism. To a single operation of g there may correspond either a single operation of G or more than one. In the first case the isomorphism is spoken of as *simple*, in the second as *multiple*.

Two simply isomorphic groups considered abstractly—that is to say, in regard only to the way in which their operations combine among themselves, and apart from any concrete representation of the operations—are clearly indistinguishable.

If G is multiply isomorphic with g, let A, B, C, ... be the operations of G which correspond to the identical operation of g. Then to the operations A^{-1} and AB of G there corresponds the identical operation of g; so that A, B, C, ... constitute a subgroup H of G. Moreover, if R is any operation of G, the identical operation of g corresponds to every operation of $R^{-1}HR$, and therefore H is a self-conjugate subgroup of G. Since S corresponds to s, and every operation of H to the identical operation of g, therefore every operation of the set SA, SB, SC, ..., which is represented by SH, corresponds to s. Also these are the only operations that correspond to s. The operations of G may therefore be divided into sets, no two of which contain a common operation, such that the correspondence between the operations of G and g connects each of the sets H, SH, TH, UH, ... with the single operations 1, s, t, u, ... written below them. The sets into which the operations of G are thus divided combine among themselves by exactly the same laws as the operations of g. For if *st* = u, then SH·TH = UH, in the sense that any operation of the set SH followed by any operation of the set TH gives an operation of the set UH.

The group g, abstractly considered, is therefore completely defined by the division of the operations of G into sets in respect of the self-conjugate subgroup H. From this point of view it is spoken of as the *factor-group* of G in respect of H, and is represented by the symbol G/H. Any composite group in a similar way defines abstractly a factor-group in respect of each of its self-conjugate subgroups.

It follows from the definition of a group that it must always be possible to choose from its operations a set such that every operation of the group can be obtained by combining the operations of the set and their inverses. If the set is such that no one of the operations belonging to it can be represented in terms of the others, it is called a set of *independent generating* operations. Such a set of generating operations may be either finite or infinite in number. If A, B, ..., E are the generating operations of a group, the group generated by them is represented by the symbol {A, B, ..., E}. An obvious extension of this symbol is used such that {A, H} represents the group generated by combining an operation A with every operation of a group H; $\{H_1, H_2\}$ represents the group obtained by combining in all possible ways the operations of the groups H_1 and H_2; and so on. The independent generating operations of a group may be subject to certain relations connecting them, but these must be such that it is impossible by combining them to obtain a relation expressing one operation in terms of the others. For instance, AB = BA is a relation conditioning the group {A, B}; it does not, however, enable A to be expressed in terms of B, so that A and B are independent generating operations.

Transitivity and primitivity.

Let O, O′, O″, ... be a set of objects which are interchanged among themselves by the operations of a group G, so that if S is any operation of the group, and O any one of the objects, then O·S is an object occurring in the set. If it is possible to find an operation S of the group such that O·S is any assigned one of the set of objects, the group is called *transitive* in respect of this set of objects. When this is not possible the group is called *intransitive* in respect of the set. If it is possible to find S so that any arbitrarily chosen n objects of the set, $O_1, O_2, ..., O_n$ are changed by S into $O'_1, O'_2, ..., O'_n$ respectively, the latter being also arbitrarily chosen, the group is said to be n-ply transitive.

If O, O′, O″, ... is a set of objects in respect of which a group G is transitive, it may be possible to divide the set into a number of subsets, no two of which contain a common object, such that every operation of the group either interchanges the objects of a subset among themselves, or changes them all into the objects of some other subset. When this is the case the group is called *imprimitive* in respect of the set; otherwise the group is called *primitive*. A group which is doubly-transitive, in respect of a set of objects, obviously cannot be imprimitive.

Illustrations of the group idea.

The foregoing general definitions and explanations will now be illustrated by a consideration of certain particular groups. To begin with, as the operations involved are of the most familiar nature, the group of rational arithmetic may be considered. The fundamental operations of elementary arithmetic consist in the addition and subtraction of integers, and multiplication and division by integers, division by zero alone omitted. Multiplication by zero is not a definite operation, and it must therefore be omitted in dealing with those operations of elementary arithmetic which form a group. The operation that results from carrying out additions, subtractions, multiplications and divisions, of and by integers a finite number of times, is represented by the relation x′ = ax + b, where a and b are rational numbers of which a is not zero, x is the object of the operation, and x′ is the result. The totality of operations of this form

obviously constitutes a group.

If S and T represent respectively the operations $x' = ax + b$ and $x' = cx + d$, then $T^{-1}ST$ represents $x' = ax + d - ad + bc$. When a and b are given rational numbers, c and d may be chosen in an infinite number of ways as rational numbers, so that $d - ad + bc$ shall be any assigned rational number. Hence the operations given by $x' = ax + b$, where a is an assigned rational number and b is any rational number, are all conjugate; and no two such operations for which the a's are different can be conjugate. If a is unity and b zero, S is the identical operation which is necessarily self-conjugate. If a is unity and b different from zero, the operation $x' = x + b$ is an addition. The totality of additions forms, therefore, a single conjugate set of operations. Moreover, the totality of additions with the identical operation, *i.e.* the totality of operations of the form $x' = x + b$, where b may be any rational number or zero, obviously constitutes a group. The operations of this group are interchanged among themselves when transformed by any operation of the original group. It is therefore a self-conjugate subgroup of the original group.

The totality of multiplications, with the identical operation, *i.e.* all operations of the form $x' = ax$, where a is any rational number other than zero, again obviously constitutes a group. This, however, is not a self-conjugate subgroup of the original group. In fact, if the operations $x' = ax$ are all transformed by $x' = cx + d$, they give rise to the set $x' = ax + d(1 - a)$. When d is a given rational number, the set constitutes a subgroup which is conjugate to the group of multiplications. It is to be noticed that the operations of this latter subgroup may be written in the form $x' - d = a(x - d)$.

The totality of rational numbers, including zero, forms a set of objects which are interchanged among themselves by all operations of the group.

If x_1 and x_2 are any pair of distinct rational numbers, and y_1 and y_2 any other pair, there is just one operation of the group which changes x_1 and x_2 into y_1 and y_2 respectively. For the equations $y_1 = ax_1 + b$, $y_1 = ax_2 + b$ determine a and b uniquely. The group is therefore doubly transitive in respect of the set of rational numbers. If H is the subgroup that leaves unchanged a given rational number x_1, and S an operation changing x_1 into x_2, then every operation of $S^{-1}HS$ leaves x_2 unchanged. The subgroups, each of which leaves a single rational number unchanged, therefore form a single conjugate set. The group of multiplications leaves zero unchanged; and, as has been seen, this is conjugate with the subgroup formed of all operations $x' - d = a(x - d)$, where d is a given rational number. This subgroup leaves d unchanged.

The group of multiplications is clearly generated by the operations $x' = px$, where for p negative unity and each prime is taken in turn. Every addition is obtained on transforming $x' = x + 1$ by the different operations of the group of multiplications. Hence $x' = x + 1$, and $x' = px$, ($p = -1, 3, 5, 7, \ldots$), form a set of independent generating operations of the group. It is a discontinuous group.

As a second example the group of motions in three-dimensional space will be considered. The totality of motions, *i.e.* of space displacements which leave the distance of every pair of points unaltered, obviously constitutes a set of operations which satisfies the group definition. From the elements of kinematics it is known that every motion is either (i.) a translation which leaves no point unaltered, but changes each of a set of parallel lines into itself; or (ii.) a rotation which leaves every point of one line unaltered and changes every other point and line; or (iii.) a twist which leaves no point and only one line (its axis) unaltered, and may be regarded as a translation along, combined with a rotation round, the axis. Let S be any motion consisting of a translation l along and a rotation a round a line AB, and let T be any other motion. There is some line CD into which T changes AB; and therefore $T^{-1}ST$ leaves CD unchanged. Moreover, $T^{-1}ST$ clearly effects the same translation along and rotation round CD that S effects for AB. Two motions, therefore, are conjugate if and only if the amplitudes of their translation and rotation components are respectively equal. In particular, all translations of equal amplitude are conjugate, as also are all rotations of equal amplitude. Any two translations are permutable with each other, and give when combined another translation. The totality of translations constitutes, therefore, a subgroup of the general group of motions; and this subgroup is a self-conjugate subgroup, since a translation is always conjugate to a translation.

All the points of space constitute a set of objects which are interchanged among themselves by all operations of the group of motions. So also do all the lines of space and all the planes. In respect of each of these sets the group is simply transitive. In fact, there is an infinite number of motions which change a point A to A′, but no motion can change A and B to A′ and B′ respectively unless the distance AB is equal to the distance A′B′.

The totality of motions which leave a point A unchanged forms a subgroup. It is clearly constituted of all possible rotations about all possible axes through A, and is known as the group of rotations about a point. Every motion can be represented as a rotation about some axis through A followed by a translation. Hence if G is the group of motions and H the group of

translations, G/H is simply isomorphic with the group of rotations about a point.

The totality of the motions which bring a given solid to congruence with itself again constitutes a subgroup of the group of motions. This will in general be the trivial subgroup formed of the identical operation above, but may in the case of a symmetrical body be more extensive. For a sphere or a right circular cylinder the subgroups are those that leave the centre and the axis respectively unaltered. For a solid bounded by plane faces the subgroup is clearly one of finite order. In particular, to each of the regular solids there corresponds such a group. That for the tetrahedron has 12 for its order, for the cube (or octahedron) 24, and for the icosahedron (or dodecahedron) 60.

The determination of a particular operation of the group of motions involves six distinct measurements; namely, four to give the axis of the twist, one for the magnitude of the translation along the axis, and one for the magnitude of the rotation about it. Each of the six quantities involved may have any value whatever, and the group of motions is therefore a continuous group. On the other hand, a subgroup of the group of motions which leaves a line or a plane unaltered is a mixed group.

We shall now discuss (i.) continuous groups, (ii.) discontinuous groups whose order is not finite, and (iii.) groups of finite order. For proofs of the statements, and the general theorems, the reader is referred to the bibliography.

Continuous Groups.

The determination of a particular operation of a given continuous group depends on assigning special values to each one of a set of parameters which are capable of continuous variation. The first distinction regards the number of these parameters. If this number is finite, the group is called a *finite* continuous group; if infinite, it is called an *infinite* continuous group. In the latter case arbitrary functions must appear in the equations defining the operations of the group when these are reduced to an analytical form. The theory of infinite continuous groups is not yet so completely developed as that of finite continuous groups. The latter theory will mainly occupy us here.

Sophus Lie, to whom the foundation and a great part of the development of the theory of continuous groups are due, undoubtedly approached the subject from a geometrical standpoint. His conception of an operation is to regard it as a geometrical transformation, by means of which each point of (*n*-dimensional) space is changed into some other definite point.

The representation of such a transformation in analytical form involves a system of equations,

$$x'_s = f_s (x_1, x_2, \ldots, x_n), (s = 1, 2, \ldots, n),$$

expressing $x'_1, x'_2, \ldots, x'_n$, the co-ordinates of the transformed point in terms of $x_1, x_2, \ldots, x_n$, the co-ordinates of the original point. In these equations the functions f_s are analytical functions of their arguments. Within a properly limited region they must be one-valued, and the equations must admit a unique solution with respect to $x_1, x_2, \ldots, x_n$, since the operation would not otherwise be a definite one.

From this point of view the operations of a continuous group, which depends on a set of r parameters, will be defined analytically by a system of equations of the form

$$x'_s = f_s(x_1, x_2, \ldots, x_n; a_1, a_2, \ldots, a_r), (s = 1, 2, \ldots, n), \qquad (I.)$$

where $a_1, a_2, \ldots, a_r$ represent the parameters. If this operation be represented by A, and that in which $b_1, b_2, \ldots, b_r$ are the parameters by B, then the operation AB is represented by the elimination (assumed to be possible) of $x'_1, x'_2, \ldots, x'_n$ between the equations (i.) and the equations

$$x''_s = f_s (x'_1, x'_2, \ldots, x'_n; b_1, b_2, \ldots, b_r), (s = 1, 2, \ldots, n).$$

Since AB belongs to the group, the result of the elimination must be

$$x''_s = f_s (x_1, x_2, \ldots, x_n; c_1, c_2, \ldots, c_r),$$

where $c_1, c_2, \ldots, c_r$ represent another definite set of values of the parameters. Moreover, since A^{-1} belongs to the group, the result of solving equations (i.) with respect to $x_1, x_2, \ldots, x_n$ must be

$$x_s = f_s (x'_1, x'_2, \ldots, x'_n; d_1, d_2, \ldots, d_r), (s = 1, 2, \ldots, n).$$

Conversely, if equations (i.) are such that these two conditions are satisfied, they do in fact define a finite continuous group.

It will be assumed that the r parameters which enter in equations (i.) are independent, *i.e.* that it is impossible to choose r′ (< r) quantities in terms of which a_1, a_2, ..., a_r can be expressed. Where this is the case the group will be spoken of as a "group of order r." Lie uses the term "*r-gliedrige Gruppe*." It is to be noticed that the word order is used in quite a different sense from that given to it in connexion with groups of finite order.

Infinitesimal operation of a continuous group.

In regard to equations (i.), which define the general operation of the group, it is to be noticed that, since the group contains the identical operation, these equations must for some definite set of values of the parameters reduce to $x'_1 = x_1$, $x'_2 = x_2$, ..., $x'_n = x_n$. This set of values may, without loss of generality, be assumed to be simultaneous zero values. For if i_1, i_2, ..., i_r be the values of the parameters which give the identical operation, and if we write

$$a_s = i_s + a, \ (s = 1, 2, ..., r),$$

then zero values of the new parameters a_1, a_2, ..., a_r give the identical operation.

To infinitesimal values of the parameters, thus chosen, will correspond operations which cause an infinitesimal change in each of the variables. These are called infinitesimal operations. The most general infinitesimal operation of the group is that given by the system

$$x'_s - x_s = \delta x_s = \frac{\partial f_s}{\partial a_1}\delta a_1 + \frac{\partial f_s}{\partial a_2}\delta a_2 + ... + \frac{\partial f_s}{\partial a_r}\delta a_r, \ (s = 1, 2, ..., n),$$

where, in $\partial f_s/\partial a_i$, zero values of the parameters are to be taken. Since a_1, a_2, ..., a_r are independent, the ratios of δa_1, δa_2, ..., δa_r are arbitrary. Hence the most general infinitesimal operation of the group may be written in the form

$$\delta x_s = \left(e_1 \frac{\partial f_s}{\partial a_1} + e_2 \frac{\partial f_s}{\partial a_2} + ... + e_r \frac{\partial f_s}{\partial a_r} \right) \delta t, \ (s = 1, 2, ..., n),$$

where e_1, e_2, ..., e_r are arbitrary constants, and δt is an infinitesimal.

If $F(x_1, x_2, ..., x_n)$ is any function of the variables, and if an infinitesimal operation of the group be carried out on the variables in F, the resulting increment of F will be

$$\frac{\partial F}{\partial x_1}\delta x_1 + \frac{\partial F}{\partial x_2}\delta x_2 + ... + \frac{\partial F}{\partial x_n}\delta x_n.$$

If the differential operator

$$\frac{\partial f_1}{\partial a_i}\ \frac{\partial}{\partial x_1} + \frac{\partial f_2}{\partial a_i}\ \frac{\partial}{\partial x_2} + ... + \frac{\partial f_n}{\partial a_i}\ \frac{\partial}{\partial x_n}$$

be represented by X_i, (i = 1, 2, ..., r), then the increment of F is given by

$$(e_1X_1 + e_2X_2 + ... + e_rX_r)\ F\delta t.$$

When the equations (i.) defining the general operation of the group are given, the coefficients $\partial f_s/\partial a_i$, which enter in these differential operators are functions of the variables which can be directly calculated.

The differential operator $e_1X_1 + e_2X_2 + ... + e_rX_r$ may then be regarded as defining the most general infinitesimal operation of the group. In fact, if it be for a moment represented by X, then $(1 + \delta tX)F$ is the result of carrying out the infinitesimal operation on F; and by putting x_1, x_2, ..., x_n in turn for F, the actual infinitesimal operation is reproduced. By a very convenient, though perhaps hardly justifiable, phraseology this differential operator is itself spoken of as the general infinitesimal operation of the group. The sense in which this phraseology is to be understood will be made clear by the foregoing explanations.

We suppose now that the constants e_1, e_2, ..., e_r have assigned values. Then the result of repeating the particular infinitesimal operation $e_1X_1 + e_2X_2 + ... + e_rX_r$ or X an infinite number of times is some finite operation of the group. The effect of this finite operation on F may be directly calculated. In fact, if δt is the infinitesimal already introduced, then

$$\frac{dF}{dt} = X \cdot F, \ \frac{d^2F}{dt^2} = X \cdot X \cdot F, \ ...$$

Hence

$$F' = F + t\frac{dF}{dt} + \frac{t^2}{1 \cdot 2} + \frac{d^2F}{dt^2} + ...$$
$$= F + tX \cdot F + \frac{t^2}{1 \cdot 2} X \cdot X \cdot F + ...$$

It must, of course, be understood that in this analytical representation of the effect of the finite

operation on F it is implied that t is taken sufficiently small to ensure the convergence of the (in general) infinite series.

When x_1, x_2, ... are written in turn for F, the system of equations

$$x'_s = (1 + tX + \frac{t^2}{1\cdot 2} X\cdot X + \ldots)x_s, \ (s = 1, 2, \ldots, n) \qquad \text{(II.)}$$

represent the finite operation completely. If t is here regarded as a parameter, this set of operations must in themselves constitute a group, since they arise by the repetition of a single infinitesimal operation. That this is really the case results immediately from noticing that the result of eliminating F′ between

$$F' = F + tX\cdot F + \frac{t^2}{1\cdot 2} X\cdot X\cdot F + \ldots$$

and

$$F'' = F' + t'X\cdot F' + \frac{t'^2}{1\cdot 2} X\cdot X\cdot F' + \ldots$$

is

$$F'' = F + (t + t') X\cdot F + \frac{(t + t')^2}{1\cdot 2} X\cdot X\cdot F + \ldots$$

The group thus generated by the repetition of an infinitesimal operation is called a *cyclical* group; so that a continuous group contains a cyclical subgroup corresponding to each of its infinitesimal operations.

The system of equations (ii.) represents an operation of the group whatever the constants e_1, e_2, ..., e_r may be. Hence if e_1t, e_2t, ..., e_rt be replaced by a_1, a_2, ..., a_r the equations (ii.) represent a set of operations, depending on r parameters and belonging to the group. They must therefore be a form of the general equations for any operation of the group, and are equivalent to the equations (i.). The determination of the finite equations of a cyclical group, when the infinitesimal operation which generates it is given, will always depend on the integration of a set of simultaneous ordinary differential equations. As a very simple example we may consider the case in which the infinitesimal operation is given by $X = x^2\partial/\partial x$, so that there is only a single variable. The relation between x′ and t is given by $dx'/dt = x'^2$, with the condition that $x' = x$ when $t = 0$. This gives at once $x' = x/(1 - tx)$, which might also be obtained by the direct use of (ii.).

Relations between the infinitesimal operations of a finite continuous group.

When the finite equations (i.) of a continuous group of order r are known, it has now been seen that the differential operator which defines the most general infinitesimal operation of the group can be directly constructed, and that it contains r arbitrary constants. This is equivalent to saying that the group contains r linearly independent infinitesimal operations; and that the most general infinitesimal operation is obtained by combining these linearly with constant coefficients. Moreover, when any r independent infinitesimal operations of the group are known, it has been seen how the general finite operation of the group may be calculated. This obviously suggests that it must be possible to define the group by means of its infinitesimal operations alone; and it is clear that such a definition would lend itself more readily to some applications (for instance, to the theory of differential equations) than the definition by means of the finite equations.

On the other hand, r arbitrarily given linear differential operators will not, in general, give rise to a finite continuous group of order r; and the question arises as to what conditions such a set of operators must satisfy in order that they may, in fact, be the independent infinitesimal operations of such a group.

If X, Y are two linear differential operators, XY − YX is also a linear differential operator. It is called the “combinant” of X and Y (Lie uses the expression *Klammerausdruck*) and is denoted by (XY). If X, Y, Z are any three linear differential operators the identity (known as Jacobi’s)

$$(X(YZ)) + (Y(ZX)) + (Z(XY)) = 0$$

holds between them. Now it may be shown that any continuous group of which X, Y are infinitesimal operations contains also (XY) among its infinitesimal operations. Hence if r linearly independent operations X_1, X_2, ..., X_r give rise to a finite continuous group of order r, the combinant of each pair must be expressible linearly in terms of the r operations themselves: that is, there must be a system of relations

$$(X_iX_j) = \sum_{k=1}^{k=r} c_{ijk} X_k,$$

where the c’s are constants. Moreover, from Jacobi’s identity and the identity (XY) + (YX) = 0 it follows that the c’s are subject to the relations

and

$$c_{ijt} + c_{jit} = 0,$$
$$\Sigma_s (c_{jks}\, c_{ist} + c_{kis}\, c_{jst} + c_{ijs}\, c_{kst}) = 0 \qquad \text{(III.)}$$

for all values of i, j, k and t.

The fundamental theorem of the theory of finite continuous groups is now that these conditions, which are necessary in order that X_1, X_2, ..., X_r may generate, as infinitesimal operations, a continuous group of order r, are also sufficient.

Determination of the distinct types of continuous groups of a given order.

For the proof of this fundamental theorem see Lie's works (cf. Lie-Engel, i. chap. 9; iii. chap. 25).

If two continuous groups of order r are such that, for each, a set of linearly independent infinitesimal operations X_1, X_2, ..., X_r and Y_1, Y_2, ..., Y_r can be chosen, so that in the relations

$$(X_i X_j) = \Sigma c_{ijs}\, X_s,\ (Y_i Y_j) = \Sigma\, d_{ijs}\, Y_s,$$

the constants c_{ijs} and d_{ijs} are the same for all values of i, j and s, the two groups are simply isomorphic, X_s and Y_s being corresponding infinitesimal operations.

Two continuous groups of order r, whose infinitesimal operations obey the same system of equations (iii.), may be of very different *form*; for instance, the number of variables for the one may be different from that for the other. They are, however, said to be of the same *type*, in the sense that the laws according to which their operations combine are the same for both.

The problem of determining all distinct types of groups of order r is then contained in the purely algebraical problem of finding all the systems of r^3 quantities c_{ijs} which satisfy the relations

$$c_{ijt} + c_{ijt} = 0,$$
$$\Sigma_s\, c_{ijs}\, c_{skt} + c_{jks}\, c_{sit} + c_{kis}\, c_{sjt} = 0.$$

for all values of i, j, k and t. To two distinct solutions of the algebraical problem, however, two distinct types of group will not necessarily correspond. In fact, X_1, X_2, ..., X_r may be replaced by any r independent linear functions of themselves, and the c's will then be transformed by a linear substitution containing r^2 independent parameters. This, however, does not alter the type of group considered.

For a single parameter there is, of course, only one type of group, which has been called cyclical.

For a group of order two there is a single relation

$$(X_1 X_2) = \alpha X_1 + \beta X_2.$$

If α and β are not both zero, let α be finite. The relation may then be written $(\alpha X_1 + \beta X_2, \alpha^{-1} X_2) = \alpha X_1 + \beta X_2$. Hence if $\alpha X_1 + \beta X_2 = X'_1$, and $\alpha^{-1} X_2 = X'_2$, then $(X'_1 X'_2) = X'_1$. There are, therefore, just two types of group of order two, the one given by the relation last written, and the other by $(X_1 X_2) = 0$.

Lie has determined all distinct types of continuous groups of orders three or four; and all types of non-integrable groups (a term which will be explained immediately) of orders five and six (cf. Lie-Engel, iii. 713-744).

Self-conjugate subgroups. Integrable groups.

A problem of fundamental importance in connexion with any given continuous group is the determination of the self-conjugate subgroups which it contains. If X is an infinitesimal operation of a group, and Y any other, the general form of the infinitesimal operations which are conjugate to X is

$$X + t(XY) + \frac{t^2}{1\cdot 2}((XY)Y) + \ldots.$$

Any subgroup which contains all the operations conjugate to X must therefore contain all infinitesimal operations (XY), ((XY)Y), ..., where for Y each infinitesimal operation of the group is taken in turn. Hence if X'_1, X'_2, ..., X'_s are s linearly independent operations of the group which generate a self-conjugate subgroup of order s, then for *every* infinitesimal operation Y of the group relations of the form

$$(X'_i Y) = \Sigma^{e=s}_{e=1}\, a_{ie}\, X'_e,\ (i = 1, 2, \ldots, s)$$

must be satisfied. Conversely, if such a set of relations is satisfied, X'_1, X'_2, ..., X'_s generate a subgroup of order s, which contains every operation conjugate to each of the infinitesimal generating operations, and is therefore a self-conjugate subgroup.

A specially important self-conjugate subgroup is that generated by the combinants of the r infinitesimal generating operations. That these generate a self-conjugate subgroup follows from the relations (iii.). In fact,

$$((X_iX_j)\,X_k) = \Sigma_s\, c_{ijs}\,(X_sX_k).$$

Of the ½r(r − 1) combinants not more than r can be linearly independent. When exactly r of them are linearly independent, the self-conjugate group generated by them coincides with the original group. If the number that are linearly independent is less than r, the self-conjugate subgroup generated by them is actually a subgroup; *i.e.* its order is less than that of the original group. This subgroup is known as the derived group, and Lie has called a group *perfect* when it coincides with its derived group. A simple group, since it contains no self-conjugate subgroup distinct from itself, is necessarily a perfect group.

If G is a given continuous group, G_1 the derived group of G, G_2 that of G_1, and so on, the series of groups G, G_1, G_2, ... will terminate either with the identical operation or with a perfect group; for the order of G_{s+1} is less than that of G_s unless G_s is a perfect group. When the series terminates with the identical operation, G is said to be an *integrable* group; in the contrary case G is called *non-integrable*.

If G is an integrable group of order r, the infinitesimal operations X_1, X_2, ..., X_r which generate the group may be chosen so that X_1, X_2, ..., X_{r1}, ($r_1 < r$) generate the first derived group, X_1, X_2, ..., X_{r2}, ($r_2 < r_1$) the second derived group, and so on. When they are so chosen the constants c_{ijs} are clearly such that if $r_p < i \leq r_{p+1}$, $r_q < j \leq r_{q+1}$, $p \geq q$, then c_{ijs} vanishes unless $s \leq r_{p+1}$.

In particular the generating operations may be chosen so that c_{ijs} vanishes unless s is equal to or less than the smaller of the two numbers i, j; and conversely, if the c's satisfy these relations, the group is integrable.

Simple groups.

A simple group, as already defined, is one which has no self-conjugate subgroup. It is a remarkable fact that the determination of all distinct types of simple continuous groups has been made, for in the case of discontinuous groups and groups of finite order this is far from being the case. Lie has demonstrated the existence of four great classes of simple groups:—

(i.) The groups simply isomorphic with the general projective group in space of n dimensions. Such a group is defined analytically as the totality of the transformations of the form

$$x'_s = \frac{a_{s,\,1}x_1 + a_{s,\,2}x_2 + \ldots + a_{s,\,n}x_n + a_{s,\,n+1}}{a_{n+1,\,1}x_1 + a_{n+1,\,2}x_2 + \ldots + a_{n+1,\,n}x_n + 1}\,,\ (s = 1, 2, \ldots, n),$$

where the a's are parameters. The order of this group is clearly n(n + 2).

(ii.) The groups simply isomorphic with the totality of the projective transformations which transform a non-special linear complex in space of 2n − 1 dimensions with itself. The order of this group is n(2n + 1).

(iii.) and (iv.) The groups simply isomorphic with the totality of the projective transformations which change a quadric of non-vanishing discriminant into itself. These fall into two distinct classes of types according as n is even or odd. In either case the order is ½n(n + 1). The case n = 3 forms an exception in which the corresponding group is not simple. It is also to be noticed that a cyclical group is a simple group, since it has no continuous self-conjugate subgroup distinct from itself.

W. K. J. Killing and E. J. Cartan have separately proved that outside these four great classes there exist only five distinct types of simple groups, whose orders are 14, 52, 78, 133 and 248; thus completing the enumeration of all possible types.

To prevent any misapprehension as to the bearing of these very general results, it is well to point out explicitly that there are no limitations on the parameters of a continuous group as it has been defined above. They are to be regarded as taking in general complex values. If in the finite equations of a continuous group the imaginary symbol does not explicitly occur, the finite equations will usually define a group (in the general sense of the original definition) when both parameters and variables are limited to real values. Such a group is, in a certain sense, a continuous group; and such groups have been considered shortly by Lie (cf. Lie-Engel, iii. 360-392), who calls them *real* continuous groups. To these real continuous groups the above statement as to the totality of simple groups does not apply; and indeed, in all probability, the number of types of *real* simple continuous groups admits of no such complete enumeration. The effect of limitation to real transformations may be illustrated by considering the groups of projective transformations which change

$$x^2 + y^2 + z^2 - 1 = 0 \text{ and } x^2 + y^2 - z^2 - 1 = 0$$

respectively into themselves. Since one of these quadrics is changed into the other by the

imaginary transformation

$$x' = x,\ y' = y,\ z' = z\sqrt{(-1)},$$

the general continuous groups which transform the two quadrics respectively into themselves are simply isomorphic. This is not, however, the case for the *real* continuous groups. In fact, the second quadric has two real sets of generators; and therefore the real group which transforms it into itself has two self-conjugate subgroups, either of which leaves unchanged each of one set of generators. The first quadric having imaginary generators, no such self-conjugate subgroups can exist for the real group which transforms it into itself; and this real group is in fact simple.

The adjunct group.

Among the groups isomorphic with a given continuous group there is one of special importance which is known as the *adjunct* group. This is a homogeneous linear group in a number of variables equal to the order of the group, whose infinitesimal operations are defined by the relations

$$X_i = \Sigma_{i,\,s}\, c_{ijs}\, x_i \frac{\partial}{\partial x_s},\ (j = 1, 2, \ldots, r),$$

where c_{ijs} are the often-used constants, which give the combinants of the infinitesimal operations in terms of the infinitesimal operations themselves.

That the r infinitesimal operations thus defined actually generate a group isomorphic with the given group is verified by forming their combinants. It is thus found that $(X_pX_q) = \Sigma_s\, c_{pqs}X_s$. The X's, however, are not necessarily linearly independent. In fact, the sufficient condition that $\Sigma_j\, a_jX_j$ should be identically zero is that $\Sigma_j\, a_jc_{ijs}$ should vanish for all values of i and s. Hence if the equations $\Sigma_j\, a_jc_{ijs} = 0$ for all values of i and s have r′ linearly independent solutions, only $r - r'$ of the X's are linearly independent, and the isomorphism of the two groups is multiple. If $Y_1, Y_2, \ldots, Y_r$ are the infinitesimal operations of the given group, the equations

$$\Sigma_j\, a_jc_{ijs} = 0,\ (s, i = 1, 2, \ldots, r)$$

express the condition that the operations of the cyclical group generated by $\Sigma_j\, a_jY_i$ should be permutable with every operation of the group; in other words, that they should be self-conjugate operations. In the case supposed, therefore, the given group contains a subgroup of order r′ each of whose operations is self-conjugate. The adjunct group of a given group will therefore be simply isomorphic with the group, unless the latter contains self-conjugate operations; and when this is the case the order of the adjunct will be less than that of the given group by the order of the subgroup formed of the self-conjugate operations.

Continuous groups of the line of the plane, and of three-dimensional space.

We have been thus far mainly concerned with the abstract theory of continuous groups, in which no distinction is made between two simply isomorphic groups. We proceed to discuss the classification and theory of groups when their form is regarded as essential; and this is a return to a more geometrical point of view.

It is natural to begin with the projective groups, which are the simplest in form and at the same time are of supreme importance in geometry. The general projective group of the straight line is the group of order three given by

$$x' = \frac{ax + b}{cx + d'},$$

where the parameters are the ratios of a, b, c, d. Since

$$\frac{x'_3 - x'_2}{x'_3 - x'_1} \cdot \frac{x' - x'_1}{x' - x'_2} = \frac{x_3 - x_2}{x_3 - x_1} \cdot \frac{x - x_1}{x - x_2}$$

is an operation of the above form, the group is triply transitive. Every subgroup of order two leaves one point unchanged, and all such subgroups are conjugate. A cyclical subgroup leaves either two distinct points or two coincident points unchanged. A subgroup which either leaves two points unchanged or interchanges them is an example of a "mixed" group.

The analysis of the general projective group must obviously increase very rapidly in complexity, as the dimensions of the space to which it applies increase. This analysis has been completely carried out for the projective group of the plane, with the result of showing that there are thirty distinct types of subgroup. Excluding the general group itself, every one of these leaves either a point, a line, or a conic section unaltered. For space of three dimensions Lie has also carried out a similar investigation, but the results are extremely complicated. One general result of great importance at which Lie arrives in this connexion is that every projective group in space of three dimensions, other than the general group, leaves either a point, a curve, a surface or a linear complex unaltered.

Returning now to the case of a single variable, it can be shown that any finite continuous

group in one variable is either cyclical or of order two or three, and that by a suitable transformation any such group may be changed into a projective group.

The genesis of an infinite as distinguished from a finite continuous group may be well illustrated by considering it in the case of a single variable. The infinitesimal operations of the projective group in one variable are d/dx, x(d/dx), x^2(d/dx). If these combined with x^3(d/dx) be taken as infinitesimal operations from which to generate a continuous group among the infinitesimal operations of the group, there must occur the combinant of x^2(d/dx) and x^3(d/dx). This is x^4(d/dx). The combinant of this and x^2(d/dx) is $2x^5$(d/dx) and so on. Hence x^r(d/dx), where r is any positive integer, is an infinitesimal operation of the group. The general infinitesimal operation of the group is therefore f(x)(d/dx), where f(x) is an arbitrary integral function of x.

In the classification of the groups, projective or non-projective of two or more variables, the distinction between primitive and imprimitive groups immediately presents itself. For groups of the plane the following question arises. Is there or is there not a singly-infinite family of curves f(x, y) = C, where C is an arbitrary constant such that every operation of the group interchanges the curves of the family among themselves? In accordance with the previously given definition of imprimitivity, the group is called imprimitive or primitive according as such a set exists or not. In space of three dimensions there are two possibilities; namely, there may either be a singly infinite system of surfaces F(x, y, z) = C, which are interchanged among themselves by the operations of the group; or there may be a doubly-infinite system of curves G(x, y, z) = a, H(x, y, z) = b, which are so interchanged.

In regard to primitive groups Lie has shown that any primitive group of the plane can, by a suitably chosen transformation, be transformed into one of three definite types of projective groups; and that any primitive group of space of three dimensions can be transformed into one of eight definite types, which, however, cannot all be represented as projective groups in three dimensions.

The results which have been arrived at for imprimitive groups in two and three variables do not admit of any such simple statement.

Contact transformations.

We shall now explain the conception of contact-transformations and groups of contact-transformations. This conception, like that of continuous groups, owes its origin to Lie.

From a purely analytical point of view a contact-transformation may be defined as a point-transformation in 2n + 1 variables, z, x_1, x_2, ..., x_n, p_1, p_2, ..., p_n which leaves unaltered the equation $dz - p_1dx_1 - p_2dx_2 - \ldots - p_ndx_n = 0$. Such a definition as this, however, gives no direct clue to the geometrical properties of the transformation, nor does it explain the name given.

In dealing with contact-transformations we shall restrict ourselves to space of two or of three dimensions; and it will be necessary to begin with some purely geometrical considerations. An infinitesimal surface-element in space of three dimensions is completely specified, apart from its size, by its position and orientation. If x, y, z are the co-ordinates of some one point of the element, and if p, q, −1 give the ratios of the direction-cosines of its normal, x, y, z, p, q are five quantities which completely specify the element. There are, therefore, ∞^5 surface elements in three-dimensional space. The surface-elements of a surface form a system of ∞^2 elements, for there are ∞^2 points on the surface, and at each a definite surface-element. The surface-elements of a curve form, again, a system of ∞^2 elements, for there are ∞^1 points on the curve, and at each ∞^1 surface-elements containing the tangent to the curve at the point. Similarly the surface-elements which contain a given point clearly form a system of ∞^2 elements. Now each of these systems of ∞^2 surface-elements has the property that if (x, y, z, p, q) and (x + dx, y + dy, z + dz, p + dp, q + dq) are consecutive elements from any one of them, then dz − pdx − qdy = 0. In fact, for a system of the first kind dx, dy, dz are proportional to the direction-cosines of a tangent line at a point of the surface, and p, q, −1 are proportional to the direction-cosines of the normal. For a system of the second kind dx, dy, dz are proportional to the direction-cosines of a tangent to the curve, and p, q, −1 give the direction-cosines of the normal to a plane touching the curve; and for a system of the third kind dx, dy, dz are zero. Now the most general way in which a system of ∞^2 surface-elements can be given is by three independent equations between x, y, z, p and q. If these equations do not contain p, q, they determine one or more (a finite number in any case) points in space, and the system of surface-elements consists of the elements containing these points; *i.e.* it consists of one or more systems of the third kind.

If the equations are such that two distinct equations independent of p and q can be derived from them, the points of the system of surface-elements lie on a curve. For such a system the equation dz − pdx − qdy = 0 will hold for each two consecutive elements only when the plane of each element touches the curve at its own point.

If the equations are such that only one equation independent of p and q can be derived from them, the points of the system of surface-elements lie on a surface. Again, for such a system the equation $dz - pdx - qdy = 0$ will hold for each two consecutive elements only when each element touches the surface at its own point. Hence, when all possible systems of ∞^2 surface-elements in space are considered, the equation $dz - pdx - qdy = 0$ is characteristic of the three special types in which the elements belong, in the sense explained above, to a point or a curve or a surface.

Let us consider now the geometrical bearing of any transformation $x' = f_1(x, y, z, p, q), \ldots, q' = f_5(x, y, z, p, q)$, of the five variables. It will interchange the surface-elements of space among themselves, and will change any system of ∞^2 elements into another system of ∞^2 elements. A special system, *i.e.* a system which belongs to a point, curve or surface, will not, however, in general be changed into another special system. The necessary and sufficient condition that a special system should always be changed into a special system is that the equation $dz' - p'dx' - q'dy' = 0$ should be a consequence of the equation $dz - pdx - qdy = 0$; or, in other words, that this latter equation should be invariant for the transformation.

When this condition is satisfied the transformation is such as to change the surface-elements of a surface in general into surface-elements of a surface, though in particular cases they may become the surface-elements of a curve or point; and similar statements may be made with respect to a curve or point. The transformation is therefore a veritable geometrical transformation in space of three dimensions. Moreover, two special systems of surface-elements which have an element in common are transformed into two new special systems with an element in common. Hence two curves or surfaces which touch each other are transformed into two new curves or surfaces which touch each other. It is this property which leads to the transformations in question being called contact-transformations. It will be noticed that an ordinary point-transformation is always a contact-transformation, but that a contact-transformation (in space of n dimensions) is not in general a point-transformation (in space of n dimensions), though it may always be regarded as a point-transformation in space of $2n + 1$ dimensions. In the analogous theory for space of two dimensions a line-element, defined by (x, y, p), where $1 : p$ gives the direction-cosines of the line, takes the place of the surface-element; and a transformation of x, y and p which leaves the equation $dy - pdx = 0$ unchanged transforms the ∞^1 line-elements, which belong to a curve, into ∞^1 line-elements which again belong to a curve; while two curves which touch are transformed into two other curves which touch.

One of the simplest instances of a contact-transformation that can be given is the transformation by reciprocal polars. By this transformation a point P and a plane p passing through it are changed into a plane p′ and a point P′ upon it; *i.e.* the surface-element defined by P, p is changed into a definite surface-element defined by P′, p′. The totality of surface-elements which belong to a (non-developable) surface is known from geometrical considerations to be changed into the totality which belongs to another (non-developable) surface. On the other hand, the totality of the surface-elements which belong to a curve is changed into another set which belong to a developable. The analytical formulae for this transformation, when the reciprocation is effected with respect to the paraboloid $x^2 + y^2 - 2z = 0$, are $x' = p$, $y' = q$, $z' = px + qy - z$, $p' = x$, $q' = y$. That this is, in fact, a contact-transformation is verified directly by noticing that

$$dz' - p'dx' - q'dy' = -d(z - px - qy) - xdp - ydq = -(dz - pdx - qdy).$$

A second simple example is that in which every surface-element is displaced, without change of orientation, normal to itself through a constant distance t. The analytical equations in this case are easily found in the form

$$x' = x + \frac{pt}{\sqrt{(1 + p^2 + q^2)}}, \quad y' = y + \frac{qt}{\sqrt{(1 + p^2 + q^2)}}, \quad z' = z - \frac{t}{\sqrt{(1 + p^2 + q^2)}},$$

$$p' = q, \; q' = q.$$

That this is a contact-transformation is seen geometrically by noticing that it changes a surface into a parallel surface. Every point is changed by it into a sphere of radius t, and when t is regarded as a parameter the equations define a cyclical group of contact-transformations.

The formal theory of continuous groups of contact-transformations is, of course, in no way distinct from the formal theory of continuous groups in general. On what may be called the geometrical side, the theory of groups of contact-transformations has been developed with very considerable detail in the second volume of Lie-Engel.

Applications of the theory of continuous

To the manifold applications of the theory of continuous groups in various branches of pure and applied mathematics it is impossible here to refer in any detail. It must suffice to indicate a few of them very briefly. In some of the older theories a new point of view is obtained which presents the results in a fresh light, and suggests the natural generalization. As an example, the theory of the

groups. invariants of a binary form may be considered.

If in the form $f = a_0x^n + na_1x^{n-1}y + \ldots + a_ny^n$, the variables be subjected to a homogeneous substitution

$$x' = \alpha x + \beta y,\ y' = \gamma x + \delta y, \tag{I.}$$

and if the coefficients in the new form be represented by accenting the old coefficients, then

$$\begin{aligned} a'_0 &= a_0\alpha^n + a_1 n\alpha^{n-1}\gamma + \ldots + a_n\gamma^n, \\ a'_1 &= a_0\alpha^{n-1}\beta + a_1\{(n-1)\alpha^{n-2}\beta\gamma + \alpha^{n-1}\delta\} + \ldots + a_n\gamma^{n-1}\delta, \\ &\ldots\ldots\ldots\ldots \\ a'_n &= a_0\beta^n + a_1 n\beta^{n-1}\delta + \ldots + a_n\delta^n; \end{aligned} \tag{II.}$$

and this is a homogeneous linear substitution performed on the coefficients. The totality of the substitutions, (i.), for which $\alpha\delta - \beta\gamma = 1$, constitutes a continuous group of order 3, which is generated by the two infinitesimal transformations $y(\partial/\partial x)$ and $x(\partial/\partial y)$. Hence with the same limitations on α, β, γ, δ the totality of the substitutions (ii.) forms a simply isomorphic continuous group of order 3, which is generated by the two infinitesimal transformations

$$a_0\frac{\partial}{\partial a_1} + 2a_1\frac{\partial}{\partial a_2} + 3a_1\frac{\partial}{\partial a_3} + \ldots + na_{n-1}\frac{\partial}{\partial a_n},$$

and

$$na_1\frac{\partial}{\partial a_0} + (n-1)a_2\frac{\partial}{\partial a_1} + (n-2)a_3\frac{\partial}{\partial a_2} + \ldots + a_u\frac{\partial}{\partial a_{u-1}}.$$

The invariants of the binary form, *i.e.* those functions of the coefficients which are unaltered by all homogeneous substitutions on x, y of determinant unity, are therefore identical with the functions of the coefficients which are invariant for the continuous group generated by the two infinitesimal operations last written. In other words, they are given by the common solutions of the differential equations

$$a_0\frac{\partial f}{\partial a_1} + 2a_1\frac{\partial f}{\partial a_1} + 3a_2\frac{\partial f}{\partial a_2} + \ldots = 0,$$
$$na_1\frac{\partial f}{\partial a_0} + (n-1)a_2\frac{\partial f}{\partial a_1} + (n-2)a_3\frac{\partial f}{\partial a_2} + \ldots = 0.$$

Both this result and the method by which it is arrived at are well known, but the point of view by which we pass from the transformation group of the variables to the isomorphic transformation group of the coefficients, and regard the invariants as invariants rather of the group than of the forms, is a new and a fruitful one.

The general theory of curvature of curves and surfaces may in a similar way be regarded as a theory of their invariants for the group of motions. That something more than a mere change of phraseology is here implied will be evident in dealing with minimum curves, *i.e.* with curves such that at every point of them $dx^2 + dy^2 + dz^2 = 0$. For such curves the ordinary theory of curvature has no meaning, but they nevertheless have invariant properties in regard to the group of motions.

The curvature and torsion of a curve, which are invariant for all transformations by the group of motions, are special instances of what are known as *differential invariants*. If $\xi(\partial/\partial x) + \eta(\partial/\partial y)$ is the general infinitesimal transformation of a group of point-transformations in the plane, and if y_1, y_2, ... represent the successive differential coefficients of y, the infinitesimal transformation may be written in the extended form

$$\xi\frac{\partial}{\partial x} + \eta\frac{\partial}{\partial y} + \eta_1\frac{\partial}{\partial y_1} + \eta_2\frac{\partial}{\partial y_2} + \ldots$$

where $\eta_1\delta t$, $\eta_2\delta t$, ... are the increments of y_1, y_2, ... By including a sufficient number of these variables the group must be intransitive in them, and must therefore have one or more invariants. Such invariants are known as differential invariants of the original group, being necessarily functions of the differential coefficients of the original variables. For groups of the plane it may be shown that not more than two of these differential invariants are independent, all others being formed from these by algebraical processes and differentiation. For groups of point-transformations in more than two variables there will be more than one set of differential invariants. For instance, with three variables, one may be regarded as independent and the other two as functions of it, or two as independent and the remaining one as a function. Corresponding to these two points of view, the differential invariants for a curve or for a surface will arise.

If a differential invariant of a continuous group of the plane be equated to zero, the resulting

differential equation remains unaltered when the variables undergo any transformation of the group. Conversely, if an ordinary, differential equation $f(x, y, y_1, y_2, \ldots) = 0$ admits the transformations of a continuous group, *i.e.* if the equation is unaltered when x and y undergo any transformation of the group, then $f(x, y, y_1, y_2, \ldots)$ or some multiple of it must be a differential invariant of the group. Hence it must be possible to find two independent differential invariants α, β of the group, such that when these are taken as variables the differential equation takes the form $F(\alpha, \beta, d\beta/d\alpha, d^2\beta/d\alpha^2, \ldots) = 0$. This equation in α, β will be of lower order than the original equation, and in general simpler to deal with. Supposing it solved in the form $\beta = \varphi(\alpha)$, where for α, β their values in terms of x, y, y_1, y_2, ... are written, this new equation, containing arbitrary constants, is necessarily again of lower order than the original equation. The integration of the original equation is thus divided into two steps. This will show how, in the case of an ordinary differential equation, the fact that the equation admits a continuous group of transformations may be taken advantage of for its integration.

The most important of the applications of continuous groups are to the theory of systems of differential equations, both ordinary and partial; in fact, Lie states that it was with a view to systematizing and advancing the general theory of differential equations that he was led to the development of the theory of continuous groups. It is quite impossible here to give any account of all that Lie and his followers have done in this direction. An entirely new mode of regarding the problem of the integration of a differential equation has been opened up, and in the classification that arises from it all those apparently isolated types of equations which in the older sense are said to be integrable take their proper place. It may, for instance, be mentioned that the question as to whether Monge's method will apply to the integration of a partial differential equation of the second order is shown to depend on whether or not a contact-transformation can be found which will reduce the equation to either $\partial^2 z/\partial x^2 = 0$ or $\partial^2 z/\partial x \partial y = 0$. It is in this direction that further advance in the theory of partial differential equations must be looked for. Lastly, it may be remarked that one of the most thorough discussions of the axioms of geometry hitherto undertaken is founded entirely upon the theory of continuous groups.

Discontinuous Groups.

We go on now to the consideration of discontinuous groups. Although groups of finite order are necessarily contained under this general head, it is convenient for many reasons to deal with them separately, and it will therefore be assumed in the present section that the number of operations in the group is not finite. Many large classes of discontinuous groups have formed the subject of detailed investigation, but a general formal theory of discontinuous groups can hardly be said to exist as yet. It will thus be obvious that in considering discontinuous groups it is necessary to proceed on different lines from those followed with continuous groups, and in fact to deal with the subject almost entirely by way of example.

Generating operations.

The consideration of a discontinuous group as arising from a set of independent generating operations suggests a purely abstract point of view in which any two simply isomorphic groups are indistinguishable. The number of generating operations may be either finite or infinite, but the former case alone will be here considered. Suppose then that $S_1, S_2, \ldots, S_n$ is a set of independent operations from which a group G is generated. The general operation of the group will be represented by the symbol $S_a^\alpha S_b^\beta \ldots S_d^\delta$, or Σ, where a, b, ..., d are chosen from 1, 2, ..., n, and α, β, ..., δ are any positive or negative integers. It may be assumed that no two successive suffixes in Σ are the same, for if b = a, then $S_a^\alpha S_b^\beta$ may be replaced by $S^{\alpha+\beta}_a$. If there are no relations connecting the generating operations and the identical operation, every distinct symbol Σ represents a distinct operation of the group. For if $\Sigma = \Sigma_1$, or $S_a^\alpha S_b^\beta \ldots S_d^\delta = S^{\alpha 1}_{a1} S^{\beta 1}_{b1} \ldots S^{\delta 1}_{d1}$, then $S^{-\delta 1}_{d1} \ldots S^{-\beta 1}_{b1} S^{-\alpha 1}_{a1} S_a^\alpha S_b^\beta \ldots S_d^\delta = 1$; and unless $a = a_1$, $b = b_1$, ..., $\alpha = \alpha_1$, $\beta = \beta_1$, ..., this is a relation connecting the generating operations.

Suppose now that $T_1, T_2, \ldots$ are operations of G, and that H is that self-conjugate subgroup of G which is generated by $T_1, T_2, \ldots$ and the operations conjugate to them. Then, of the operations that can be formed from $S_1, S_2, \ldots, S_n$, the set ΣH, and no others, reduce to the same operation Σ when the conditions $T_1 = 1, T_2 = 1, \ldots$ are satisfied by the generating operations. Hence the group which is generated by the given operations, when subjected to the conditions just written, is simply isomorphic with the factor-group G/H. Moreover, this is obviously true even when the conditions are such that the generating operations are no longer independent. Hence any discontinuous group may be defined abstractly, that is, in regard to the laws of combination of its operations apart from their actual form, by a set of generating operations and a system of relations connecting them. Conversely, when such a set of operations and system of relations are given arbitrarily they define in abstract form a single discontinuous group. It may, of course, happen that the group so defined is a group of finite order, or that it reduces to the identical operation only; but in regard to the general statement these will be particular and exceptional cases.

Properly and improperly discontinuous groups.

An operation of a discontinuous group must necessarily be specified analytically by a system of equations of the form

$$x'_s = f_s(x_1, x_2, \ldots, x_n; a_1, a_2, \ldots, a_r), \quad (s = 1, 2, \ldots, n),$$

and the different operations of the group will be given by different sets of values of the parameters $a_1, a_2, \ldots, a_r$. No one of these parameters is susceptible of continuous variations, but at least one must be capable of taking a number of values which is not finite, if the group is not one of finite order. Among the sets of values of the parameters there must be one which gives the identical transformation. No other transformation makes each of the differences $x'_1 - x_1, x'_2 - x_2, \ldots, x'_n - x_n$ vanish. Let d be an arbitrary assigned positive quantity. Then if a transformation of the group can be found such that the modulus of each of these differences is less than d when the variables have arbitrary values within an assigned range of variation, however small d may be chosen, the group is said to be *improperly* discontinuous. In the contrary case the group is called *properly* discontinuous. The range within which the variables are allowed to vary may clearly affect the question whether a given group is properly or improperly discontinuous. For instance, the group defined by the equation $x' = ax + b$, where a and b are any rational numbers, is improperly discontinuous; and the group defined by $x' = x + a$, where a is an integer, is properly discontinuous, whatever the range of the variable. On the other hand, the group, to be later considered, defined by the equation $x' = (ax + b) / (cx + d)$, where a, b, c, d are integers satisfying the relation $ad - bc = 1$, is properly discontinuous when x may take any complex value, and improperly discontinuous when the range of x is limited to real values.

Among the discontinuous groups that occur in analysis, a large number may be regarded as arising by imposing limitations on the range of variation of the parameters of continuous groups. If

$$x'_s = f_s(x_1, x_2, \ldots, x_n; a_1, a_2, \ldots, a_r), \quad (s = 1, 2, \ldots, n),$$

are the finite equations of a continuous group, and if C with parameters $c_1, c_2, \ldots, c_r$ is the operation which results from carrying out A and B with corresponding parameters in succession, then the c's are determined uniquely by the a's and the b's. If the c's are rational functions of the a's and b's, and if the a's and b's are arbitrary rational numbers of a given corpus (see NUMBER), the c's will be rational numbers of the same corpus. If the c's are rational integral functions of the a's and b's, and the latter are arbitrarily chosen integers of a corpus, then the c's are integers of the same corpus. Hence in the first case the above equations, when the a's are limited to be rational numbers of a given corpus, will define a discontinuous group; and in the second case they will define such a group when the a's are further limited to be integers of the corpus. A most important class of discontinuous groups are those that arise in this way from the general linear continuous group in a given set of variables. For n variables the finite equations of this continuous group are

Linear discontinuous groups.

$$x'_s = a_{s1}x_1 + a_{s2}x_2 + \ldots + a_{sn}x_n, \quad (s = 1, 2, \ldots, n),$$

where the determinant of the a's must not be zero. In this case the c's are clearly integral lineo-linear functions of the a's and b's. Moreover, the determinant of the c's is the product of the determinant of the a's and the determinant of the b's. Hence equations (ii.), where the parameters are restricted to be integers of a given corpus, define a discontinuous group; and if the determinant of the coefficients is limited to the value unity, they define a discontinuous group which is a (self-conjugate) subgroup of the previous one.

The simplest case which thus presents itself is that in which there are two variables while the coefficients are rational integers. This is the group defined by the equations

$$x' = ax + by,$$
$$y' = cx + dy,$$

where a, b, c, d are integers such that $ad - bc = 1$. To every operation of this group there corresponds an operation of the set defined by

$$z' = \frac{az + b}{cz + d},$$

in such a way that to the product of two operations of the group there corresponds the product of the two analogous operations of the set. The operations of the set (iv.), where $ad - bc = 1$, therefore constitute a group which is isomorphic with the previous group. The isomorphism is multiple, since to a single operation of the second set there correspond the two operations of the first for which a, b, c, d and $-a, -b, -c, -d$ are parameters. These two groups, which are of fundamental importance in the theory of quadratic forms and in the theory of modular functions, have been the object of very many investigations.

Another large class of discontinuous groups, which have far-reaching applications in analysis, are those which arise in the first instance from purely geometrical considerations. By

Discontinuous groups arising from geometrical operations.

the combination and repetition of a finite number of geometrical operations such as displacements, projective transformations, inversions, &c., a discontinuous group of such operations will arise. Such a group, as regards the points of the plane (or of space), will in general be improperly discontinuous; but when the generating operations are suitably chosen, the group may be properly discontinuous. In the latter case the group may be represented in a graphical form by the division of the plane (or space) into regions such that no point of one region can be transformed into another point of the same region by any operation of the group, while any given region can be transformed into any other by a suitable transformation. Thus, let ABC be a triangle bounded by three circular arcs BC, CA, AB; and consider the figure produced from ABC by inversions in the three circles of which BC, CA, AB are part. By inversion at BC, ABC becomes an equiangular triangle A′BC. An inversion in AB changes ABC and A′BC into equiangular triangles ABC′ and A″BC′. Successive inversions at AB and BC then will change ABC into a series of equiangular triangles with B for a common vertex. These will not overlap and will just fill in the space round B if the angle ABC is a submultiple of two right angles. If then the angles of ABC are submultiples of two right angles (or zero), the triangles formed by any number of inversions will never overlap, and to each operation consisting of a definite series of inversions at BC, CA and AB will correspond a distinct triangle into which ABC is changed by the operation. The network of triangles so formed gives a graphical representation of the group that arises from the three inversions in BC, CA, AB. The triangles may be divided into two sets, those, namely, like A″BC′, which are derived from ABC by an even number of inversions, and those like A′BC or ABC′ produced by an odd number. Each set are interchanged among themselves by any even number of inversions. Hence the operations consisting of an even number of inversions form a group by themselves. For this group the quadrilateral formed by ABC and A′BC constitutes a region, which is changed by every operation of the group into a distinct region (formed of two adjacent triangles), and these regions clearly do not overlap. Their distribution presents in a graphical form the group that arises by pairs of inversions at BC, CA, AB; and this group is generated by the operation which consists of successive inversions at AB, BC and that which consists of successive inversions at BC, CA. The group defined thus geometrically may be presented in many analytical forms. If x, y and x′, y′ are the rectangular co-ordinates of two points which are inverse to each other with respect to a given circle, x′ and y′ are rational functions of x and y, and conversely. Thus the group may be presented in a form in which each operation gives a birational transformation of two variables. If $x + iy = z$, $x' + iy' = z'$, and if x′, y′ is the point to which x, y is transformed by any even number of inversions, then z′ and z are connected by a linear relation $z' = (\alpha z + \beta) / (\gamma z + \delta)$, where α, β, γ, δ are constants (in general complex) depending on the circles at which the inversions are taken. Hence the group may be presented in the form of a group of linear transformations of a single variable generated by the two linear transformations $z' = (\alpha_1 z + \beta_1) / (\gamma_1 z + \delta_1)$, $z' = (\alpha_2 z + \beta_2) / (\gamma_2 z + \delta_2)$, which correspond to pairs of inversions at AB, BC and BC, CA respectively. In particular, if the sides of the triangle are taken to be $x = 0$, $x^2 + y^2 - 1 = 0$, $x^2 + y^2 + 2x = 0$, the generating operations are found to be $z' = z + 1$, $z' = -z^{-1}$; and the group is that consisting of all transformations of the form $z' = (az + b) / (cz + d)$, where $ad - bc = 1$, a, b, c, d being integers. This is the group already mentioned which underlies the theory of the elliptic modular functions; a modular function being a function of z which is invariant for some subgroup of finite index of the group in question.

The triangle ABC from which the above geometrical construction started may be replaced by a polygon whose sides are circles. If each angle is a submultiple of two right angles or zero, the construction is still effective to give a set of non-overlapping regions, which represent graphically the group which arises from pairs of inversions in the sides of the polygon. In their analytical form, as groups of linear transformations of a single variable, the groups are those on which the theory of automorphic functions depends. A similar construction in space, the polygons bounded by circular arcs being replaced by polyhedra bounded by spherical faces, has been used by F. Klein and Fricke to give a geometrical representation for groups which are improperly discontinuous when represented as groups of the plane.

Group of a linear differential equation.

The special classes of discontinuous groups that have been dealt with in the previous paragraphs arise directly from geometrical considerations. As a final example we shall refer briefly to a class of groups whose origin is essentially analytical. Let

$$\frac{d^n y}{dx^n} + P_1 \frac{d^{n-1} y}{dx^{n-1}} + \ldots + P_{n-1} \frac{dy}{dx} + P_n y = 0$$

be a linear differential equation, the coefficients in which are rational functions of x, and let y_1, y_2, ..., y_n be a linearly independent set of integrals of the equation. In the neighbourhood of a finite value x_0 of x, which is not a singularity of any of the coefficients in the equation, these integrals are ordinary power-series in $x - x_0$. If the analytical continuations of y_1, y_2, ..., y_n be formed for any closed path starting from and returning to x_0, the final values arrived at when

x_0 is again reached will be another set of linearly independent integrals. When the closed path contains no singular point of the coefficients of the differential equation, the new set of integrals is identical with the original set. If, however, the closed path encloses one or more singular points, this will not in general be the case. Let y'_1, y'_2, ..., y'_n be the new integrals arrived at. Since in the neighbourhood of x_0 every integral can be represented linearly in terms of y_1, y_2, ..., y_n, there must be a system of equations

$$\begin{aligned} y'_1 &= a_{11}y_1 + a_{12}y_2 + \ldots + a_{1n}y_n, \\ y'_2 &= a_{21}y_1 + a_{22}y_2 + \ldots + a_{2n}y_n, \\ &\cdots \\ y'_n &= a_{n1}y_1 + a_{n2}y_2 + \ldots + a_{nn}y_n, \end{aligned}$$

where the a's are constants, expressing the new integrals in terms of the original ones. To each closed path described by x_0 there therefore corresponds a definite linear substitution performed on the y's. Further, if S_1 and S_2 are the substitutions that correspond to two closed paths L_1 and L_2, then to any closed path which can be continuously deformed, without crossing a singular point, into L_1 followed by L_2, there corresponds the substitution S_1S_2. Let L_1, L_2, ..., L_r be arbitrarily chosen closed paths starting from and returning to the same point, and each of them enclosing a single one of the (r) finite singular points of the equation. Every closed path in the plane can be formed by combinations of these r paths taken either in the positive or in the negative direction. Also a closed path which does not cut itself, and encloses all the r singular points within it, is equivalent to a path enclosing the point at infinity and no finite singular point. If S_1, S_2, S_3, ..., S_r are the linear substitutions that correspond to these r paths, then the substitution corresponding to every possible path can be obtained by combination and repetition of these r substitutions, and they therefore generate a discontinuous group each of whose operations corresponds to a definite closed path. The group thus arrived at is called the group of the equation. For a given equation it is unique in type. In fact, the only effect of starting from another set of independent integrals is to transform every operation of the group by an arbitrary substitution, while choosing a different set of paths is equivalent to taking a new set of generating operations. The great importance of the group of the equation in connexion with the nature of its integrals cannot here be dealt with, but it may be pointed out that if all the integrals of the equation are algebraic functions, the group must be a group of finite order, since the set of quantities y_1, y_2 ..., y_n can then only take a finite number of distinct values.

Groups of Finite Order.

We shall now pass on to groups of finite order. It is clear that here we must have to do with many properties which have no direct analogues in the theory of continuous groups or in that of discontinuous groups in general; those properties, namely, which depend on the fact that the number of distinct operations in the group is finite.

Let S_1, S_2, S_3, ..., S_N denote the operations of a group G of finite order N, S_1 being the identical operation. The tableau

$$\begin{array}{ccccc} S_1, & S_2, & S_3, & \ldots, & S_N, \\ S_1S_2, & S_2S_2, & S_3S_3, & \ldots, & S_NS_2, \\ S_1S_3, & S_2S_3, & S_3S_3, & \ldots, & S_NS_3, \\ \cdots & \cdots & \cdots & \cdots & \cdots \\ S_1S_N, & S_2S_N, & S_3S_N, & \ldots, & S_NS_N, \end{array}$$

when in it each compound symbol S_pS_q is replaced by the single symbol S_r that is equivalent to it, is called the multiplication table of the group. It indicates directly the result of multiplying together in an assigned sequence any number of operations of the group. In each line (and in each column) of the tableau every operation of the group occurs just once. If the letters in the tableau are regarded as mere symbols, the operation of replacing each symbol in the first line by the symbol which stands under it in the pth line is a permutation performed on the set of N symbols. Thus to the N lines of the tableau there corresponds a set of N permutations performed on the N symbols, which includes the identical permutation that leaves each unchanged. Moreover, if $S_pS_q = S_r$, then the result of carrying out in succession the permutations which correspond to the pth and qth lines gives the permutation which corresponds to the rth line. Hence the set of permutations constitutes a group which is simply isomorphic with the given group.

Every group of finite order N can therefore be represented in concrete form as a transitive group of permutations on N symbols.

The order of any subgroup or operation of G is necessarily finite. If $T_1(= S_1)$, T_2, ..., T_n are the operations of a subgroup H of G, and if Σ is any operation of G which is not contained in H, the set of operations ΣT_1, ΣT_2, ..., ΣT_n, or ΣH, are all distinct from each other and from the operations of H. If the sets H and ΣH do not exhaust the operations of G, and if Σ′ is an operation not belonging to them, then the operations of the set Σ′H are distinct from each other and from those of H and ΣH. This process may be continued till the operations of G are exhausted. The order n of H must therefore be a factor of the order N of G. The ratio N/n is called the index of the subgroup H. By taking for H the cyclical subgroup generated by any operation S of G, it follows that the order of S must be a factor of the order of G.

Properties of a group which depend on the order.

Every operation S is permutable with its own powers. Hence there must be some subgroup H of G of greatest possible order, such that every operation of H is permutable with S. Every operation of H transforms S into itself, and every operation of the set HΣ transforms S into the same operation. Hence, when S is transformed by every operation of G, just N/n distinct operations arise if n is the order of H. These operations, and no others, are conjugate to S within G; they are said to form a set of conjugate operations. The number of operations in every conjugate set is therefore a factor of the order of G. In the same way it may be shown that the number of subgroups which are conjugate to a given subgroup is a factor of the order of G. An operation which is permutable with every operation of the group is called a *self-conjugate* operation. The totality of the self-conjugate operations of a group forms a self-conjugate Abelian subgroup, each of whose operations is permutable with every operation of the group.

An Abelian group contains subgroups whose orders are any given factors of the order of the group. In fact, since every subgroup H of an Abelian group G and the corresponding factor groups G/H are Abelian, this result follows immediately by an induction from the case in which the order contains n prime factors to that in which it contains n + 1. For a group which is not Abelian no general law can be stated as to the existence or non-existence of a subgroup whose order is an arbitrarily assigned factor of the order of the group. In this connexion the most important general result, which is independent of any supposition as to the order of the group, is known as Sylow's theorem, which states that if p^a is the highest power of a prime p which divides the order of a group G, then G contains a single conjugate set of subgroups of order p^a, the number in the set being of the form 1 + kp. Sylow's theorem may be extended to show that if $p^{a'}$ is a factor of the order of a group, the number of subgroups of order $p^{a'}$ is of the form 1 + kp. If, however, $p^{a'}$ is not the highest power of p which divides the order, these groups do not in general form a single conjugate set.

Sylow's theorem.

The importance of Sylow's theorem in discussing the structure of a group of given order need hardly be insisted on. Thus, as a very simple instance, a group whose order is the product p_1p_2 of two primes ($p_1 < p_2$) must have a self-conjugate subgroup of order p_2, since the order of the group contains no factor, other than unity, of the form $1 + kp_2$. The same again is true for a group of order $p_1^2p_2$, unless $p_1 = 2$, and $p_2 = 3$.

There is one other numerical property of a group connected with its order which is quite general. If N is the order of G, and n a factor of N, the number of operations of G, whose orders are equal to or are factors of n, is a multiple of n.

As already defined, a composite group is a group which contains one or more self-conjugate subgroups, whose orders are greater than unity. If H is a self-conjugate subgroup of G, the factor-group G/H may be either simple or composite. In the former case G can contain no self-conjugate subgroup K, which itself contains H; for if it did K/H would be a self-conjugate subgroup of G/H. When G/H is simple, H is said to be a maximum self-conjugate subgroup of G. Suppose now that G being a given composite group, G, G_1, G_2, ..., G_n, 1 is a series of subgroups of G, such that each is a maximum self-conjugate subgroup of the preceding; the last term of the series consisting of the identical operation only. Such a series is called a *composition-series* of G. In general it is not unique, since a group may have two or more maximum self-conjugate subgroups. A composition-series of a group, however it may be chosen, has the property that the number of terms of which it consists is always the same, while the factor-groups G/G_1, G_1/G_2, ..., G_n differ only in the sequence in which they occur. It should be noticed that though a group defines uniquely the set of factor-groups that occur in its composition-series, the set of factor-groups do not conversely in general define a single type of group. When the orders of all the factor-groups are primes the group is said to be *soluble*.

Composition-series of a group.

If the series of subgroups G, H, K, ..., L, 1 is chosen so that each is the greatest self-conjugate subgroup of G contained in the previous one, the series is called a chief composition-series of G. All such series derived from a given group may be shown to consist of the same number of terms, and to give rise to the same set of factor-groups, except as regards sequence.

The factor-groups of such a series will not, however, necessarily be simple groups. From any chief composition-series a composition-series may be formed by interpolating between any two terms H and K of the series for which H/K is not a simple group, a number of terms h_1, h_2, ..., h_r; and it may be shown that the factor-groups H/h_1, h_1/h_2, ..., h_r/K are all simply isomorphic with each other.

A group may be represented as isomorphic with itself by transforming all its operations by any one of them. In fact, if $S_pS_q = S_r$, then $S^{-1}S_pS \cdot S^{-1}S_qS = S^{-1}S_rS$. An isomorphism of the group with itself, established in this way, is called an inner isomorphism. It may be regarded as an operation carried out on the symbols of the operations, being indeed a permutation performed on these symbols. The totality of these operations clearly constitutes a group isomorphic with the given group, and this group is called the group of inner isomorphisms. A group is simply or multiply isomorphic with its group of inner isomorphisms according as it does not or does contain self-conjugate operations other than identity. It may be possible to establish a correspondence between the operations of a group other than those given by the inner isomorphisms, such that if S′ is the operation corresponding to S, then $S'_pS'_q = S'_r$ is a consequence of $S_pS_q = S_r$. The substitution on the symbols of the operations of a group resulting from such a correspondence is called an outer isomorphism. The totality of the isomorphisms of both kinds constitutes the group of isomorphisms of the given group, and within this the group of inner isomorphisms is a self-conjugate subgroup. Every set of conjugate operations of a group is necessarily transformed into itself by an inner isomorphism, but two or more sets may be interchanged by an outer isomorphism.

Isomorphism of a group with itself.

A subgroup of a group G, which is transformed into itself by every isomorphism of G, is called a *characteristic* subgroup. A series of groups G, G_1, G_2, ..., 1, such that each is a maximum characteristic subgroup of G contained in the preceding, may be shown to have the same invariant properties as the subgroups of a composition series. A group which has no characteristic subgroup must be either a simple group or the direct product of a number of simply isomorphic simple groups.

It has been seen that every group of finite order can be represented as a group of permutations performed on a set of symbols whose number is equal to the order of the group. In general such a representation is possible with a smaller number of symbols. Let H be a subgroup of G, and let the operations of G be divided, in respect of H, into the sets H, S_2H, S_3H, ..., S_mH. If S is any operation of G, the sets SH, SS_2H, SS_3H, ..., SS_mH differ from the previous sets only in the sequence in which they occur. In fact, if SS_p belong to the set S_qH, then since H is a group, the set SS_pH is identical with the set S_qH. Hence, to each operation S of the group will correspond a permutation performed on the symbols of the m sets, and to the product of two operations corresponds the product of the two analogous permutations. The set of permutations, therefore, forms a group isomorphic with the given group. Moreover, the isomorphism is simple unless for one or more operations, other than identity, the sets all remain unaltered. This can only be the case for S, when every operation conjugate to S belongs to H. In this case H would contain a self-conjugate subgroup, and the isomorphism is multiple.

Permutation-groups.

The fact that every group of finite order can be represented, generally in several ways, as a group of permutations, gives special importance to such groups. The number of symbols involved in such a representation is called the *degree* of the group. In accordance with the general definitions already given, a permutation-group is called transitive or intransitive according as it does or does not contain permutations changing any one of the symbols into any other. It is called imprimitive or primitive according as the symbols can or cannot be arranged in sets, such that every permutation of the group changes the symbols of any one set either among themselves or into the symbols of another set. When a group is imprimitive the number of symbols in each set must clearly be the same.

The total number of permutations that can be performed on n symbols is n!, and these necessarily constitute a group. It is known as the *symmetric* group of degree n, the only rational functions of the symbols which are unaltered by all possible permutations being the symmetric functions. When any permutation is carried out on the product of the $n(n-1)/2$, differences of the n symbols, it must either remain unaltered or its sign must be changed. Those permutations which leave the product unaltered constitute a group of order n!/2, which is called the *alternating* group of degree n; it is a self-conjugate subgroup of the symmetric group. Except when n = 4 the alternating group is a simple group. A group of degree n, which is not contained in the alternating group, must necessarily have a self-conjugate subgroup of index 2, consisting of those of its permutations which belong to the alternating group.

Among the various concrete forms in which a group of finite order can be presented the most important is that of a group of linear substitutions. Such groups have already been referred to in connexion with discontinuous groups. Here the number of distinct substitutions is necessarily finite; and to each operation S of a

Groups of linear

substitutions. group G of finite order there will correspond a linear substitution s, viz.

$$x_i = \sum_{j=1}^{j=m} s_{ij}\, x_j \ (i, j = 1, 2, \ldots, m),$$

on a set of m variables, such that if ST = U, then st = u. The linear substitutions s, t, u, ... then constitute a group g with which G is isomorphic; and whether the isomorphism is simple or multiple g is said to give a "representation" of G as a group of linear substitutions. If all the substitutions of g are transformed by the same substitution on the m variables, the (in general) new group of linear substitutions so constituted is said to be "equivalent" with g as a representation of G; and two representations are called "non-equivalent," or "distinct," when one is not capable of being transformed into the other.

A group of linear substitutions on m variables is said to be "reducible" when it is possible to choose m′ (< m) linear functions of the variables which are transformed among themselves by every substitution of the group. When this cannot be done the group is called "irreducible." It can be shown that a group of linear substitutions, of finite order, is always either irreducible, or such that the variables, when suitably chosen, may be divided into sets, each set being irreducibly transformed among themselves. This being so, it is clear that when the irreducible representations of a group of finite order are known, all representations may be built up.

It has been seen at the beginning of this section that every group of finite order N can be presented as a group of permutations (*i.e.* linear substitutions in a limited sense) on N symbols. This group is obviously reducible; in fact, the sum of the symbols remain unaltered by every substitution of the group. The fundamental theorem in connexion with the representations, as an irreducible group of linear substitutions, of a group of finite order N is the following.

If r is the number of different sets of conjugate operations in the group, then, when the group of N permutations is completely reduced,

(i.) just r distinct irreducible representations occur:

(ii.) each of these occurs a number of times equal to the number of symbols on which it operates:

(iii.) these irreducible representations exhaust all the distinct irreducible representations of the group.

Among these representations what is called the "identical" representation necessarily occurs, *i.e.* that in which each operation of the group corresponds to leaving a single symbol unchanged. If these representations are denoted by Γ_1, Γ_2, ..., Γ_r, then any representation of the group as a group of linear substitutions, or in particular as a group of permutations, may be uniquely represented by a symbol $\Sigma\alpha_i\Gamma_i$, in the sense that the representation when completely reduced will contain the representation Γ_i just α_i times for each suffix i.

Group characteristics. A representation of a group of finite order as an irreducible group of linear substitutions may be presented in an infinite number of equivalent forms. If

$$x'_i = \Sigma s_{ij}\, x_j \ (i, j = 1, 2, \ldots, m),$$

is the linear substitution which, in a given irreducible representation of a group of finite order G, corresponds to the operation S, the determinant

$$\begin{vmatrix} s_{11} - \lambda & s_{12} & \ldots & s_{1m} \\ s_{21} & s_{22} - \lambda & \ldots & s_{2m} \\ . & . & \ldots & . \\ . & . & \ldots & . \\ . & . & \ldots & . \\ s_{m1} & s_{2m} & \ldots & s_{mm} - \lambda \end{vmatrix}$$

is invariant for all equivalent representations, when written as a polynomial in λ. Moreover, it has the same value for S and S′, if these are two conjugate operations in G. Of the various invariants that thus arise the most important is $s_{11} + s_{22} + \ldots + s_{mm}$, which is called the "characteristic" of S. If S is an operation of order p, its characteristic is the sum of m pth roots of unity; and in particular, if S is the identical operation its characteristic is m. If r is the number of sets of conjugate operations in G, there is, for each representation of G as an irreducible group, a set of r characteristics: X_1, X_2, ... X_r, one corresponding to each conjugate set; so that for the r irreducible representations just r such sets of characteristics arise. These are distinct, in the sense that if Ψ_1, Ψ_2, ..., Ψ_r are the characteristics for a distinct representation from the above, then X_i and Ψ_i are not equal for all values of the suffix i. It may be the case that the r characteristics for a given representation are all real. If this is so the representation is said to be self-inverse. In the contrary case there is always another representation, called the "inverse" representation, for which each characteristic is the

conjugate imaginary of the corresponding one in the original representation. The characteristics are subject to certain remarkable relations. If h_p denotes the number of operations in the *p*th conjugate set, while X^i_p, and X^j_p are the characteristics of the *p*th conjugate set in Γ_i and Γ_j, then

$$\sum^{p=r}_{p=1} h_p X^i_p X^j_p = 0 \text{ or } n,$$

according to Γ_i and Γ_j are not or are inverse representations, n being the order of G.

Again

$$\sum^{i=r}_{i=1} X^i_p X^i_q = 0 \text{ or } n/h_p$$

according as the pth and qth conjugate sets are not or are inverse; the qth set being called the inverse of the *p*th if it consists of the inverses of the operations constituting the *p*th.

Linear homogeneous groups.

Another form in which every group of finite order can be represented is that known as a linear homogeneous group. If in the equations

$$x'_r = a_{r1}x_1 + a_{r2}x_2 + \ldots + a_{rm}x_m, \ (r = 1, 2, \ldots, m),$$

which define a linear homogeneous substitution, the coefficients are integers, and if the equations are replaced by congruences to a finite modulus n, the system of congruences will give a definite operation, provided that the determinant of the coefficients is relatively prime to n. The product of two such operations is another operation of the same kind; and the total number of distinct operations is finite, since there is only a limited number of choices for the coefficients. The totality of these operations, therefore, constitutes a group of finite order; and such a group is known as a *linear homogeneous* group. If n is a prime the order of the group is

$$(n^m - 1)(n^m - n) \ldots (n^m - n^{m-1}).$$

The totality of the operations of the linear homogeneous group for which the determinant of the coefficients is congruent to unity forms a subgroup. Other subgroups arise by considering those operations which leave a function of the variables unchanged (mod. n). All such subgroups are known as linear homogeneous groups.

When the ratios only of the variables are considered, there arises a *linear fractional* group, with which the corresponding linear homogeneous group is isomorphic. Thus, if p is a prime the totality of the congruences

$$z' \equiv \frac{az + b}{cz + d}, \ ad - bc \neq 0, \ (\text{mod. } p)$$

constitutes a group of order $p(p^2 - 1)$. This class of groups for various values of p is almost the only one which has been as yet exhaustively analysed. For all values of p except 3 it contains a simple self-conjugate subgroup of index 2.

A great extension of the theory of linear homogeneous groups has been made in recent years by considering systems of congruences of the form

$$x'_r \equiv a_{r1}x_1 + a_{r2}x_2 + \ldots + a_{rm}x_m, \ (r = 1, 2, \ldots, m),$$

in which the coefficients a_{rs}, are integral functions with real integral coefficients of a root of an irreducible congruence to a prime modulus. Such a system of congruences is obviously limited in numbers and defines a group which contains as a subgroup the group defined by the same congruences with ordinary integral coefficients.

Applications.

The chief application of the theory of groups of finite order is to the theory of algebraic equations. The analogy of equations of the second, third and fourth degrees would give rise to the expectation that a root of an equation of any finite degree could be expressed in terms of the coefficients by a finite number of the operations of addition, subtraction, multiplication, division, and the extraction of roots; in other words, that the equation could be solved by radicals. This, however, as proved by Abel and Galois, is not the case: an equation of a higher degree than the fourth in general defines an algebraic irrationality which cannot be expressed by means of radicals, and the cases in which such an equation can be solved by radicals must be regarded as exceptional. The theory of groups gives the means of determining whether an equation comes under this exceptional case, and of solving the equation when it does. When it does not, the theory provides the means of reducing the problem presented by the equation to a normal form. From this point of view the theory of equations of the fifth degree has been exhaustively treated, and the problems presented by certain equations of the sixth and seventh degrees have actually been reduced to normal form.

Galois (see EQUATION) showed that, corresponding to every irreducible equation of the *n*th degree, there exists a transitive substitution-group of degree n, such that every function of the

roots, the numerical value of which is unaltered by all the substitutions of the group can be expressed rationally in terms of the coefficients, while conversely every function of the roots which is expressible rationally in terms of the coefficients is unaltered by the substitutions of the group. This group is called the group of the equation. In general, if the equation is given arbitrarily, the group will be the symmetric group. The necessary and sufficient condition that the equation may be soluble by radicals is that its group should be a soluble group. When the coefficients in an equation are rational integers, the determination of its group may be made by a finite number of processes each of which involves only rational arithmetical operations. These processes consist in forming resolvents of the equation corresponding to each distinct type of subgroup of the symmetric group whose degree is that of the equation. Each of the resolvents so formed is then examined to find whether it has rational roots. The group corresponding to any resolvent which has a rational root contains the group of the equation; and the least of the groups so found is the group of the equation. Thus, for an equation of the fifth degree the various transitive subgroups of the symmetric group of degree five have to be considered. These are (i.) the alternating group; (ii.) a soluble group of order 20; (iii.) a group of order 10, self-conjugate in the preceding; (iv.) a cyclical group of order 5, self-conjugate in both the preceding. If x_0, x_1, x_2, x_3, x_4 are the roots of the equation, the corresponding resolvents may be taken to be those which have for roots (i.) the square root of the discriminant; (ii.) the function $(x_0x_1 + x_1x_2 + x_2x_3 + x_3x_4 + x_4x_0)\,(x_0x_2 + x_2x_4 + x_4x_1 + x_1x_3 + x_3x_0)$; (iii.) the function $x_0x_1 + x_1x_2 + x_2x_3 + x_3x_4 + x_4x_0$; and (iv.) the function $x_0^2x_1 + x_1^2x_2 + x_2^2x_3 + x_3^2x_4 + x_4^2x_0$. Since the groups for which (iii.) and (iv.) are invariant are contained in that for which (ii.) is invariant, and since these are the only soluble groups of the set, the equation will be soluble by radicals only when the function (ii.) can be expressed rationally in terms of the coefficients. If

$$(x_0x_1 + x_1x_2 + x_2x_3 + x_3x_4 + x_4x_0)\,(x_0x_2 + x_2x_4 + x_4x_1 + x_1x_3 + x_3x_0)$$

is known, then clearly $x_0x_1 + x_1x_2 + x_2x_3 + x_3x_4 + x_4x_0$ can be determined by the solution of a quadratic equation. Moreover, the sum and product $(x_0 + \varepsilon x_1 + \varepsilon^2x_2 + \varepsilon^3x_3 + \varepsilon^4x_4)^5$ and $(x_0 + \varepsilon^4x_1 + \varepsilon^3x_2 + \varepsilon^2x_3 + \varepsilon x_4)^5$ can be expressed rationally in terms of $x_0x_1 + x_1x_2 + x_2x_3 + x_3x_4 + x_4x_0$, ε, and the symmetric functions; ε being a fifth root of unity. Hence $(x_0 + \varepsilon x_1 + \varepsilon^2x_2 + \varepsilon^3x_3 + \varepsilon^4X_4)^5$ can be determined by the solution of a quadratic equation. The roots of the original equation are then finally determined by the extraction of a fifth root. The problem of reducing an equation of the fifth degree, when not soluble by radicals, to a normal form, forms the subject of Klein's *Vorlesungen über das Ikosaeder*. Another application of groups of finite order is to the theory of linear differential equations whose integrals are algebraic functions. It has been already seen, in the discussion of discontinuous groups in general, that the groups of such equations must be groups of finite order. To every group of finite order which can be represented as an irreducible group of linear substitutions on n variables will correspond a class of irreducible linear differential equations of the *n*th order whose integrals are algebraic. The complete determination of the class of linear differential equations of the second order with all their integrals algebraic, whose group has the greatest possible order, viz. 120, has been carried out by Klein.

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(W. BU.)

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1 The word "group," which appears first in English in the sense of an assemblage of figures in an

artistic design, picture, &c., is adapted from the Fr. *groupe*, which is to be referred to the Teutonic word meaning “knot,” “mass,” “bunch,” represented in English by “crop” (*q.v.*). The technical mathematical sense is not older than 1870.

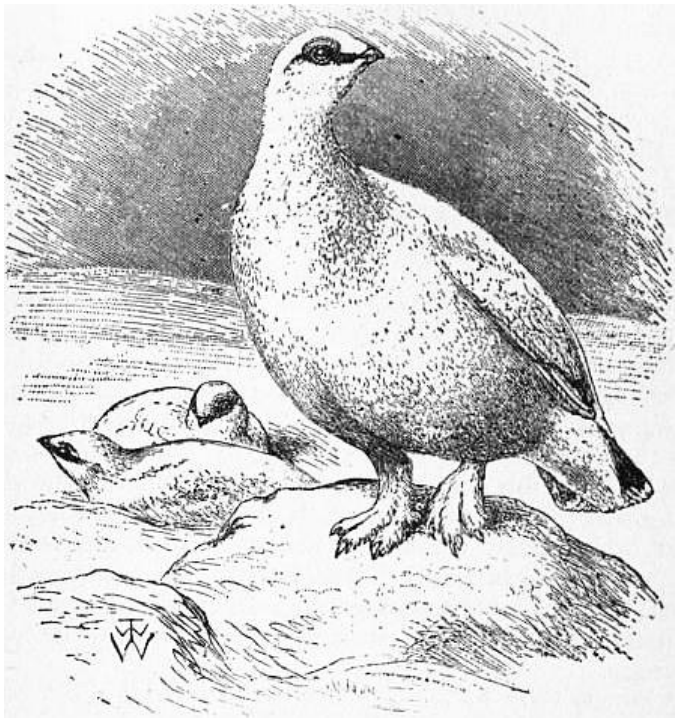
GROUSE, a word of uncertain origin,[1] now used generally by ornithologists to include all the “rough-footed” Gallinaceous birds, but in common speech applied almost exclusively, when used alone, to the *Tetrao scoticus* of Linnaeus, the *Lagopus scoticus* of modern systematists—more particularly called in English the red grouse, but till the end of the 18th century almost invariably spoken of as the Moor-fowl or Moor-game. The effect which this species is supposed to have had on the British legislature, and therefore on history, is well known, for it was the common belief that parliament always rose when the season for grouse-shooting began (August 12th); while according to the *Orkneyinga Saga* (ed. Jonaeus, p. 356; ed. Anderson, p. 168) events of some importance in the annals of North Britain followed from its pursuit in Caithness in the year 1157.

The red grouse is found on moors from Monmouthshire and Derbyshire northward to the Orkneys, as well as in most of the Hebrides. It inhabits similar situations throughout Wales and Ireland, but it does not naturally occur beyond the limits of the British Islands,[2] and is the only species among birds peculiar to them. The word “species” may in this case be used advisedly (since the red grouse invariably “breeds true,” it admits of an easy diagnosis, and it has a definite geographical range); but scarcely any zoologist can doubt of its common origin with the willow-grouse, *Lagopus albus* (*L. subalpinus* or *L. saliceti* of some authors), that inhabits a subarctic zone from Norway across the continents of Europe and Asia, as well as North America from the Aleutian Islands to Newfoundland. The red grouse indeed is rarely or never found away from the heather on which chiefly it subsists; while the willow-grouse in many parts of the Old World seems to prefer the shrubby growth of berry-bearing plants (*Vaccinium* and others) that, often thickly interspersed with willows and birches, clothes the higher levels or the lower mountain-slopes, and it flourishes in the New World where heather scarcely exists, and a “heath” in its strict sense is unknown. It is true that the willow-grouse always becomes white in winter, which the red grouse never does; but in summer there is a considerable resemblance between the two species, the cock willow-grouse having his head, neck and breast of nearly the same rich chestnut-brown as his British representative, and, though his back be lighter in colour, as is also the whole plumage of his mate, than is found in the red grouse, in other respects the two species are precisely alike. No distinction can be discovered in their voice, their eggs, their build, nor in their anatomical details, so far as these have been investigated and compared.[3] Moreover, the red grouse, restricted as is its range, varies in colour not inconsiderably according to locality.

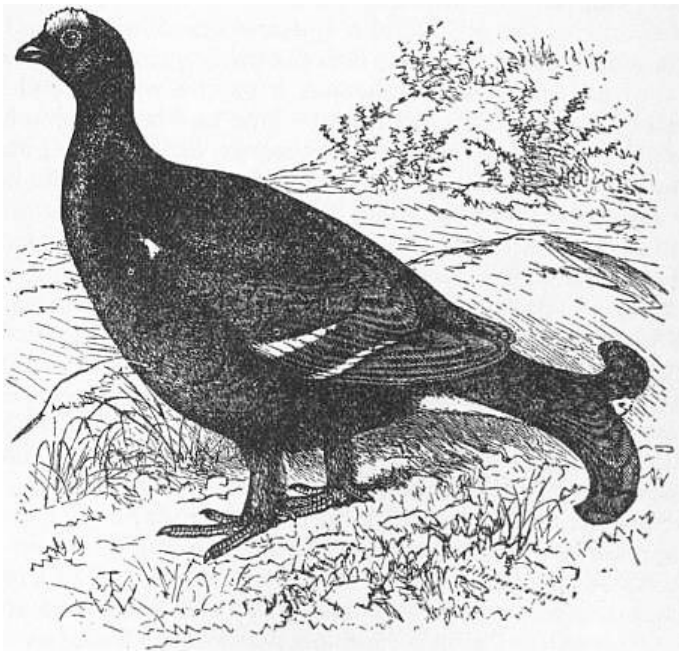
Red Grouse.

Though the red grouse does not, after the manner of other members of the genus *Lagopus*, become white in winter, Scotland possesses a species of the genus which does. This is the

ptarmigan, *L. mutus* or *L. alpinus*, which differs far more in structure, station and habits from the red grouse than that does from the willow-grouse, and in Scotland is far less abundant, haunting only the highest and most barren mountains. It is said to have formerly inhabited both Wales and England, but there is no evidence of its appearance in Ireland. On the continent of Europe it is found most numerously in Norway, but at an elevation far above the growth of trees, and it occurs on the Pyrenees and on the Alps. It also inhabits northern Russia. In North America, Greenland and Iceland it is represented by a very nearly allied form —so much so indeed that it is only at certain seasons that the slight difference between them can be detected. This form is the *L. rupestris* of authors, and it would appear to be found also in Siberia (*Ibis*, 1879, p. 148). Spitzbergen is inhabited by a large form which has received recognition as *L. hemileucurus*, and the northern end of the chain of the Rocky Mountains is tenanted by a very distinct species, the smallest and perhaps the most beautiful of the genus, *L. leucurus*, which has all the feathers of the tail white.



Ptarmigan.



Blackcock.

The bird, however, to which the name of grouse in all strictness belongs is probably the *Tetrao tetrix* of Linnaeus—the blackcock and greyhen, as the sexes are respectively called. It is distributed over most of the heath-country of England, except in East Anglia, where attempts to introduce it have been only partially successful. It also occurs in North Wales and very generally throughout Scotland, though not in Orkney, Shetland or the Outer Hebrides, nor in

Ireland. On the continent of Europe it has a very wide range, and it extends into Siberia. In Georgia its place is taken by a distinct species, on which a Polish naturalist (*Proc. Zool. Society*, 1875, p. 267) has conferred the name of *T. mlokosiewiczi*. Both these birds have much in common with their larger congener the capercally and its eastern representative.

The species of the genus *Bonasa*, of which the European *B. sylvestris* is the type, does not inhabit the British Islands. It is perhaps the most delicate game-bird that comes to table. It is the *gelinotte* of the French, the *Haselhuhn* of Germans, and *Hjerpe* of Scandinavians. Like its transatlantic congener *B. umbellus*, the ruffed grouse or birch-partridge (of which there are two other local forms, *B. umbelloides* and *B. sabinii*), it is purely a forest-bird. The same may be said of the species of *Canace*, of which two forms are found in America, *C. canadensis*, the spruce-partridge, and *C. franklini*, and also of the Siberian *C. falcipennis*. Nearly allied to these birds is the group known as *Dendragapus*, containing three large and fine forms *D. obscurus*, *D. fuliginosus*, and *D. richardsoni*—all peculiar to North America. Then there are *Centrocercus urophasianus*, the sage-cock of the plains of Columbia and California, and *Pedioecetes*, the sharp-tailed grouse, with its two forms, *P. phasianellus* and *P. columbianus*, while finally *Cupidonia*, the prairie-hen, also with two local forms, *C. cupido* and *C. pallidicincta*, is a bird that in the United States of America possesses considerable economic value, enormous numbers being consumed there, and also exported to Europe.

The various sorts of grouse are nearly all figured in Elliot's *Monograph of the Tetraoninae*, and an excellent account of the American species is given in Baird, Brewer and Ridgway's *North American Birds* (iii. 414-465). See also SHOOTING.

(A. N.)

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1 It seems first to occur (O. Salusbury Brereton, *Archaeologia*, iii. 157) as "grows" in an ordinance for the regulation of the royal household dated "apud Eltham, mens. Jan. 22 Hen. VIII.," *i.e.* 1531, and considering the locality must refer to black game. It is found in an Act of Parliament 1 Jac. I. cap. 27, § 2, *i.e.* 1603, and, as reprinted in the *Statutes at Large*, stands as now commonly spelt, but by many writers or printers the final *e* was omitted in the 17th and 18th centuries. In 1611 Cotgrave had "Poule griesche. A Moore-henne; the henne of the Grice [in ed. 1673 "Griece"] or Mooregame" (*Dictionarie of the French and English Tongues, s.v. Poule*). The most likely derivation seems to be from the old French word *griesche*, *greoche* or *griais* (meaning speckled, and cognate with *griseus*, grisly or grey), which was applied to some kind of partridge, or according to Brunetto Latini (*Trés.* p. 211) to a quail, "porce que ele fu premiers trovée en Grece." The Oxford Dictionary repudiates the possibility of "grouse" being a spurious singular of an alleged plural "grice," and, with regard to the possibility of "grows" being a plural of "grow," refers to Giraldus Cambrensis (*c.* 1210), *Topogr. Hib. opera* (Rolls) v. 47: "gallinae campestres, quas vulgariter *grutas* vocant."

2 It was successfully, though with much trouble, introduced by Mr Oscar Dickson on a tract of land near Gottenburg in Sweden (*Svenska Jägarförbundets Nya Tidskrift*, 1868, p. 64 *et alibi*).

3 A very interesting subject for discussion would be whether *Lagopus scoticus* or *L. albus* has varied most from the common stock of both. Looking to the fact that the former is the only species of the genus which does not assume white clothing in winter, an evolutionist might at first deem the variation greatest in its case; but then it must be borne in mind that the species of *Lagopus* which turn white differ in that respect from all other groups of the family *Tetraonidae*. Furthermore every species of *Lagopus* (even *L. leucurus*, the whitest of all) has its first set of *remiges* coloured brown. These are dropped when the bird is about half-grown, and in all the species but *L. scoticus* white *remiges* are then produced. If therefore the successive phases assumed by any animal in the course of its progress to maturity indicate the phases through which the species has passed, there may have been a time when all the species of *Lagopus* wore a brown livery even when adult, and the white dress donned in winter has been imposed upon the wearers by causes that can be easily suggested. The white plumage of the birds of this group protects them from danger during the snows of a protracted winter. But the red grouse, instead of perpetuating directly the more ancient properties of an original *Lagopus* that underwent no great seasonal change of plumage, may derive its ancestry from the widely-ranging willow-grouse, which in an epoch comparatively recent (in the geological sense) may have stocked Britain, and left descendants that, under conditions in which the assumption of a white garb would be almost fatal to the preservation of the species, have reverted (though doubtless with some modifications) to a comparative immutability essentially the same as that of the primal *Lagopus*.

GROVE, SIR GEORGE (1820-1900), English writer on music, was born at Clapham on the 13th of August 1820. He was articled to a civil engineer, and worked for two years in a factory near Glasgow. In 1841 and 1845 he was employed in the West Indies, erecting lighthouses in Jamaica and Bermuda. In 1849 he became secretary to the Society of Arts, and in 1852 to the

Crystal Palace. In this capacity his natural love of music and enthusiasm for the art found a splendid opening, and he threw all the weight of his influence into the task of promoting the best music of all schools in connexion with the weekly and daily concerts at Sydenham, which had a long and honourable career under the direction of Mr (afterwards Sir) August Manns. Without Sir George Grove that eminent conductor would hardly have succeeded in doing what he did to encourage young composers and to educate the British public in music. Grove's analyses of the Beethoven symphonies, and the other works presented at the concerts, set the pattern of what such things should be; and it was as a result of these, and of the fact that he was editor of *Macmillan's Magazine* from 1868 to 1883, that the scheme of his famous *Dictionary of Music and Musicians*, published from 1878 to 1889 (new edition, edited by J. A. Fuller Maitland, 1904-1907), was conceived and executed. His own articles in that work on Beethoven, Mendelssohn and Schubert are monuments of a special kind of learning, and that the rest of the book is a little thrown out of balance owing to their great length is hardly to be regretted. Long before this he had contributed to the *Dictionary of the Bible*, and had promoted the foundation of the Palestine Exploration Fund. On a journey to Vienna, undertaken in the company of his lifelong friend, Sir Arthur Sullivan, the important discovery of a large number of compositions by Schubert was made, including the music to *Rosamunde*. When the Royal College of Music was founded in 1882 he was appointed its first director, receiving the honour of knighthood. He brought the new institution into line with the most useful European conservatoriums. On the completion of the new buildings in 1894 he resigned the directorship, but retained an active interest in the institution to the end of his life. He died at Sydenham on the 28th of May 1900.

His life, a most interesting one, was written by Mr Charles Graves.

(J. A. F. M.)

GROVE, SIR WILLIAM ROBERT (1811-1896), English judge and man of science, was born on the 11th of July 1811 at Swansea, South Wales. After being educated by private tutors, he went to Brasenose College, Oxford, where he took an ordinary degree in 1832. Three years later he was called to the bar at Lincoln's Inn. His health, however, did not allow him to devote himself strenuously to practice, and he occupied his leisure with scientific studies. About 1839 he constructed the platinum-zinc voltaic cell that bears his name, and with the aid of a number of these exhibited the electric arc light in the London Institution, Finsbury Circus. The result was that in 1840 the managers appointed him to the professorship of experimental philosophy, an office which he held for seven years. His researches dealt very largely with electro-chemistry and with the voltaic cell, of which he invented several varieties. One of these, the Grove gas-battery, which is of special interest both intrinsically and as the forerunner of the secondary batteries now in use for the "storage" of electricity, was based on his observation that a current is produced by a couple of platinum plates standing in acidulated water and immersed, the one in hydrogen, the other in oxygen. At one of his lectures at the Institution he anticipated the electric lighting of to-day by illuminating the theatre with incandescent electric lamps, the filaments being of platinum and the current supplied by a battery of his nitric acid cells. In 1846 he published his famous book on *The Correlation of Physical Forces*, the leading ideas of which he had already put forward in his lectures: its fundamental conception was that each of the forces of nature—light, heat, electricity, &c.—is definitely and equivalently convertible into any other, and that where experiment does not give the full equivalent, it is because the initial force has been dissipated, not lost, by conversion into other unrecognized forces. In the same year he received a Royal medal from the Royal Society for his Bakerian lecture on "Certain phenomena of voltaic ignition and the decomposition of water into its constituent gases." In 1866 he presided over the British Association at its Nottingham meeting and delivered an address on the continuity of natural phenomena. But while he was thus engaged in scientific research, his legal work was not neglected, and his practice increased so greatly that in 1853 he became a Q.C. One of the best-known cases in which he appeared as an advocate was that of William Palmer, the Rugeley poisoner, whom he defended. In 1871 he was made a judge of the Common Pleas in succession to Sir Robert Collier, and remained on the bench till 1887. He died in London on the 1st of August 1896.

A selection of his scientific papers is given in the sixth edition of *The Correlation of Physical Forces*, published in 1874.

GROVE (O.E. *graf*, cf. O.E. *græfa*, brushwood, later "greave"; the word does not appear in any other Teutonic language, and the *New English Dictionary* finds no Indo-European root to which it can be referred; Skeat considers it connected with "grave," to cut, and finds the original meaning to be a glade cut through a wood), a small group or cluster of trees, growing naturally and forming something smaller than a wood, or planted in particular shapes or for particular purposes, in a park, &c. Groves have been connected with religious worship from the earliest times, and in many parts of India every village has its sacred group of trees. For the connexion of religion with sacred groves see TREE-WORSHIP.

The word "grove" was used by the authors of the Authorized Version of the Bible to translate two Hebrew words: (1) *'ēshel*, as in Gen. xxi. 33, and 1 Sam. xxii. 6; this is rightly given in the Revised Version as "tamarisk"; (2) *asherah* in many places throughout the Old Testament. Here the translators followed the Septuagint ἄλσος and the Vulgate *lucus*. The *'ăshéráh* was a wooden post erected at the Canaanitish places of worship, and also by the altars of Yahweh. It may have represented a tree.

GROZNYI, a fortress and town of Russia, North Caucasia, in the province of Terek, on the Zunzha river, 82 m. by rail N.E. of Vladikavkaz, on the railway to Petrovsk. There are naphtha wells close by. The fortifications were constructed in 1819. Pop. (1897) 15,599.

GRUB, the larva of an insect, a caterpillar, maggot. The word is formed from the verb "to grub," to dig, break up the surface of the ground, and clear of stumps, roots, weeds, &c. According to the *New English Dictionary*, "grub" may be referred to an ablaut variant of the Old Teutonic *grab-*, to dig, cf. "grave." Skeat (*Etym. Dict.* 1898) refers it rather to the root seen in "grope," "grab," &c., the original meaning "to search for." The earliest quotation of the slang use of the word in the sense of food in the *New English Dictionary* is dated 1659 from *Ancient Poems, Ballads*, &c., Percy Society Publications. "Grub-street," as a collective term for needy hack-writers, dates from the 17th century and is due to the name of a street near Moorfields, London, now Milton Street, which was as Johnson says "much inhabited by writers of small histories, dictionaries and temporary poems."

GRUBER, JOHANN GOTTFRIED (1774-1851), German critic and literary historian, was born at Naumburg on the Saale, on the 29th of November 1774. He received his education at the town school of Naumburg and the university of Leipzig, after which he resided successively at Göttingen, Leipzig, Jena and Weimar, occupying himself partly in teaching and partly in various literary enterprises, and enjoying in Weimar the friendship of Herder, Wieland and Goethe. In 1811 he was appointed professor at the university of Wittenberg, and after the division of Saxony he was sent by the senate to Berlin to negotiate the union of the university of Wittenberg with that of Halle. After the union was effected he became in 1815 professor of philosophy at Halle. He was associated with Johann Samuel Ersch in the editorship of the great work *Allgemeine Encyklopädie der Wissenschaften und Künste*; and after the death of Ersch he continued the first section from vol. xviii. to vol. liv. He also succeeded Ersch in the editorship of the *Allgemeine Literaturzeitung*. He died on the 7th of August 1851.

Gruber was the author of a large number of works, the principal of which are *Charakteristik Herders* (Leipzig, 1805), in conjunction with Johann T. L. Danz (1769-1851), afterwards professor of theology at Jena; *Geschichte des menschlichen Geschlechts* (2 vols., Leipzig, 1806); *Wörterbuch der altklassischen Mythologie* (3 vols., Weimar, 1810-1815); *Wielands Leben* (2 parts, Weimar, 1815-1816), and *Klopstocks Leben* (Weimar, 1832). He also edited Wieland's *Sämtliche Werke* (Leipzig, 1818-1828).

GRUMBACH, WILHELM VON (1503-1567), German adventurer, chiefly known through his connexion with the so-called “Grumbach feuds” (*Grumbachsche Händel*), the last attempt of the German knights to destroy the power of the territorial princes. A member of an old Franconian family, he was born on the 1st of June 1503, and having passed some time at the court of Casimir, prince of Bayreuth (d. 1527), fought against the peasants during the rising in 1524 and 1525. About 1540 Grumbach became associated with Albert Alcibiades, the turbulent prince of Bayreuth, whom he served both in peace and war. After the conclusion of the peace of Passau in 1552, Grumbach assisted Albert in his career of plunder in Franconia and was thus able to take some revenge upon his enemy, Melchior von Zobel, bishop of Würzburg. As a landholder Grumbach was a vassal of the bishops of Würzburg, and had held office at the court of Conrad of Bibra, who was bishop from 1540 to 1544. When, however, Zobel was chosen to succeed Conrad the harmonious relations between lord and vassal were quickly disturbed. Unable to free himself and his associates from the suzerainty of the bishop by appealing to the imperial courts he decided to adopt more violent measures, and his friendship with Albert was very serviceable in this connexion. Albert’s career, however, was checked by his defeat at Sievershausen in July 1553 and his subsequent flight into France, and the bishop took advantage of this state of affairs to seize Grumbach’s lands. The knight obtained an order of restitution from the imperial court of justice (*Reichskammergericht*), but he was unable to carry this into effect; and in April 1558 some of his partisans seized and killed the bishop. Grumbach declared he was innocent of this crime, but his story was not believed, and he fled to France. Returning to Germany he pleaded his cause in person before the diet at Augsburg in 1559, but without success. Meanwhile he had found a new patron in John Frederick, duke of Saxony, whose father, John Frederick, had been obliged to surrender the electoral dignity to the Albertine branch of his family. Chafing under this deprivation the duke listened readily to Grumbach’s plans for recovering the lost dignity, including a general rising of the German knights and the deposition of Frederick II., king of Denmark. Magical charms were employed against the duke’s enemies, and communications from angels were invented which helped to stir up the zeal of the people. In 1563 Grumbach attacked Würzburg, seized and plundered the city and compelled the chapter and the bishop to restore his lands. He was consequently placed under the imperial ban, but John Frederick refused to obey the order of the emperor Maximilian II. to withdraw his protection from him. Meanwhile Grumbach sought to compass the assassination of the Saxon elector, Augustus; proclamations were issued calling for assistance; and alliances both without and within Germany were concluded. In November 1566 John Frederick was placed under the ban, which had been renewed against Grumbach earlier in the year, and Augustus marched against Gotha. Assistance was not forthcoming, and a mutiny led to the capitulation of the town. Grumbach was delivered to his foes, and, after being tortured, was executed at Gotha on the 18th of April 1567.

See F. Ortloff, *Geschichte der Grumbachschen Händel* (Jena, 1868-1870), and J. Voigt, *Wilhelm von Grumbach und seine Händel* (Leipzig, 1846-1847).

GRUMENTUM, an ancient town in the centre of Lucania, 33 m. S. of Potentia by the direct road through Anxia, and 52 m. by the Via Herculia, at the point of divergence of a road eastward to Heraclea. It seems to have been a native Lucanian town, not a Greek settlement. In 215 B.C. the Carthaginian general Hanno was defeated under its walls, and in 207 B.C. Hannibal made it his headquarters. In the Social War it appears as a strong fortress, and seems to have been held by both sides at different times. It became a colony, perhaps in the time of Sulla, at latest under Augustus, and seems to have been of some importance. Its site, identified by Holste from the description of the martyrdom of St Laverius, is a ridge on the right bank of the Aciris (Agri) about 1960 ft. above sea-level, ½ m. below the modern Saponara, which lies much higher (2533 ft.). Its ruins (all of the Roman period) include those of a large amphitheatre (arena 205 by 197 ft.), the only one in Lucania, except that at Paestum. There are also remains of a theatre. Inscriptions record the repair of its town walls and the construction of *thermae* (of which remains were found) in 57-51 B.C., the construction in 43 B.C., of a portico, remains of which may be seen along an ancient road, at right angles to the main road, which traversed Grumentum from S. to N.

See F. P. Caputi in *Notizie degli scavi* (1877), 129, and G. Patroni, *ibid.* (1897) 180.

(T. As.)

GRÜN. Hans Baldung (*c.* 1470-1545), commonly called Grün, a German painter of the age of Dürer, was born at Gmünd in Swabia, and spent the greater part of his life at Strassburg and Freiburg in Breisgau. The earliest pictures assigned to him are altarpieces with the monogram H. B. interlaced, and the date of 1496, in the monastery chapel of Lichtenthal near Baden. Another early work is a portrait of the emperor Maximilian, drawn in 1501 on a leaf of a sketch-book now in the print-room at Carlsruhe. The "Martyrdom of St Sebastian" and the "Epiphany" (Berlin Museum), fruits of his labour in 1507, were painted for the market-church of Halle in Saxony. In 1509 Grün purchased the freedom of the city of Strassburg, and resided there till 1513, when he moved to Freiburg in Breisgau. There he began a series of large compositions, which he finished in 1516, and placed on the high altar of the Freiburg cathedral. He purchased anew the freedom of Strassburg in 1517, resided in that city as his domicile, and died a member of its great town council 1545.

Though nothing is known of Grün's youth and education, it may be inferred from his style that he was no stranger to the school of which Dürer was the chief. Gmünd is but 50 m. distant on either side from Augsburg and Nuremberg. Grün prints were often mistaken for those of Dürer; and Dürer himself was well acquainted with Grün's woodcuts and copper-plates in 640
which he traded during his trip to the Netherlands (1520). But Grün's prints, though Düreresque, are far below Dürer, and his paintings are below his prints. Without absolute correctness as a draughtsman, his conception of human form is often very unpleasant, whilst a questionable taste is shown in ornament equally profuse and "baroque." Nothing is more remarkable in his pictures than the pug-like shape of the faces, unless we except the coarseness of the extremities. No trace is apparent of any feeling for atmosphere or light and shade. Though Grün has been commonly called the Correggio of the north, his compositions are a curious medley of glaring and heterogeneous colours, in which pure black is contrasted with pale yellow, dirty grey, impure red and glowing green. Flesh is a mere glaze under which the features are indicated by lines. His works are mainly interesting because of the wild and fantastic strength which some of them display. We may pass lightly over the "Epiphany" of 1507, the "Crucifixion" of 1512, or the "Stoning of Stephen" of 1522, in the Berlin Museum. There is some force in the "Dance of Death" of 1517, in the museum of Basel, or the "Madonna" of 1530, in the Liechtenstein Gallery at Vienna. Grün's best effort is the altarpiece of Freiburg, where the "Coronation of the Virgin," and the "Twelve Apostles," the "Annunciation, Visitation, Nativity and Flight into Egypt," and the "Crucifixion," with portraits of donors, are executed with some of that fanciful power which Martin Schön bequeathed to the Swabian school. As a portrait painter he is well known. He drew the likeness of Charles V., as well as that of Maximilian; and his bust of Margrave Philip in the Munich Gallery tells us that he was connected with the reigning family of Baden as early as 1514. At a later period he had sittings from Margrave Christopher of Baden, Ottilia his wife, and all their children, and the picture containing these portraits is still in the grand-ducal gallery at Carlsruhe. Like Dürer and Cranach, Grün became a hearty supporter of the Reformation. He was present at the diet of Augsburg in 1518, and one of his woodcuts represents Luther under the protection of the Holy Ghost, which hovers over him in the shape of a dove.

GRÜNBERG, a town of Germany, in Prussian Silesia, beautifully situated between two hills on an affluent of the Oder, and on the railway from Breslau to Stettin via Küstrin, 36 m. N.N.W. of Glogau. Pop. (1905) 20,987. It has a Roman Catholic and two Evangelical churches, a modern school and a technical (textiles) school. There are manufactures of cloth, paper, machinery, straw hats, leather and tobacco. The prosperity of the town depends chiefly on the vine culture in the neighbourhood, from which, besides the exportation of a large quantity of grapes, about 700,000 gallons of wine are manufactured annually.

GRUNDTVIG, NIKOLAI FREDERIK SEVERIN (1783-1872), Danish poet, statesman and divine, was born at the parsonage of Udby in Zealand on the 8th of September 1783. In 1791 he was sent to live at the house of a priest in Jutland, and studied at the free school of Aarhuus until he went up to the university of Copenhagen in 1800. At the close of his university life he made Icelandic his special study, until in 1805 he took the position of tutor in a house on the island of Langeland. The next three years were spent in the study of Shakespeare, Schiller and Fichte. His cousin, the philosopher Henrik Steffens, had returned to Copenhagen in 1802 full of the teaching of Schelling and his lectures and the early poetry of Öhlenschläger opened the eyes of Grundtvig to the new era in literature. His first work, *On the Songs in the Edda*, attracted no attention. Returning to Copenhagen in 1808 he achieved greater success with his *Northern Mythology*, and again in 1809-1811 with a long epic poem, the *Decline of the Heroic Life in the North*. The boldness of the theological views expressed in his first sermon in 1810 offended the ecclesiastical authorities, and he retired to a country parish as his father's assistant for a while. From 1812 to 1817 he published five or six works, of which the *Rhyme of Roskilde* is the most remarkable. From 1816 to 1819 he was editor of a polemical journal entitled *Dannevirke*, and in 1818 to 1822 appeared his Danish paraphrases (6 vols.) of Saxo Grammaticus and Snorri. During these years he was preaching against rationalism to an enthusiastic congregation in Copenhagen, but he accepted in 1821 the country living of Praestö, only to return to the metropolis the year after. In 1825 he published a pamphlet, *The Church's Reply*, against H. N. Clausen, who was professor of theology in the university of Copenhagen. Grundtvig was publicly prosecuted and fined, and for seven years he was forbidden to preach, years which he spent in publishing a collection of his theological works, in paying two visits to England, and in studying Anglo-Saxon. In 1832 he obtained permission to preach again, and in 1839 he became priest of the workhouse church of Vartov hospital, Copenhagen, a post he continued to hold until his death. In 1837-1841 he published *Songs for the Danish Church*, a rich collection of sacred poetry; in 1838 he brought out a selection of early Scandinavian verse; in 1840 he edited the Anglo-Saxon poem of the *Phoenix*, with a Danish translation. He visited England a third time in 1843. From 1844 until after the first German war Grundtvig took a very prominent part in politics. In 1861 he received the titular rank of bishop, but without a see. He went on writing occasional poems till 1866, and preached in the Vartov every Sunday until a month before his death. His preaching attracted large congregations, and he soon had a following. His hymn-book effected a great change in Danish church services, substituting the hymns of the national poets for the slow measures of the orthodox Lutherans. The chief characteristic of his theology was the substitution of the authority of the "living word" for the apostolic commentaries, and he desired to see each congregation a practically independent community. His patriotism was almost a part of his religion, and he established popular schools where the national poetry and history should form an essential part of the instruction. His followers are known as Grundtvigians. He was married three times, the last time in his seventy-sixth year. He died on the 2nd of September 1872. Grundtvig holds a unique position in the literature of his country; he has been styled the Danish Carlyle. He was above all things a man of action, not an artist; and the formless vehemence of his writings, which have had a great influence over his own countrymen, is hardly agreeable or intelligible to a foreigner. The best of his poetical works were published in a selection (7 vols., 1880-1889) by his eldest son, Svend Hersleb Grundtvig (1824-1883), who was an authority on Scandinavian antiquities, and made an admirable collection of old Danish poetry (*Danmarks gamle Folkeviser*, 1853-1883, 5 vols.; completed in 1891 by A. Olrik).

His correspondence with Ingemann was edited by S. Grundtvig (1882); his correspondence with Christian Molbech by L. Schröder (1888); see also F. Winkel Horn, *Grundtvigs Liv og Gjerning* (1883); and an article by F. Nielsen in Bricka's *Dansk Biografisk Lexikon*.

GRUNDY, SYDNEY (1848-), English dramatist, was born at Manchester on the 23rd of March 1848, son of Alderman Charles Sydney Grundy. He was educated at Owens College, Manchester, and was called to the bar in 1869, practising in Manchester until 1876. His farce, *A Little Change*, was produced at the Haymarket Theatre in 1872. He became well known as an adapter of plays, among his early successes in this direction being *The Snowball* (Strand Theatre, 1879) from *Oscar, ou le mari qui trompe sa femme* by MM. Scribe and Duvergne, and *In Honour Bound* (1880) from Scribe's *Une Chaîne*. In 1887 he made a popular success with *The Bells of Haslemere*, written with Mr H. Pettitt and produced at the Adelphi. In 1889-1890 he produced two ingenious original comedies, *A White Lie* (Court Theatre) and *A Fool's Paradise* (Gaiety Theatre), which had been played two years earlier at Greenwich as *The*

Mouse-Trap. These were followed by *Sowing the Wind* (Comedy, 1893), *An Old Jew* (Garrick, 1894), and by an adaptation of Octave Feuillet's *Montjoye as A Bunch of Violets* (Haymarket, 1894). In 1894 he produced *The New Woman* and *The Slaves of the Ring*; in 1895, *The Greatest of These*, played by Mr and Mrs Kendal at the Garrick Theatre; *The Degenerates* (Haymarket, 1899), and *A Debt of Honour* (St James's 1900). Among Mr Grundy's most successful adaptations were the charming *Pair of Spectacles* (Garrick, 1890) from *Les Petits Oiseaux* of MM. Labiche and Delacour. Others were *A Village Priest* (Haymarket, 1890) from *Le Secret de la terreuse*, a melodrama by MM. Busnach and Cauvin; *A Marriage of Convenience* (Haymarket, 1897) from *Un Mariage de Louis XV*, by Alex. Dumas, père, *The Silver Key* (Her Majesty's, 1897) from his *Mlle de Belle-isle*, and *The Musqueteers* (1899) from the same author's novel; *Frocks and Frills* (Haymarket, 1902) from the *Doigts de fées* of MM. Scribe and Legouvé; *The Garden of Lies* (St James's Theatre, 1904) from Mr Justus Miles Forman's novel; *Business is Business* (His Majesty's Theatre, 1905), a rather free adaptation from Octave Mirbeau's *Les Affaires sont les affaires*; and *The Diplomatists* (Royalty Theatre, 1905) from *La Poudre aux yeux*, by Labiche.

GRUNDY, MRS, the name of an imaginary English character, who typifies the disciplinary control of the conventional "proprieties" of society over conduct, the tyrannical pressure of the opinion of neighbours on the acts of others. The name appears in a play of Thomas Morton, *Speed the Plough* (1798), in which one of the characters, Dame Ashfield, continually refers to what her neighbour Mrs Grundy will say as the criterion of respectability. Mrs Grundy is not a character in the play, but is a kind of "Mrs Harris" to Dame Ashfield.

GRUNER, GOTTLIEB SIGMUND (1717-1778), the author of the first connected attempt to describe in detail the snowy mountains of Switzerland. His father, Johann Rudolf Gruner (1680-1761), was pastor of Trachselwald, in the Bernese Emmenthal (1705), and later (1725) of Burgdorf, and a great collector of information relating to historical and scientific matters; his great *Thesaurus topographico-historicus totius ditionis Bernensis* (4 vols. folio, 1729-1730) still remains in MS., but in 1732 he published a small work entitled *Deliciae urbis Bernae*, while he possessed an extensive cabinet of natural history objects. Naturally such tastes had a great influence on the mind of his son, who was born at Trachselwald, and educated by his father and at the Latin school at Burgdorf, not going to Berne much before 1736, when he published a dissertation on the use of fire by the heathen. In 1739 he qualified as a notary, in 1741 became the archivist of Hesse-Homburg, and in 1743 accompanied Prince Christian of Anhalt-Schaumburg to Silesia and the university of Halle. He returned to his native land before 1749, when he obtained a post at Thorberg, being transferred in 1764 to Landshut and Fraubrunnen. It was in 1760 that he published in 3 vols. at Berne his chief work, *Die Eisgebirge des Schweizerlandes* (bad French translation by M. de Kéralio, Paris, 1770). The first two volumes are filled by a detailed description of the snowy Swiss mountains, based not so much on personal experience as on older works, and a very large number of communications received by Gruner from numerous friends; the third volume deals with glaciers in general, and their various properties. Though in many respects imperfect, Gruner's book sums up all that was known on the subject in his day, and forms the starting-point for later writers. The illustrations are very curious and interesting. In 1778 he republished (nominally in London, really at Berne) much of the information contained in his larger work, but thrown into the form of letters, supposed to be written in 1776 from various spots, under the title of *Reisen durch die merkwürdigsten Gegenden Helvetiens* (2 vols.).

(W. A. B. C.)

GRÜNEWALD, MATHIAS. The accounts which are given of this German painter, a native of Aschaffenburg, are curiously contradictory. Between 1518 and 1530, according to

statements adopted by Waagen and Passavant, he was commissioned by Albert of Brandenburg, elector and archbishop of Mainz, to produce an altarpiece for the collegiate church of St Maurice and Mary Magdalen at Halle on the Saale; and he acquitted himself of this duty with such cleverness that the prelate in after years caused the picture to be rescued from the Reformers and brought back to Aschaffenburg. From one of the churches of that city it was taken to the Pinakothek of Munich in 1836. It represents St Maurice and Mary Magdalen between four saints, and displays a style so markedly characteristic, and so like that of Lucas Cranach, that Waagen was induced to call Grünewald Cranach's master. He also traced the same hand and technical execution in the great altarpieces of Annaberg and Heilbronn, and in various panels exhibited in the museums of Mainz, Darmstadt, Aschaffenburg, Vienna and Berlin. A later race of critics, declining to accept the statements of Waagen and Passavant, affirm that there is no documentary evidence to connect Grünewald with the pictures of Halle and Annaberg, and they quote Sandrart and Bernhard Jobin of Strassburg to show that Grünewald is the painter of pictures of a different class. They prove that he finished before 1516 the large altarpiece of Issenheim, at present in the museum of Colmar, and starting from these premises they connect the artist with Altdorfer and Dürer to the exclusion of Cranach. That a native of the Palatinate should have been asked to execute pictures for a church in Saxony can scarcely be accounted strange, since we observe that Hans Baldung (Grün) was entrusted with a commission of this kind. But that a painter of Aschaffenburg should display the style of Cranach is strange and indeed incredible, unless vouched for by first-class evidence. In this case documents are altogether wanting, whilst on the other hand it is beyond the possibility of doubt, even according to Waagen, that the altarpiece of Issenheim is the creation of a man whose teaching was altogether different from that of the painter of the pictures of Halle and Annaberg. The altarpiece of Issenheim is a fine and powerful work, completed as local records show before 1516 by a Swabian, whose distinguishing mark is that he followed the traditions of Martin Schongauer, and came under the influence of Altdorfer and Dürer. As a work of art the altarpiece is important, being a poliptych of eleven panels, a carved central shrine covered with a double set of wings, and two side pieces containing the Temptation of St Anthony, the hermits Anthony and Paul in converse, the Virgin adored by Angels, the Resurrection, the Annunciation, the Crucifixion, St Sebastian, St Anthony, and the Marys wailing over the dead body of Christ. The author of these compositions is also the painter of a series of monochromes described by Sandrart in the Dominican convent, and now in part in the Saalhof at Frankfort, and a Resurrection in the museum of Basel, registered in Amerbach's inventory as the work of Grünewald.

GRUTER (or GRUYTÈRE), **JAN** (1560-1627), a critic and scholar of Dutch parentage by his father's side and English by his mother's, was born at Antwerp on the 3rd of December 1560. To avoid religious persecution his parents while he was still young came to England; and for some years he prosecuted his studies at Cambridge, after which he went to Leiden, where he graduated M. A. In 1586 he was appointed professor of history at Wittenberg, but as he refused to subscribe the *formula concordiae* he was unable to retain his office. From 1589 to 1592 he taught at Rostock, after which he went to Heidelberg, where in 1602 he was appointed librarian to the university. He died at Heidelberg on the 20th of September 1627.

Gruter's chief works were his *Inscriptiones antiquae totius orbis Romani* (2 vols., Heidelberg, 1603), and *Lampas, sive fax artium liberalium* (7 vols., Frankfort, 1602-1634).

GRUYÈRE (Ger. *Greyerz*), a district in the south-eastern portion of the Swiss canton of Fribourg, famed for its cattle and its cheese, and the original home of the "Ranz des Vaches," the melody by which the herdsmen call their cows home at milking time. It is composed of the middle reach (from Montbovon to beyond Bulle) of the Sarine or Saane valley, with its tributary glens of the Hongrin (left), the Jogne (right) and the Trême (left), and is a delightful pastoral region (in 1901 it contained 17,364 cattle). It forms an administrative district of the canton of Fribourg, its population in 1900 being 23,111, mainly French-speaking and Romanists. From Montbovon (11 m. by rail from Bulle) there are mountain railways leading S.W. past Les Avants to Montreux (14 m.), and E. up the Sarine valley past Château d'Oex to

Saanen or Gessenay (14 m.), and by a tunnel below a low pass to the Simme valley and Spiez on the Lake of Thun. The modern capital of the district is the small town of Bulle [Ger. *Boll*], with a 13th-century castle and in 1900 3330 inhabitants, French-speaking and Romanists. But the historical capital is the very picturesque little town of *Gruyères* (which keeps its final "s" in order to distinguish it from the district), perched on a steep hill (S.E. of Bulle) above the left bank of the Sarine, and at a height of 2713 ft. above the sea-level. It is only accessible by a rough carriage road, and boasts of a very fine old castle, at the foot of which is the solitary street of the town, which in 1900 had 1389 inhabitants.

The castle was the seat of the counts of the Gruyère, who are first mentioned in 1073. The name is said to come from the word *gruyer*, meaning the officer of woods and forests, but the counts bore the canting arms of a crane (*grue*), which are seen all over the castle and the town. That valiant family ended (in the legitimate line) with Count Michel (d. 1575) whose extravagance and consequent indebtedness compelled him in 1555 to sell his domains to Bern and Fribourg. Bern took the upper Sarine valley (it still keeps Saanen at its head, but in 1798 lost the Pays d'En-Haut to the canton du Léman, which in 1803 became the canton of Vaud). Fribourg took the rest of the county, which it added to Bulle and Albeuve (taken in 1537 from the bishop of Lausanne), and to the lordship of Jaun in the Jaun or Jogne valley (bought in 1502-1504 from its lords), in order to form the present administrative district of Gruyère, which is not co-extensive with the historical county of that name.

See the materials collected by J. J. Hisely and published in successive vols. of the *Mémoires et documents de la suisse romande ... introa. à l'hist.* (1851); Histoire (2 vols., 1855-1857); and Monuments de l'histoire (2 vols., 1867-1869); K. V. von Bonstetten, *Briefe über ein schweiz. Hirtenland* (1781) (Eng. trans., 1784); J. Reichlen, *La Gruyère illustrée* (1890), seq.; H. Raemy, *La Gruyère* (1867); and *Les Alpes fribourgeoises*, by many authors (Lausanne, 1908).

(W. A. B. C.)

GRYNAEUS (or Gryner), **JOHANN JAKOB** (1540-1617), Swiss Protestant divine, was born on the 1st of October 1540 at Bern. His father, Thomas (1512-1564), was for a time professor of ancient languages at Basel and Bern, but afterwards became pastor of Röteln in Baden. He was nephew of the more eminent Simon Grynaeus (*q.v.*). Johann was educated at Basel, and in 1559 received an appointment as curate to his father. In 1563 he proceeded to Tübingen for the purpose of completing his theological studies, and in 1565 he returned to Röteln as successor to his father. Here he felt compelled to abjure the Lutheran doctrine of the Lord's Supper, and to renounce the *formula concordiae*. Called in 1575 to the chair of Old Testament exegesis at Basel, he became involved in unpleasant controversy with Simon Sulzer and other champions of Lutheran orthodoxy; and in 1584 he was glad to accept an invitation to assist in the restoration of the university of Heidelberg. Returning to Basel in 1586, after Simon Sulzer's death, as *antistes* or superintendent of the church there and as professor of the New Testament, he exerted for upwards of twenty-five years a considerable influence upon both the church and the state affairs of that community, and acquired a wide reputation as a skilful theologian of the school of Ulrich Zwingli. Amongst other labours he helped to reorganize the gymnasium in 1588. Five years before his death he became totally blind, but continued to preach and lecture till his death on the 13th of August 1617.

His many works include commentaries on various books of the Old and New Testament, *Theologica theoremata el problemata* (1588), and a collection of patristic literature entitled *Monumenta S. patrum orthodoxographa* (2 vols., fol., 1569).

GRYNAEUS, SIMON (1493-1541), German scholar and theologian of the Reformation, son of Jacob Gryner, a Swabian peasant, was born in 1493 at Vehringen, in Hohenzollern-Sigmaringen. He adopted the name Grynaeus from the epithet of Apollo in Virgil. He was a schoolfellow with Melanchthon at Pforzheim, whence he went to the university of Vienna, distinguishing himself there as a Latinist and Grecian. His appointment as rector of a school at Buda was of no long continuance; his views excited the zeal of the Dominicans and he was thrown into prison. Gaining his freedom at the instance of Hungarian magnates, he visited Melanchthon at Wittenberg, and in 1524 became professor of Greek at the university of

Heidelberg, being in addition professor of Latin from 1526. His Zwinglian view of the Eucharist disturbed his relations with his Catholic colleagues. From 1526 he had corresponded with Oecolampadius, who in 1529 invited him to Basel, which Erasmus had just left. The university being disorganized, Grynaeus pursued his studies, and in 1531 visited England for research in libraries. A commendatory letter from Erasmus gained him the good offices of Sir Thomas More. He returned to Basel charged with the task of collecting the opinions of continental reformers on the subject of Henry VIII.'s divorce, and was present at the death of Oecolampadius (Nov. 24, 1531). He now, while holding the chair of Greek, was appointed extraordinary professor of theology, and gave exegetical lectures on the New Testament. In 1534 Duke Ulrich called him to Württemberg in aid of the reformation there, as well as for the reconstitution of the university of Tübingen, which he carried out in concert with Ambrosius Blarer of Constanz. Two years later he had an active hand in the so-called First Helvetic Confession (the work of Swiss divines at Basel in January 1536); also in the conferences which urged the Swiss acceptance of the Wittenberg Concord (1536). At the Worms conference (1540) between Catholics and Protestants he was the sole representative of the Swiss churches, being deputed by the authorities of Basel. He was carried off suddenly in his prime by the plague at Basel on the 1st of August 1541. A brilliant scholar, a mediating theologian, and personally of lovable temperament, his influence was great and wisely exercised. Erasmus and Calvin were among his correspondents. His chief works were Latin versions of Plutarch, Aristotle and Chrysostom.

His son Samuel (1539-1599) was professor of jurisprudence at Basel. His nephew Thomas (1512?-1564) was professor at Basel and minister in Baden, and left four distinguished sons of whom Johann Jakob (1540-1617) was a leader in the religious affairs of Basel. The last of the direct descendants of Simon Grynaeus was his namesake Simon (1725-1799), translator into German of French and English anti-deistical works, and author of a version of the Bible in modern German (1776).

See Bayle's *Dictionnaire*; W. T. Streuber in Hauck's *Realencyklopädie* (1899); and for bibliography, Streuber's *S. Grynaei epistolae* (1847).

(A. Go.*)

GRYPHIUS, ANDREAS (1616-1664), German lyric poet and dramatist, was born on the 11th of October 1616, at Grossglogau in Silesia, where his father was a clergyman. The family name was Greif, latinized, according to the prevailing fashion, as Gryphius. Left early an orphan and driven from his native town by the troubles of the Thirty Years' War, he received his schooling in various places, but notably at Fraustadt, where he enjoyed an excellent classical education. In 1634 he became tutor to the sons of the eminent jurist Georg von Schönborn (1579-1637), a man of wide culture and considerable wealth, who, after filling various administrative posts and writing many erudite volumes on law, had been rewarded by the emperor Ferdinand II. with the title and office of imperial count-palatine (*Pfalzgraf*). Schönborn, who recognized Gryphius's genius, crowned him *poëta laureatus*, gave him the diploma of master of philosophy, and bestowed on him a patent of nobility, though Gryphius never used the title. A month later, on the 23rd of December 1637, Schönborn died; and next year Gryphius went to continue his studies at Leiden, where he remained six years, both hearing and delivering lectures. Here he fell under the influence of the great Dutch dramatists, Pieter Cornelissen Hooft (1581-1647) and Joost van den Vondel (1587-1679), who largely determined the character of his later dramatic works. After travelling in France, Italy and South Germany, Gryphius settled in 1647 at Fraustadt, where he began his dramatic work, and in 1650 was appointed syndic of Glogau, a post he held until his death on the 16th of July 1664. A short time previously he had been admitted under the title of "The Immortal" into the *Fruchtbringende Gesellschaft*, a literary society, founded in 1617 by Ludwig, prince of Anhalt-Köthen on the model of the Italian academies.

Gryphius was a man of morbid disposition, and his melancholy temperament, fostered by the misfortunes of his childhood, is largely reflected in his lyrics, of which the most famous are the *Kirchhofsgedanken* (1656). His best works are his comedies, one of which, *Absurda Comica, oder Herr Peter Squentz* (1663), is evidently based on the comic episode of Pyramus and Thisbe in *The Midsummer Night's Dream*. *Die geliebte Dornrose* (1660), which is written in a Silesian dialect, contains many touches of natural simplicity and grace, and ranks high among the comparatively small number of German dramas of the 17th century. *Horribilicribrifax* (1663), founded on the *Miles gloriosus* of Plautus, is a rather laboured attack on pedantry. Besides these three comedies, Gryphius wrote five tragedies. In all of them his tendency is to

become wild and bombastic, but he had the merit of at least attempting to work out artistically conceived plans, and there are occasional flashes both of passion and of imagination. His models seem to have been Seneca and Vondel. He had the courage, in *Carolus Stuardus* (1649) to deal with events of his own day; his other tragedies are *Leo Armenius* (1646); *Katharina von Georgien* (1657), *Cardenio und Celinde* (1657) and *Papinianus* (1663). No German dramatic writer before him had risen to so high a level, nor had he worthy successors until about the middle of the 18th century.

A complete edition of Gryphius's dramas and lyric poetry has been published by H. Palm in the series of the Stuttgart Literarische Verein (3 vols., 1878, 1882, 1884). Volumes of selected works will be found in W. Muller's *Bibliothek der deutschen Dichter des 17ten Jahrhunderts* (1822) and in J. Tittmann's *Deutsche Dichter des 17ten Jahrhunderts* (1870). There is also a good selection by H. Palm in Kürschner's *Deutsche Nationalliteratur*.

See O. Klopp, *Andreas Gryphius als Dramatiker* (1851); J. Hermann, *Über Andreas Gryphius* (1851); T. Wissowa, *Beiträge zur Kenntnis von Andreas Gryphius' Leben und Schriften* (1876); J. Wysocki, *Andreas Gryphius et la tragédie allemande au XVII^{e} siècle*; and V. Mannheimer, *Die Lyrik des Andreas Gryphius* (1904).

GUACHARO (said to be an obsolete Spanish word signifying one that cries, moans or laments loudly), the Spanish-American name of what English writers call the oil-bird, the *Steatornis caripensis* of ornithologists, a very remarkable bird, first described by Alexander von Humboldt (*Voy. aux rég. équinoxiales* i. 413, Eng. trans. iii. 119; *Obs. Zoologie* ii. 141, pl. xliv.) from his own observation and from examples obtained by Aimé J. A. Bonpland, on the visit of those two travellers, in September 1799, to a cave near Caripé (at that time a monastery of Aragonese Capuchins) some forty miles S.E. of Cumaná on the northern coast of South America. A few years later it was discovered, says Latham (*Gen. Hist. Birds*, 1823, vii. 365), to inhabit Trinidad, where it appears to bear the name of *Diablotin*;[1] but by the receipt of specimens procured at Sarayacu in Peru, Cajamarca in the Peruvian Andes, and Antioquia in Colombia (*Proc. Zool. Society*, 1878, pp. 139, 140; 1879, p. 532), its range has been shown to be much greater than had been supposed. The singularity of its structure, its curious habits, and its peculiar economical value have naturally attracted no little attention from zoologists. First referring it to the genus *Caprimulgus*, its original describer soon saw that it was no true goatsucker. It was subsequently separated as forming a subfamily, and has at last been regarded as the type of a distinct family, *Steatornithidae*—a view which, though not put forth till 1870 (*Zool. Record*, vi. 67), seems now to be generally deemed correct. Its systematic position, however, can scarcely be considered settled, for though on the whole its predominating alliance may be with the *Caprimulgidae*, nearly as much affinity may be traced to the *Strigidae*, while it possesses some characters in which it differs from both (*Proc. Zool. Society*, 1873, pp. 526-535). About as big as a crow, its plumage exhibits the blended tints of chocolate-colour and grey, barred and pencilled with dark-brown or black, and spotted in places with white, that prevail in the two families just named. The beak is hard, strong and deeply notched, the nostrils are prominent, and the gape is furnished with twelve long hairs on each side. The legs and toes are comparatively feeble, but the wings are large. In habits the guacharo is wholly nocturnal, slumbering by day in deep and dark caverns which it frequents in vast numbers. Towards evening it arouses itself, and, with croaking and clattering which has been likened to that of castanets, it approaches the exit of its retreat, whence at nightfall it issues in search of its food, which, so far as is known, consists entirely of oily nuts or fruits, belonging especially to the genera *Achras*, *Aiphanas*, *Laurus* and *Psichotria*, some of them sought, it would seem, at a very great distance, for Funck (*Bull. Acad. Sc. Bruxelles* xi. pt. 2, pp. 371-377) states that in the stomach of one he obtained at Caripé he found the seed of a tree which he believed did not grow nearer than 80 leagues. The hard, indigestible seed swallowed by the guacharo are found in quantities on the floor and the ledges of the caverns it frequents, where many of them for a time vegetate, the plants thus growing being etiolated from want of light, and, according to travellers, forming a singular feature of the gloomy scene which these places present. The guacharo is said to build a bowl-like nest of clay, in which it lays from two to four white eggs, with a smooth but lustreless surface, resembling those of some owls. The young soon after they are hatched become a perfect mass of fat, and while yet in the nest are sought by the Indians, who at Caripé, and perhaps elsewhere, make a special business of taking them and extracting the oil they contain. This is done about midsummer, when by the aid of torches and long poles many thousands of the young birds are slaughtered, while their parents in alarm and rage hover over the destroyers' heads, uttering harsh and

deafening cries. The grease is melted over fires kindled at the cavern's mouth, run into earthen pots, and preserved for use in cooking as well as for the lighting of lamps. It is said to be pure and limpid, free from any disagreeable taste or smell, and capable of being kept for a year without turning rancid. In Trinidad the young are esteemed s great delicacy for the table by many, though some persons object to their peculiar scent, which resembles that of a cockroach (*Blatta*), and consequently refuse to eat them. The old birds also, according to E. C. Taylor (*Ibis*, 1864, p. 90), have a strong crow-like odour. But one species of the genus *Steatornis* is known.

In addition to the works above quoted valuable information about this curious bird may be found under the following references: L'Herminier, *Ann. Sc. Nat.* (1836), p. 60, and *Nouv. Ann. Mus.* (1838), p. 321; Hautessier, Rev. Zool. (1838), p. 164; J. Müller, *Monatsb. Berl. Acad.* (1841), p. 172, and *Archiv für Anat.* (1862), pp. 1-11; des Murs, *Rev. zool.* (1843), p. 32, and *Ool. Orn.* pp. 260-263; Blanchard, *Ann. Mus.* (1859), xi. pl. 4, fig. 30; König-Warthausen, *Journ. für Orn.* (1868), pp. 384-387; Goering, *Vargasia* (1869), pp. 124-128; Murie, *Ibis* (1873), pp. 81-86.

(A. N.)

1 Not to be confounded with the bird so called in the French Antilles, which is a petrel (*Oestrelata*).

GUACO, Huaco or Guao, also Vejuco and Bejuco, terms applied to various Central and South American and West Indian plants, in repute for curative virtues. The Indians and negroes of Colombia believe the plants known to them as guaco to have been so named after a species of kite, thus designated in imitation of its cry, which they say attracts to it the snakes that serve it principally for food; they further hold the tradition that their antidotal qualities were discovered through the observation that the bird eats of their leaves, and even spreads the juice of the same on its wings, during contests with its prey. The disputes that have arisen as to what is "the true guaco" are to be attributed mainly to the fact that the names of the American Indians for all natural objects are generic, and their genera not always in coincidence with those of naturalists. Thus any twining plant with a heart-shaped leaf, white and green above and purple beneath, is called by them guaco (R. Spruce, in Howard's *Neueva Quinologia*, "Cinchona succirubra," p. 22, note). What is most commonly recognized in Colombia as guaco, or *Vejuco del guaco*, would appear to be *Mikania Guaco* (Humboldt and Bonpland, *Pl. équinox*, ii. 84, pl. 105, 1809), a climbing Composite plant of the tribe *Eupatoriaceae*, affecting moist and shady situations, and having a much-branched and deep-growing root, variegated, serrate, opposite leaves and dull-white flowers, in axillary clusters. The whole plant emits a disagreeable odour. It is stated that the Indians of Central America, after having "guaconized" themselves, *i.e.* taken guaco, catch with impunity the most dangerous snakes, which writhe in their hands as though touched by a hot iron (B. Seemann, *Hooker's Journ. of Bot.* v. 76, 1853). The odour alone of guaco has been said to cause in snakes 644
a state of stupor and torpidity; and Humboldt, who observed that the near approach of a rod steeped in guaco-juice was obnoxious to the venomous *Coluber corallinus*, was of opinion that inoculation with it imparts to the perspiration an odour which makes reptiles unwilling to bite. The drug is not used in modern therapeutics.

GUADALAJARA, an inland city of Mexico and capital of the state of Jalisco, 275 m. (direct) W.N.W. of the Federal capital, in lat. 20° 41′ 10″ N., long. 103° 21′ 15″ W. Pop. (1895) 83,934; (1900) 101,208. Guadalajara is served by a short branch of the Mexican Central railway from Irapuato. The city is in the Antemarac valley near the Rio Grande de Santiago, 5092 ft. above sea-level. Its climate is dry, mild and healthy, though subject to sudden changes. The city is well built, with straight and well-paved streets, numerous plazas, public gardens and shady promenades. Its public services include tramways and electric lighting, the Juanacatlán falls of the Rio Grande near the city furnishing the electric power. Guadalajara is an episcopal see, and its cathedral, built between 1571 and 1618, is one of the largest and most elaborately decorated churches in Mexico. The government palace, which like the cathedral faces upon the *plaza mayor*, is generally considered one of the finest specimens of Spanish architecture in Mexico. Other important edifices and institutions are the university, with its schools of law and

medicine, the mint, built in 1811, the modern national college and high schools, a public library of over 28,000 volumes, an episcopal seminary, an academy of fine arts, the Teatro Degollado, and the large modern granite building of the penitentiary. There are many interesting churches and eleven conventual establishments in the city. Charitable institutions of a high character are also prominent, among which are the Hospicio, which includes an asylum for the aged, infirm, blind, deaf and dumb, foundlings and orphans, a primary school for both sexes, and a girls' training school, and the Hospital de San Miguel de Belen, which is a hospital, an insane asylum, and a school for little children. One of the most popular public resorts of the city is the *Paseo*, a beautiful drive and promenade extending along both banks of the Rio San Juan de Dios for 1¼ m. and terminating in the *alameda*, or public garden. The city has a good water-supply, derived from springs and brought in through an aqueduct 8 m. long. Guadalajara is surrounded by a fertile agricultural district and is an important commercial town, but the city is chiefly distinguished as the centre of the iron, steel and glass industries of Mexico. It is also widely known for the artistic pottery manufactured by the Indians of the city and of its suburb, San Pedro. Among other prominent industries are the manufacture of cotton and woollen goods, leather, furniture, hats and sweetmeats. Guadalajara was founded in 1531 by Nuño de Guzman, and became the seat of a bishop in 1549. The Calderon bridge near the city was the scene of a serious defeat of the revolutionists under Hidalgo in January 1811. The severe earthquake of the 31st of May 1818 partially destroyed the two cathedral steeples; and that of the 11th of March 1875 damaged many of the larger buildings. The population includes large Indian and mestizo elements.

GUADALAJARA, a province of central Spain, formed in 1833 of districts taken from New Castile; bounded on the N. by Segovia, Soria and Saragossa, E. by Saragossa and Teruel, S. by Cuenca and W. by Madrid. Pop. (1900) 200,186; area, 4676 sq. m. Along the northern frontier of Guadalajara rise the lofty Guadarrama mountains, culminating in the peaks of La Cebollera (6955 ft.) and Ocejon (6775 ft.); the rest of the province, apart from several lower ranges in the east, belongs to the elevated plateau of New Castile, and has a level or slightly undulating surface, which forms the upper basin of the river Tagus, and is watered by its tributaries the Tajuña, Henares, Jarama and Gallo. The climate of this region, as of Castile generally, is marked by the extreme severity of its winter cold and summer heat; the soil varies very much in quality, but is fertile enough in many districts, notably the cornlands of the Alcarria, towards the south. Few of the cork and oak forests which formerly covered the mountains have escaped destruction; and the higher tracts of land are mainly pasture for the sheep and goats which form the principal wealth of the peasantry. Grain, olive oil, wine, saffron, silk and flax are produced, but agriculture makes little progress, owing to defective communications and unscientific farming. In 1903, the only minerals worked were common salt and silver, and the total output of the mines was valued at £25,000. Deposits of iron, lead and gold also exist and were worked by the Romans; but their exploitation proved unprofitable when renewed in the 19th century. Trade is stagnant and the local industries are those common to almost all Spanish towns and villages, such as the manufacture of coarse cloth and pottery. The Madrid-Saragossa railway traverses the province for 70 m.; the roads are ill-kept and insufficient. Guadalajara (11,144) is the capital, and the only town with more than 5000 inhabitants; Molina de Aragon, a fortified town built at the foot of the Parameras de Molina (2500-3500 ft.), and on the right bank of the Gallo, a tributary of the Tagus, is of some importance as an agricultural centre. Siguënza, on the railway, is an episcopal city, with a fine Romanesque cathedral dating from the 11th century. It is probably the ancient *Segontia*, founded in 218 B.C. by refugees from Saguntum. The population of the province, which numbers only 42 per sq. m., decreased slightly between 1870 and 1900, and extreme poverty compels many families to emigrate (see also CASTILE).

GUADALAJARA, the capital of the Spanish province of Guadalajara, on the left bank of the river Henares, and on the Madrid-Saragossa railway, 35 m. E.N.E. of Madrid. Pop. (1900) 11,144. Guadalajara is a picturesque town, occupying a somewhat sterile plain, 2100 ft. above the sea. A Roman aqueduct and the Roman foundations of the bridge built in 1758 across the Henares bear witness to its antiquity. Under Roman and Visigothic rule it was known as

Arriaca or *Caraca*; its present name, which sometimes appears in medieval chronicles as *Godelfare*, represents the *Wad-al-hajarah*, or "Valley of Stones," of the Moors, who occupied the town from 714 until 1081, when it was captured by Alvar Yañez de Minaya, a comrade of the more famous Cid. The church of Santa Maria contains the image of the "Virgin of Battles," which accompanied Alphonso VI. of Castile (1072-1109) on his campaigns against the Moors; and there are several other ancient and interesting churches in Guadalajara, besides two palaces, dating from the 15th century, and built with that blend of Christian and Moorish architecture which Spaniards call the *Mudéjar* style. The more important of these is the palace of the ducal house del Infantado, formerly owned by the Mendoza family, whose *panteon*, or mausoleum, added between 1696 and 1720 to the 13th-century church of San Francisco, is remarkable for the rich sculpture of its tombs. The town and provincial halls date from 1585, and the college of engineers was originally built by Philip V., early in the 18th century, as a cloth factory. Manufactures of soap, leather, woollen fabrics and bricks have superseded the original cloth-weaving industry for which Guadalajara was long celebrated; there is also a considerable trade in agricultural produce.

GUADALQUIVIR (ancient *Baetis*, Moorish *Wadi al Kebir*, "the Great River"), a river of southern Spain. What is regarded as the main stream rises 4475 ft. above sea-level between the Sierra de Cazorla and Sierra del Pozo, in the province of Jaen. It does not become a large river until it is joined by the Guadiana Menor (Guadianamenor) on the left, and the Guadalimar on the right. Lower down it receives many tributaries, the chief being the Genil or Jenil, from the left. The general direction of the river is west by south, but a few miles above Seville it changes to south by west. Below Coria it traverses the series of broad fens known as Las Marismas, the greatest area of swamp in the Iberian Peninsula. Here it forms two subsidiary channels, the western 31 m., the eastern 12 m. long, which rejoin the main stream on the borders of the province of Cadiz. Below Sanlúcar the river enters the Atlantic after a total course of 360 m. It drains an area of 21,865 sq. m. Though the shortest of the great rivers of the peninsula, it is the only one which flows at all seasons with a full stream, being fed in winter by the rains, in summer by the melted snows of the Sierra Nevada. In the time of the Moors it was navigable up to Cordova, but owing to the accumulation of silt in its lower reaches it is now only navigable up to Seville by vessels of 1200 to 1500 tons.

GUADELOUPE, a French colony in the West Indies, lying between the British islands of Montserrat on the N., and Dominica on the S., between 15° 59′ and 16° 20′ N. and 61° 31′ and 61° 50′ W. It consists of two entirely distinct islands, separated by a narrow arm of the sea, Rivière Salée (Salt river), varying from 100 ft. to 400 ft. in width and navigable for small vessels. The western island, a rugged mass of ridges, peaks and lofty uplands, is called Basse-Terre, while the eastern and smaller island, the real low-land, is known as Grande-Terre. A sinuous ridge runs through Basse-Terre from N. to S. In the north-west rises the peak of Grosse Montagne (2370 ft.), from which sharp spurs radiate in all directions; near the middle of the west coast are the twin heights of Les Mamelles (2536 ft. and 2368 ft.). Farther south the highest elevation is attained in La Soufrière (4900 ft.). In 1797 this volcano was active, and in 1843 its convulsions laid several towns in ruins; but a few thermal springs and solfataras emitting vapour are now its only signs of activity. The range terminates in the extreme south in the jagged peak of Caraibe (2300 ft.). Basse-Terre is supremely beautiful, its cloud-capped mountains being clothed with a mantle of luxuriant vegetation. On Grande-Terre the highest elevation is only 450 ft., and this island is the seat of extensive sugar plantations. It consists of a plain composed mainly of limestone and a conglomerate of sand and broken shells known as *maconne de bon dieu*, much used for building. The bay between the two sections of Guadeloupe on the north is called Grand Cul-de-Sac Marin, that on the south being Petit Cul-de-Sac Marin. Basse-Terre (364 sq. m.) is 28 m. long by 12 m. to 15 m. wide; Grande-Terre (255 sq. m.) is 22 m. long from N. to S., of irregular shape, with a long peninsula, Chateaux Point, stretching from the south-eastern extremity. Basse-Terre is watered by a considerable number of streams, most of which in the rainy season are liable to sudden floods (locally called *galions*), but Grande-Terre is practically destitute of springs, and the water-supply is derived almost entirely from ponds and cisterns.

The west half of the island consists of a foundation of old eruptive rocks upon which rest the recent accumulations of the great volcanic cones, together with mechanical deposits derived from the denudation of the older rocks. Grande-Terre on the other hand, consists chiefly of nearly horizontal limestones lying conformably upon a series of fine tuffs and ashes, the whole belonging to the early part of the Tertiary system (probably Eocene and Oligocene). Occasional deposits of marl and limestone of late Pliocene age rest unconformably upon these older beds; and near the coast there are raised coral reefs of modern date.

The mean annual temperature is 78° F., and the minimum 61° F., and the maximum 101° F. From July to November heavy rains fall, the annual average on the coast being 86 in., while in the interior it is much greater. Guadeloupe is subject to terrible storms. In 1825 a hurricane destroyed the town of Basse-Terre, and Grand Bourg in Marie Galante suffered a like fate in 1865. The soil is rich and fruitful, sugar having long been its staple product. The other crops include cereals, cocoa, cotton, manioc, yams and rubber; tobacco, vanilla, coffee and bananas are grown, but in smaller quantities. Over 30% of the total area is under cultivation, and of this more than 50% is under sugar. The centres of this industry are St Anne, Pointe-à-Pitre and Le Moule, where there are well-equipped *usines*, and there is also a large *usine* at Basse-Terre. The forests, confined to the island of Basse-Terre, are extensive and rich in valuable woods, but, being difficult of access, are not worked. Salt and sulphur are the only minerals extracted, and in addition to the sugar *usines*, there are factories for the making of rum, liqueurs, chocolate, besides fruit-canning works and tanneries. France takes most of the exports; and next to France, the United States, Great Britain and India are the countries most interested in the import trade.

The inhabitants of Guadeloupe consist of a few white officials and planters, a few East Indian immigrants from the French possessions in India, and the rest negroes and mulattoes. These mulattoes are famous for their grace and beauty of both form and feature. The women greatly outnumber the men, and there is a very large percentage of illegitimate births. Pop. (1900) 182,112.

The governor is assisted by a privy council, a director of the interior, a procurator-general and a paymaster, and there is also an elected legislative council of 30 members. The colony forms a department of France and is represented in the French parliament by a senator and two deputies. Political elections are very eagerly contested, the mulatto element always striving to gain the preponderance of power.

The seat of government, of the Apostolic administration and of the court of appeal is at Basse-Terre (7762), which is situated on the south-west coast of the island of that name. It is a picturesque, healthy town standing on an open roadstead. Pointe-à-Pitre (17,242), the largest town, lies in Grande-Terre near the mouth of the Rivière Salée. Its excellent harbour has made it the chief port and commercial capital of the colony. Le Moule (10,378) on the east coast of Grande-Terre does a considerable export trade in sugar, despite its poor harbour. Of the other towns, St Anne (9497), Morne à l'Eau (8442), Petit Canal (6748), St François (5265), Petit Bourg (5110) and Trois Rivières (5016), are the most important.

Round Guadeloupe are grouped its dependencies, namely, La Desirade, 6 m. E., a narrow rugged island 10 sq. m. in area; Marie Galante 16 m. S.E. Les Saintes, a group of seven small islands, 7 m. S., one of the strategic points of the Antilles, with a magnificent and strongly fortified naval harbour; St Martin, 142 m. N.N.W.; and St Bartholomew, 130 m. N.N.W.

History.—Guadeloupe was discovered by Columbus in 1493, and received its name in honour of the monastery of S. Maria de Guadalupe at Estremadura in Spain. In 1635 l'Olive and Duplessis took possession of it in the name of the French Company of the Islands of America, and l'Olive exterminated the Caribs with great cruelty. Four chartered companies were ruined in their attempts to colonize the island, and in 1674 it passed into the possession of the French crown and long remained a dependency of Martinique. After unsuccessful attempts in 1666, 1691 and 1703, the British captured the island in 1759, and held it for four years. Guadeloupe was finally separated from Martinique in 1775, but it remained under the governor of the French Windward Islands. In 1782 Rodney defeated the French fleet near the island, and the British again obtained possession in April 1794, but in the following summer they were driven out by Victor Hugues with the assistance of the slaves whom he had liberated for the purpose. In 1802 Bonaparte, then first consul, sent an expedition to the island in order to re-establish slavery, but, after a heroic defence, many of the negroes preferred suicide to submission. During the Hundred Days in 1810, the British once more occupied the island, but, in spite of its cession to Sweden by the treaty of 1813 and a French invasion in 1814, they did not withdraw till 1816. Between 1816 and 1825 the code of laws peculiar to the island was introduced. Municipal institutions were established in 1837; and slavery was finally abolished in 1848.

GUADET, MARGUERITE ÉLIE (1758-1794), French Revolutionist, was born at St Émilion near Bordeaux on the 20th of July 1758. When the Revolution broke out he had already gained a reputation as a brilliant advocate at Bordeaux. In 1790 he was made administrator of the Gironde and in 1791 president of the criminal tribunal. In this year he was elected to the Legislative Assembly as one of the brilliant group of deputies known subsequently as Girondins or Girondists. As a supporter of the constitution of 1791 he joined the Jacobin club, and here and in the Assembly became an eloquent advocate of all the measures directed against real or supposed traitors to the constitution. He bitterly attacked the ministers of Louis XVI., and was largely instrumental in forcing the king to accept the Girondist ministry of the 15th of March 1792. He was an ardent advocate of the policy of forcing Louis XVI. into harmony with the Revolution; moved (May 3) for the dismissal of the king's non-juring confessor, for the banishment of all non-juring priests (May 16), for the disbandment of the royal guard (May 30), and the formation in Paris of a camp of *fédérés* (June 4). He remained a royalist, however, and with Gensonné and Vergniaud even addressed a letter to the king soliciting a private interview. Whatever negotiations may have resulted, however, were cut short by the insurrection of the 10th of August. Guadet, who presided over the Assembly during part of this fateful day, put himself into vigorous opposition to the insurrectionary Commune of Paris, and it was on his motion that on the 30th of August the Assembly voted its dissolution—a decision reversed on the following day. In September Guadet was returned by a large majority as deputy to the Convention. At the trial of Louis XVI. he voted for an appeal to the people and for the death sentence, but with a respite pending appeal. In March 1793 he had several conferences with Danton, who was anxious to bring about a *rapprochement* between the Girondists and the Mountain during the war in La Vendée, but he unconditionally refused to join hands with the man whom he held responsible for the massacres of September. Involved in the fall of the Girondists, and his arrest being decreed on the 2nd of June 1793, he fled to Caen, and afterwards hid in his father's house at St Émilion. He was discovered and taken to Bordeaux, where, after his identity had been established, he was guillotined on the 17th of June 1794.

See J. Guadet, *Les Girondins* (Paris, 1889); and F. A. Aulard, *Les Orateurs de la législative et de la convention* (Paris, 2nd ed., 1906).

GUADIANA (anc. *Anas*, Moorish *Wadi Ana*), a river of Spain and Portugal. The Guadiana was long believed to rise in the lowland known as the Campo de Montiel, where a chain of small lakes, the Lagunas de Ruidera (partly in Ciudad Real, partly in Albacete), are linked together by the Guadiana Alto or Upper Guadiana. This stream flows north-westward from the last lake and vanishes underground within 3 m. of the river Zancara or Giguela. About 22 m. S.W. of the point of disappearance, the Guadiana Alto was believed to re-emerge in the form of several large springs, which form numerous lakes near the Zancara and are known as the "eyes of the Guadiana" (*los ojos de Guadiana*). The stream which connects them with the Zancara is called the Guadiana Bajo or Lower Guadiana. It is now known that the Guadiana Alto has no such course, but flows underground to the Zancara itself, which is the true "Upper Guadiana." The Zancara rises near the source of the Júcar, in the east of the tableland of La Mancha; thence it flows westward, assuming the name of Guadiana near Ciudad Real, and reaching the Portuguese frontier 6 m. S.W. of Badajoz. In piercing the Sierra Morena it forms a series of foaming rapids, and only begins to be navigable at Mertola, 42 m. from its mouth. From the neighbourhood of Badajoz it forms the boundary between Spain and Portugal as far as a point near Monsaraz, where it receives the small river Priega Muñoz on the left, and passes into Portuguese territory, with a southerly direction. At Pomarão it again becomes a frontier stream and forms a broad estuary 25 m. long. It enters the Gulf of Cadiz between the Portuguese town of Villa Real de Santo Antonio and the Spanish Ayamonte, after a total course of 510 m. Its mouth is divided by sandbanks into many channels. The Guadiana drains an area of 31,940 sq. m. Its principal tributaries are the Zujar, Jabalón, Matachel and Ardila from the left; the Bullaque, Ruecas, Botoa, Degebe and Cobres from the right.

The Guadiana Menor (or *Guadianamenor*, *i.e.* "Lesser Guadiana") rises in the Sierra Nevada, receives two large tributaries, the Fardes from the right and Barbata from the left, and enters

the Guadalquivir near Ubeda, after a course of 95 m.

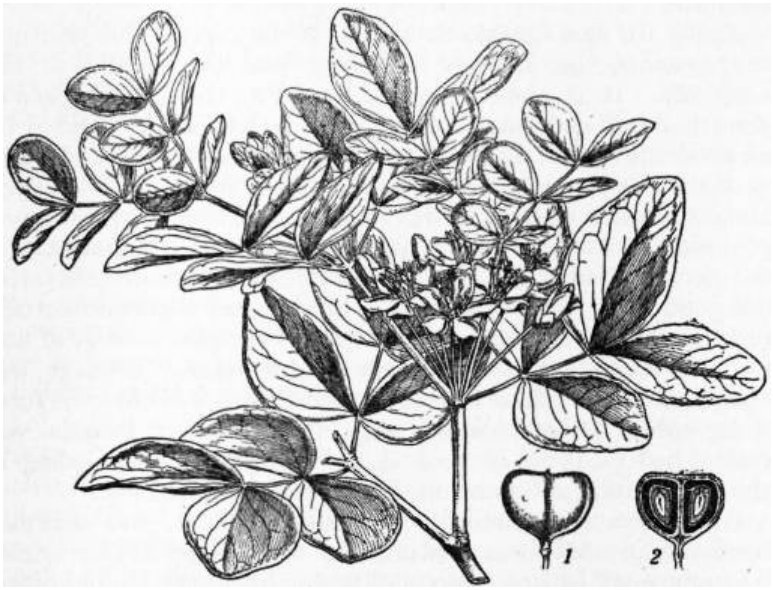
GUADIX, a city of southern Spain, in the province of Granada; on the left bank of the river Guadix, a subtributary of the Guadiana Menor, and on the Madrid-Valdepeñas-Almería railway. Pop. (1900) 12,652. Guadix occupies part of an elevated plateau among the northern foothills of the Sierra Nevada. It is surrounded by ancient walls, and was formerly dominated by a Moorish castle, now in ruins. It is an episcopal see of great antiquity, but its cathedral, built in the 18th century on the site of a mosque, possesses little architectural merit. The city was once famous for its cutlery; but its modern manufactures (chiefly earthenware, hempen goods, and hats) are inconsiderable. It has some trade in wool, cotton, flax, corn and liqueurs. The warm mineral springs of Graena, much frequented during the summer, are 6 m. W. Guadix el Viejo, 5 m. N.W., was the Roman *Acci*, and, according to tradition, the seat of the first Iberian bishopric, in the 2nd century. After 711 it rose to some importance as a Moorish fortress and trading station, and was renamed *Wad Ash*, "Water of Life." It was surrendered without a siege to the Spaniards, under Ferdinand and Isabella, in 1489.

GUADUAS, a town of the department of Cundinamarca, Colombia, 53 m. N.W. of Bogotá on the old road between that city and the Magdalena river port of Honda. Pop. (1900, estimate) 9000, chiefly Indians or of mixed blood. It stands in a narrow and picturesque valley formed by spurs of the Eastern Cordillera, and on a small stream bearing the same name, which is that of the South American bamboo (*guaduas*), found in great abundance along its banks. Sugar-cane and coffee are cultivated in the vicinity, and fruits of various kinds are produced in great abundance. The elevation of the town is 3353 ft. above the sea, and it has a remarkably uniform temperature throughout the whole year. Guaduas has a pretty church facing upon its *plaza*, and an old monastery now used for secular purposes. The importance of the town sprang from its position on the old *camino real* between Bogotá and Honda, an importance that has passed away with the completion of the railway from Girardot to the Bogotá plateau. Guaduas was founded in 1614.

GUAIACUM, a genus of trees of the natural order *Zygophyllaceae*. The guaiacum or lignum-vitae tree (Ger. *Guajakbaum*, *Franzosenbaum*, *Pockenholzbaum*; Fr. *Gayac*, *Gaïac*), *G. officinale*, is a native of the West Indies and the north coast of South America, where it attains a height of 20 to 30 ft. Its branches are numerous, flexuous and knotted; the leaves opposite and pinnate, with caducous (falling early) stipules, and entire, glabrous, obovate or oval leaflets, arranged in 2 or, more rarely, 3 pairs; the flowers are in axillary clusters (cymes), and have 5 oval pubescent sepals, 5 distinct pale-blue petals three times the length of the sepals, 10 stamens, and a 2-celled superior ovary. The fruit is about ¾ in. long, with a leathery pericarp, and contains in each of its two cells a single seed (see fig.). *G. sanctum* grows in the Bahamas and Cuba, and at Key West in Florida. It is distinguished from *G. officinale* by its smaller and narrow leaflets, which are in 4 to 5 pairs, by its shorter and glabrous sepals, and 5-celled and 5-winged fruit. *G. arboreum*, the guaiacum tree of Colombia, is found in the valley of the Magdalena up to altitudes 800 metres (2625 ft.) above sea-level, and reaches considerable dimensions. Its wood is of a yellow colour merging into green, and has an almost pulverulent fracture; the flowers are yellow and conspicuous; and the fruit is dry and 4-winged.

The lignum vitae of commerce, so named on account of its high repute as a medicinal agent in past times, when also it was known as *lignum sanctum* and *lignum Indicum*, *lignum guaycanum*, or simply *guayacan*, is procured from *G. officinale*, and in smaller amount from *G. sanctum*. It is exported in large logs or blocks, generally divested of bark, and presents in transverse section very slightly marked concentric rings of growth, and scarcely any traces of

pith; with the aid of a magnifying glass the medullary rays are seen to be equidistant and very numerous. The outer wood, the sapwood or alburnum, is of a pale yellow hue, and devoid of resin; the inner, the heartwood or duramen, which is by far the larger proportion, is of a dark greenish-brown, contains in its pores 26% of resin, and has a specific gravity of 1.333, and therefore sinks in water on which the alburnum floats. Owing to the diagonal and oblique arrangement of the successive layers of its fibres, the wood cannot be split; and on account of its hardness, density and durability it is much valued for the manufacture of ships' pulleys, rulers, skittle-balls, mallets and other articles.



From Bentley & Trimen's *Medicinal Plants*, by permission of J. & A. Churchill.
Guaiacum or Lignum Vitae, *Guaiacum officinale* shoot-bearing leaves and flowers. 1, Fruit; 2, Vertical section of fruit, showing the solitary pendulous seed in each chamber. All about ½ natural size.

Chips or turnings of the heartwood of *G. officinale* (*guaiaci lignum*) are employed in the preparation of the *liquor sarsae compositus concentratus* of British pharmacy. They may be recognized by being either yellow of greenish-brown in colour, and by turning bluish-green when treated with nitric acid, or when heated with corrosive sublimate, and green with solution of chloride of lime. They are occasionally adulterated with boxwood shavings. Lignum vitae is imported chiefly from St Domingo, the Bahamas and Jamaica.

The bark was formerly used in medicine; it contains much calcium oxalate, and yields on incineration 23% of ash. Guaiacum resin, the *guaiaci resina* of pharmacopoeias, is obtained from the wood as an exudation from natural fissures or from incisions; by heating billets about 3 ft. in length, bored to permit of the outflow of the resin; or by boiling chips and raspings in water to which salt has been added to raise the temperature of ebullition. It occurs in rounded or oval tears, commonly coated with a greyish-green dust, and supposed to be the produce of *G. sanctum*, or in large brownish or greenish-brown masses, translucent at the edges; fuses at 85° C.; is brittle, and has a vitreous fracture, and a slightly balsamic odour, increased by pulverization and by heat; and is at first tasteless when chewed, but produces subsequently a sense of heat in the throat. It is readily soluble in alcohol, ether, chloroform, creosote, oil of cloves and solutions of caustic alkalies; and its solution gives a blue colour with gluten, raw potato parings and the roots of horse-radish, carrot and various other plants. The alcoholic tincture becomes green with sodium hypochlorite, and with nitric acid turns in succession green, blue and brown. With glycerin it gives a clear solution, and with nitrous ether a bluish-green gelatinous mass. It is blued by various oxidizing agents, *e.g.* ozone, and, as Schönbein discovered, by the juice of certain fungi. The chief constituents are three distinct resins, *guaiaconic acid*, $C_{19}H_{20}O_5$ (70%), *guaiac acid*, which is closely allied to benzoic acid, and *guaiaretic acid*. Like all resins, these are insoluble in water, soluble in alkalies, but precipitated on neutralization of the alkaline solution.

Guaiacum wood was first introduced into Europe by the Spaniards in 1508, and Nicolaus Poll, writing in 1517 (see Luisinus, *De morbo gallico*, p. 210, Ven., 1566), states that some three thousand persons in Spain had already been restored to health by it. The virtues of the resin, however, were not known until a later period, and in Thomas Paynel's translation (*Of the Wood called Guaiacum*, &c., p. 9, ed. of 1540) of Ulrich von Hutten's treatise *De morbi gallici curatione per administrationem ligni guaiaci* (1519) we read of the wood: "There followeth fro it, whan it bourneth a gomme, which we yet knowe not, for what pourpose it serueth." Flückiger and Hanbury (*Pharmacographia*, p. 95) state that the first edition of the *London Pharmacopoeia* in which they find the resin mentioned is that of 1677. The decoction of the

wood was administered in gout, the stone, palsy, leprosy, dropsy, epilepsy, and other diseases, but principally in the “morbus gallicus,” or syphilis, for which it was reckoned a certain specific, insomuch that at first “the physitions wolde not allowe it, perceyuynge that theyr profite wolde decay therby” (Paynel, *op. cit.* p. 8). Minute instructions are given in old works as to the mode of administering guaiacum. The patient was confined in a closed and heated chamber, was placed on the lowest possible diet, and, after liberal purgation, was made twice a day to drink a milk-warm decoction of the wood. The use of salt was specially to be avoided. A decoction of 1 ℔ of guaiacum was held to be sufficient for the four first days of the treatment. The earlier opinions as to the efficacy of guaiacum came to be much modified in the course of time, and Dr Pearson (*Observations on the Effects of Various Articles of the Mat. Med. in the Cure of Lues Venerea*, c. i., 2nd ed., 1807) says:—“I never saw one single instance in which the powers of this medicine eradicated the venereal virus.” He found its beneficial effects to be most marked in cases of secondary symptoms. Guaiacum resin is given medicinally in doses of 5-15 grains. Its important preparations in the British Pharmacopoeia are the *mistura guiaci* (dose ½-1 oz.), the ammoniated tincture of guaiacum (dose ½-1 drachm), in which the resin is dissolved by means of ammonia, and the trochiscus or lozenge, containing 3 grains of the resin. This lozenge is undoubtedly of value when given early in cases of sore throat, especially of rheumatic origin. Powdered guaiacum is also used.

Guaiacum resin differs pharmacologically from other resins in being less irritant, so that it is absorbed from the bowel and exerts remote stimulant actions, notably upon the skin and kidneys. It affects the bronchi but slightly, since it contains no volatile oil.

The drug is useful both in acute and chronic sore throat, the mixture, according to Sir Lauder Brunton, being more effective than the tincture. The aperient action, which it exerts less markedly than other members of its class, renders it useful in the treatment of chronic constipation. Sir Alfred Garrod has urged the claims of this drug in the treatment of chronic gout. Both in this disease and in other forms of chronic arthritis guaiacum may be given in combination with iodides, which it often enables the patient to tolerate. Guaiacum is not now used in the treatment of syphilis.

The tincture of guaiacum is universally used as a test for the presence of blood, or rather of haemoglobin, the red colouring matter of the blood, in urine or other secretions. This test was first suggested by Dr John Day of Geelong, Australia. A *single drop* of the tincture should be added to, say, an inch of urine in a test-tube. The resin is at once precipitated, yielding a milky fluid. If “ozonic ether”—an ethereal solution of hydrogen peroxide—be now poured gently into the test-tube, a deep blue coloration is produced along the line of contact if haemoglobin be present. The reaction is due to the oxidation of the resin by the peroxide of hydrogen—such oxidation occurring only if haemoglobin be present to act as an oxygen-carrier.

GUALDO TADINO (anc. *Tadinum*, 1 m. to the W.), a town and episcopal see of Umbria, Italy, 1755 ft. above sea-level, in the province of Perugia, 22 m. N. of Foligno by rail. Pop. (1901), town, 4440; commune, 10,756. The suffix Tadino distinguishes it from Gualdo in the province of Macerata, and Gualdo Cattaneo, S.W. of Foligno. The cathedral has a good rose-window and possesses, like several of the other churches, 15th-century paintings by Umbrian artists, especially works by Niccolò Alunno. The town is still surrounded by walls. The ancient Tadinum lay 1 m. to the W. of the modern town. It is mentioned in the Eugubine tablets (see IGUVIUM) as a hostile city against which imprecations are directed. In its neighbourhood Narses defeated and slew Totila in 552. No ruins are now visible, though they seem to have been extant in the 17th century. The new town seems to have been founded in 1237. It was at first independent, but passed under Perugia in 1292, and later became dependent on the duchy of Spoleto.

GUALEGUAY, a flourishing town and river port of the province of Entre Rios, Argentine Republic, on the Gualeguay river, 32 m. above its confluence with the Ibicuy branch of the Paraná, and about 120 m. N.N.W. of Buenos Aires. Pop. (1895) 7810. The Gualeguay is the largest of the Entre Rios rivers, traversing almost the whole length of the province from N. to S., but it is of but slight service in the transportation of produce except the few miles below Gualeguay, whose port, known as Puerto Ruiz, is 7 m. lower down stream. A steam tramway

connects the town and port, and a branch line connects with Entre Rios railways at the station of Tala. The principal industry in this region is that of stock-raising, and there is a large exportation of cattle, jerked beef, hides, tallow, mutton, wool and sheep-skins. Wood and charcoal are also exported to Buenos Aires. The town was founded in 1783.

GUALEGUAYCHÚ, a prosperous commercial and industrial town and port of the province of Entre Rios, Argentine Republic, on the left bank of the Gualeguaychú river, 11 m. above its confluence with the Uruguay, and 120 m. N. of Buenos Aires. Pop. (1892, est.) 14,000. It is the chief town of a department of the same name, the largest in the province. A bar at the mouth of the river prevents the entrance of larger vessels and compels the transfer of cargoes to and from lighters. The town is surrounded by a rich grazing country, and exports cattle, jerked beef, mutton, hides, pelts, tallow, wool and various by-products. A branch line running N. connects with the Entre Rios railways at Basavilbaso. The town was founded in 1783.

GUALO, CARDINAL (fl. 1216), was sent to England by Pope Innocent III. in 1216. He supported John with all the weight of papal authority. After John’s death he crowned the infant Henry III. and played an active part in organizing resistance to the rebels led by Louis of France, afterwards king Louis VIII. As representing the pope, the suzerain of Henry, he claimed the regency and actually divided the chief power with William Marshal, earl of Pembroke. He proclaimed a crusade against Louis and the French, and, after the peace of Lambeth, he forced Louis to make a public and humiliating profession of penitence (1217). He punished the rebellious clergy severely, and ruled the church with an absolute hand till his departure from England in 1218. Gualo’s character has been severely criticized by English writers; but his chief offence seems to have been that of representing unpopular papal claims.

GUAM (Span. *Guajan*; *Guahan*, in the native Chamorro), the largest and most populous of the Ladrone or Mariana Islands, in the North Pacific, in 13° 26′ N. lat. and 144° 39′ E. long., about 1823 m. E. by S. of Hong Kong, and about 1450 m. E. of Manila. Pop. (1908) about 11,360, of whom 363 were foreigners, 140 being members of the U.S. naval force. Guam extends about 30 m. from N.N.E. to S.S.W., has an average width of about 6½ m., and has an area of 207 sq. m. The N. portion is a plateau from 300 to 600 ft. above the sea, lowest in the interior and highest along the E. and W. coast, where it terminates abruptly in bluffs and headlands; Mt Santa Rosa, toward the N. extremity, has an elevation of 840 ft. A range of hills from 700 to nearly 1300 ft. in height traverses the S. portion from N. to S. a little W. of the middle—Mt Jumullong Mangloc, the highest peak, has an elevation of 1274 ft. Between the foot of the steep W. slope of these hills and the sea is a belt of rolling lowlands and to the E. the surface is broken by the valleys of five rivers with a number of tributaries, has a general slope toward the sea, and terminates in a coast-line of bluffs. Apra (formerly San Luis d’Apra) on the middle W. coast is the only good harbour; it is about 3½ m. across, has a depth of 4-27 fathoms, and is divided into an inner and an outer harbour by a peninsula and an island. It serves as a naval station and as a port of transit between America and the Philippines, at which army transports call monthly. Deer, wild hog, duck, curlew, snipe and pigeon are abundant game, and several varieties of fish are caught. Some of the highest points of the island are nearly bare of vegetation, and the more elevated plateau surface is covered with sword grass, but in the valleys and on the lower portions of the plateaus there is valuable timber. The lowlands have a rich soil; in lower parts of the highlands raised coralliferous limestone with a light covering of soil appears, and in the higher parts the soil is entirely of clay and silt. The climate is agreeable and healthy. From December to June the N.E. trade winds prevail and the rainfall is relatively light; during the other six months the monsoon blows and produces the rainy season. Destructive typhoons and earthquakes sometimes visit Guam. The island is thought to possess little if any mineral wealth, with the possible exception

of coal. Only a small part of Guam is under cultivation, and most of this lies along the S.W. coast, its chief products being cocoanuts, rice, sugar, coffee and cacao. A United States Agricultural Experiment Station in Guam (at Agaña) was provided for in 1908.

The inhabitants are of the Chamorro (Indonesian) stock, strongly intermixed with Philippine Tagals and Spaniards; their speech is a dialect of Malay, corrupted by Tagal and Spanish. There are very few full-blood Chamorros. The aboriginal native was of a very dark mahogany or chocolate colour. A majority of the total number of natives live in Agaña. The natives are nearly all farmers, and most of them are poor, but their condition has been improved under American rule. Public schools have been established; in 1908 the enrolment was 1700. On the island there is a small colony of lepers, segregated only after American occupation. Gangrosa is a disease said to be peculiar to Guam and the neighbouring islands; it is due to a specific bacillus and usually destroys the nasal septum. The victims of this disease also are segregated. There is a good general hospital.

Agaña (or San Ignacio de Agaña) is the capital and principal town; under the Spanish régime it was the capital of the Ladrones. It is about 5 m. N.E. of Piti, the landing-place of Apra harbour and port of entry, with which it is connected by an excellent road. Agaña has paved streets and sewer and water systems. Other villages, all small, are Asan, Piti, Sumay, Umata, Merizo and Inarajan. Guam is governed by a “naval governor,” an officer of the U.S. navy who is commandant of the naval station. The island is divided into four administrative districts, each with an executive head called a gobernadorcillo (commissioner), and there are a court of appeals, a court of first instance and courts of justices of the peace. Peonage was abolished in the island by the United States in February 1900. Telegraphic communication with the Caroline Islands was established in 1905; in 1908 there were four cables ending at the relay station at Sumay on the Shore of Apra harbour.

Guam was discovered by Magellan in 1521, was occupied by Spain in 1688, was captured by the United States cruiser “Charleston” in June 1899, and was ceded to the United States by the Treaty of Paris on the 10th of December 1898.

See *A List of Books* (*with References to Periodicals*) *on Samoa and Guam* (1901; issued by the Library of Congress); L. M. Cox, “The Island of Guam,” in *Bulletin of the American Geographical Society*, vol. 36 (New York, 1904); Gen. Joseph Wheeler, *Report on the Island of Guam*, June 1900 (War Department, Document No. 123); F. W. Christian, *The Caroline Islands* (London, 1899); an account of the flora of Guam by W. E. Safford in the publications of the National Herbarium (Smithsonian Institution); and the reports of the naval governor.

GUAN, a word apparently first introduced into the ornithologist’s vocabulary about 1743 by Edwards,[1] who said that a bird he figured (*Nat. Hist. Uncommon Birds*, pl. xiii.) was “so called in the West Indies,” and the name has hence been generally applied to all the members of the subfamily *Penelopinae*, which are distinguished from the kindred subfamily *Cracinae* or curassows by the broad postacetabular area of the pelvis as pointed out by Huxley (*Proc. Zool. Society*, 1868, p. 297) as well as by their maxilla being wider than it is high, with its culmen depressed, the crown feathered, and the nostrils bare—the last two characters separating the *Penelopinae* from the *Oreophasinae*, which form the third subfamily of the *Cracidae*,[2] a family belonging to that taxonomer’s division *Peristeropodes* of the order *Gallinae*.

The *Penelopinae* have been separated into seven genera, of which *Penelope* and *Ortalis*, containing respectively about sixteen and nineteen species, are the largest, the others numbering from one to three only. Into their minute differences it would be useless to enter: nearly all have the throat bare of feathers, and from that of many of them hangs a wattle; but one form, *Chamaepetes*, has neither of these features, and *Stegnolaema*, though wattled, has the throat clothed. With few exceptions the guans are confined to the South-American continent; one species of *Penelope* is however found in Mexico (*e.g.* at Mazatlan), *Pipile cumanensis* inhabits Trinidad as well as the mainland, while three species of *Ortalis* occur in Mexico or Texas, and one, which is also common to Venezuela, in Tobago. Like curassows, guans are in great measure of arboreal habit. They also readily become tame, but all attempts to domesticate them in the full sense of the word have wholly failed, and the cases in which they have even been induced to breed and the young have been reared in confinement are very few. Yet it would seem that guans and curassows will interbreed with poultry (*Ibis*, 1866, p. 24; *Bull. Soc. Imp. d’Acclimatation*, 1868, p. 559; 1869, p. 357), and what is more extraordinary is that in Texas the hybrids between the chiacalacca (*Ortalis vetula*) and the

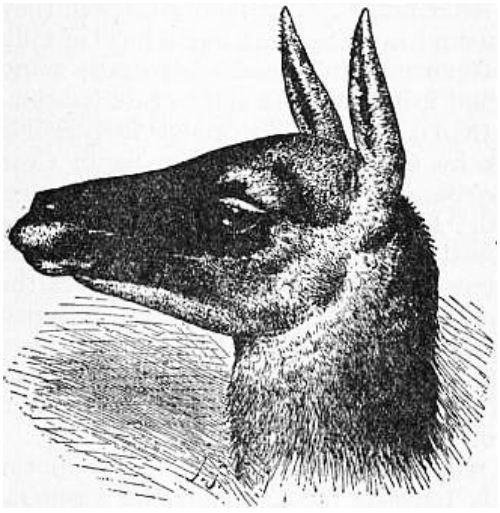
domestic fowl are asserted to be far superior to ordinary game-cocks for fighting purposes.
(A. N.)

1 Edwards also gives “quan” as an alternative spelling, and this may be nearer the original form, since we find Dampier in 1676 writing (Voy. ii. pt. 2, p. 66) of what was doubtless an allied if not the same bird as the “quam.” The species represented by Edwards does not seem to have been identified.

2 See the excellent *Synopsis* by Sclater and Salvin in the *Proceedings of the Zoological Society* for 1870 (pp. 504-544), while further information on the Cracinae was given by Sclater in the *Transactions* of the same society (ix. pp. 273-288, pls. xl.-liii.). Some additions have since been made to the knowledge of the family, but none of very great importance.

GUANABACOA (an Indian name meaning “site of the waters”), a town of Cuba, in Havana province, about 6 m. E. of Havana. Pop. (1907) 14,368. Guanabacoa is served by railway to Havana, with which it is connected by the Regla ferry across the bay. It is picturesquely situated amid woods, on high hills which furnish a fine view. There are medicinal springs in the town, and deposits of liquid bitumen in the neighbouring hills. The town is essentially a residence suburb of the capital, and has some rather pretty streets and squares and some old and interesting churches (including Nuestra Señora de la Asuncion, 1714-1721). Just outside the city is the church of Potosi with a famous “wonder-working” shrine and image. An Indian pueblo of the same name existed here before 1555, and a church was established in 1576. Already at the end of the 17th century Guanabacoa was the fashionable summer residence of Havana. It enjoyed its greatest popularity in this respect from the end of the 18th to the middle of the 19th century. It was created a *villa* with an *ayuntamiento* (city council) in 1743. In 1762 its fort, the Little Morro, on the N. shore near Cojimar (a bathing beach, where the Key West cable now lands), was taken by the English.

GUANACO, sometimes spelt Huanaca, the larger of the two wild representatives in South America of the camel tribe; the other being the vicugña. The guanaco (*Lama huanacus*), which stands nearly 4 ft. at the shoulder, is an elegant creature, with gracefully curved neck and long slender legs, the hind-pair of the latter bearing two naked patches or callosities. The head and body are covered with long soft hair of a fawn colour above and almost pure white beneath. Guanaco are found throughout the southern half of South America, from Peru in the north to Cape Horn in the south, but occur in greatest abundance in Patagonia. They live in herds usually of from six to thirty, although these occasionally contain several hundreds, while solitary individuals are sometimes met. They are exceedingly timid, and therefore wary and difficult of approach; like many other ruminants, however, their curiosity sometimes overcomes their timidity, so as to bring them within range of the hunter’s rifle. Their cry is peculiar, being something between the belling of a deer and the neigh of a horse. The chief enemies of the guanaco are the Patagonian Indians and the puma, as it forms the principal food of both. Its flesh is palatable although wanting in fat, while its skin forms the chief clothing material of the Patagonians. Guanaco are readily domesticated, and in this state become very bold and will attack man, striking him from behind with both knees. In the wild state they never defend themselves, and if approached from different points, according to the Indian fashion of hunting, get completely bewildered and fall an easy prey. They take readily to the water, and have been observed swimming from one island to another, while they have been seen drinking salt-water. They have a habit of depositing their droppings during



Head of Guanaco.

successive days on the same spot—a habit appreciated by the Peruvian Indians, who use those deposits for fuel. Guanaco also have favourite localities in which to die, as appears from the great heaps of their bones found in particular spots.

GUANAJAY, a town of western Cuba, in Pinar del Rio province, about 36 m. (by rail) S.W. of Havana. Pop. (1907) 6400. Guanajay is served by the W. branch of the United railways of Havana, of which it is the W. terminus. The town lies among hills, has an excellent climate, and in colonial times was (like Holguín) an acclimatization station for troops fresh from Spain; it now has considerable repute as a health resort. The surrounding country is a fertile sugar and tobacco region. Guanajay has always been important as a distributing point in the commerce of the western end of the island. It was an ancient pueblo, of considerable size and importance as early as the end of the 18th century.

GUANAJUATO, or Guanaxuato, an inland state of Mexico, bounded N. by Zacatecas and San Luis Potosi, E. by Querétaro, S. by Michoacan and W. by Jalisco. Area, 11,370 sq. m. It is one of the most densely populated states of the republic; pop. (1895) 1,047,817; (1900) 1,061,724. The state lies wholly within the limits of the great central plateau of Mexico, and has an average elevation of about 6000 ft. The surface of its northern half is broken by the Sierra Gorda and Sierra de Guanajuato, but its southern half is covered by fertile plains largely devoted to agriculture. It is drained by the Rio Grande de Lerma and its tributaries, which in places flow through deeply eroded valleys. The climate is semi-tropical and healthy, and the rainfall is sufficient to insure good results in agriculture and stock-raising. In the warm valleys sugar-cane is grown, and at higher elevations Indian corn, beans, barley and wheat. The southern plains are largely devoted to stock-raising. Guanajuato has suffered much from the destruction of its forests, but there remain some small areas on the higher elevations of the north. The principal industry of the state is mining, the mineral wealth of the mountain ranges of the north being enormous. Among its mineral products are silver, gold, tin, lead, mercury, copper and opals. Silver has been extracted since the early days of the Spanish conquest, over $800,000,000 having been taken from the mines during the subsequent three and a half centuries. Some of the more productive of these mines, or groups of mines, are the Veta Madre (mother lode), the San Bernabé lode, and the Rayas mines of Guanajuato, and the La Valenciana mine, the output of which is said to have been $226,000,000 between 1766 and 1826. The manufacturing establishments include flour mills, tanneries and manufactories of leather, cotton and woollen mills, distilleries, foundries and potteries. The Mexican Central and the Mexican National railway lines cross the state from N. to S., and the former operates a short branch from Silao to the state capital and another westward from Irapuato to Guadalajara. The capital is Guanajuato, and other important cities and towns are León, or León de las Aldamas; Celaya (pop. 25,565 in 1900), an important railway junction 22 m. by rail W. from Querétaro, and known for its manufactures of broadcloth, saddlery, soap and sweetmeats; Irapuato (18,593 in 1900), a railway junction and commercial centre, 21 m. S. by W. of Guanajuato; Silao (15,355), a railway junction and manufacturing town (woollens and cottons), 14 m. S.W. of Guanajuato; Salamanca (13,583). on the Mexican Central railway and Lerma river, 25 m. S. by E. of Guanajuato, with manufactures of cottons and porcelain; Allende (10,547), a commercial town 30 m. E. by S. of Guanajuato, with mineral springs; Valle de Santiago (12,660). 50 m. W. by S. of Querétaro; Salvatierra (10,393), 60 m. S.E. of Guanajuato; Cortazar (8633); La Luz (8318), in a rich mining district; Pénjamo (8262); Santa Cruz (7239); San Francisco del Rincón (10,904), 39 m. W. of Guanajuato in a rich mining district; and Acambaro (8345), a prosperous town of the plain, 76 m. S.S.E. of Guanajuato.

GUANAJUATO, or Santa Fé de Guanajuato, a city of Mexico and capital of the above state, 155 m. (direct) N.W. of the Federal capital, on a small tributary of the Rio Grande de Lerma or

Santiago. Pop. (1895) 39,404; (1900) 41,486. The city is built in the Cañada de Marfil at the junction of three ravines about 6500 ft. above the sea, and its narrow, tortuous streets rise steeply as they follow the ravines upward to the mining villages clustered about the opening of the mines in the hillsides. Guanajuato is sometimes described as a collection of mining villages; but in addition there is the central city with its crowded winding streets, its substantial old Spanish buildings, its fifty ore-crushing mills and busy factories and its bustling commercial life. Enclosing the city are the steep, barren mountain sides honeycombed with mines. The climate is semi-tropical and is considered healthy. The noteworthy public buildings and institutions are an interesting old Jesuit church with arches of pink stone and delicate carving, eight monasteries, the government palace, a mint dating from 1812, a national college, the fine Teatro Juárez, and the Pantheon, or public cemetery, with catacombs below. The Alhóndiga de Granaditas, originally a public granary, was used as a fort during the War of Independence, and is celebrated as the scene of the first battle (1810) in that long struggle. Among the manufactures are cottons, prints, soaps, chemicals, pottery and silverware, but mining is the principal interest and occupation of the population. The silver mines of the vicinity were long considered the richest in Mexico, the celebrated Veta Madre (mother lode) even being described as the richest in the world; and Guanajuato has the largest reduction works in Mexico. The railway outlet for the city consists of a short branch of the Mexican Central, which joins the trunk line at Silao. Guanajuato was founded in 1554. It attained the dignity of a city in 1741. It was celebrated for its vigorous resistance to the invaders at the time of the Spanish conquest, and was repeatedly sacked during that war.

GUANCHES, Guanchis or Guanchos (native Guanchinet; *Guan* = person, *Chinet* = Teneriffe, —"man of Teneriffe," corrupted, according to Nuñez de la Peña, by Spaniards into Guanchos), the aboriginal inhabitants of the Canary Islands. Strictly the Guanches were the primitive inhabitants of Teneriffe, where they seem to have preserved racial purity to the time of the Spanish conquest, but the name came to be applied to the indigenous populations of all the islands. The Guanches, now extinct as a distinct people, appear, from the study of skulls and bones discovered, to have resembled the Cro-Magnon race of the Quaternary age, and no real doubt is now entertained that they were an offshoot of the great race of Berbers which from the dawn of history has occupied northern Africa from Egypt to the Atlantic. Pliny the Elder, deriving his knowledge from the accounts of Juba, king of Mauretania, states that when visited by the Carthaginians under Hanno the archipelago was found by them to be uninhabited, but that they saw ruins of great buildings. This would suggest that the Guanches were not the first inhabitants, and from the absence of any trace of Mahommedanism among the peoples found in the archipelago by the Spaniards it would seem that this extreme westerly migration of Berbers took place between the time of which Pliny wrote and the conquest of northern Africa by the Arabs. Many of the Guanches fell in resisting the Spaniards, many were sold as slaves, and many conformed to the Roman Catholic faith and married Spaniards.

Such remains as there are of their language, a few expressions and the proper names of ancient chieftains still borne by certain families, connect it with the Berber dialects. In many of the islands signs are engraved on rocks. Domingo Vandewalle, a military governor of Las Palmas, was the first, in 1752, to investigate these; and it is due to the perseverance of D. Aquilino Padran, a priest of Las Palmas, that anything about the inscription on the island Hierro has been brought to light. In 1878 Dr R. Verneau discovered in the ravines of Las Balos some genuine Libyan inscriptions. Without exception the rock inscriptions have proved to be Numidic. In two of the islands (Teneriffe and Gomera) the Guanche type has been retained with more purity than in the others. No inscriptions have been found in these two islands, and therefore it would seem that the true Guanches did not know how to write. In the other islands numerous Semitic traces are found, and in all of them are the rock-signs. From these facts it would seem that the Numidians, travelling from the neighbourhood of Carthage and intermixing with the dominant Semitic race, landed in the Canary Islands, and that it is they who have written the inscriptions at Hierro and Grand Canary.

The political and social institutions of the Guanches varied. In some islands hereditary autocracy prevailed; in others the government was elective. In Teneriffe all the land belonged to the chiefs who leased it to their subjects. In Grand Canary suicide was regarded as honourable, and on a chief inheriting, one of his subjects willingly honoured the occasion by throwing himself over a precipice. In some islands polyandry was practised; in others the natives were monogamous. But everywhere the women appear to have been respected, an insult offered any woman by an armed man being a capital offence. Almost all the Guanches

used to wear garments of goat-skins, and others of vegetable fibres, which have been found in the tombs of Grand Canary. They had a taste for ornaments, necklaces of wood, bone and shells, worked in different designs. Beads of baked earth, cylindrical and of all shapes, with smooth or polished surfaces, mostly black and red in colour, were chiefly in use. They painted their bodies; the *pintaderas*, baked clay objects like seals in shape, have been explained by Dr Verneau as having been used solely for painting the body in various colours. They manufactured rough pottery, mostly without decorations, or ornamented by means of the finger-nail. The Guanches' weapons were those of the ancient races of south Europe. The polished battle-axe was more used in Grand Canary, while stone and obsidian, roughly cut, were commoner in Teneriffe. They had, besides, the lance, the club, sometimes studded with pebbles, and the javelin, and they seem to have known the shield. They lived in natural or artificial caves in their mountains. In districts where cave-dwellings were impossible, they built small round houses and, according to the Spaniards, they even practised rude fortification. In Palma the old people were at their own wish left to die alone. After bidding their family farewell they were carried to the sepulchral cave, nothing but a bowl of milk being left them. The Guanches embalmed their dead; many mummies have been found in an extreme state of desiccation, each weighing not more than 6 or 7 lb. Two almost inaccessible caves in a vertical rock by the shore 3 m. from Santa Cruz (Teneriffe) are said still to contain bones. The process of embalming seems to have varied. In Teneriffe and Grand Canary the corpse was simply wrapped up in goat and sheep skins, while in other islands a resinous substance was used to preserve the body, which was then placed in a cave difficult of access, or buried under a tumulus. The work of embalming was reserved for a special class, women for female corpses, men for male. Embalming seems not to have been universal, and bodies were often simply hidden in caves or buried.

Little is known of the religion of the Guanches. They appear to have been a distinctly religious race. There was a general belief in a supreme being, called Acoran, in Grand Canary, Achihuran in Teneriffe, Eraoranhan in Hierro, and Abora in Palma. The women of Hierro worshipped a goddess called Moneiba. According to tradition the male and female gods lived in mountains whence they descended to hear the prayers of the people. In other islands the natives venerated the sun, moon, earth and stars. A belief in an evil spirit was general. The demon of Teneriffe was called Guayota and lived in the peak of Teyde, which was the hell called Echeyde. In times of drought the Guanches drove their flocks to consecrated grounds, where the lambs were separated from their mothers in the belief that their plaintive bleatings would melt the heart of the Great Spirit. During the religious feasts all war and even personal quarrels were stayed.

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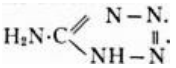
GUANIDINE, CN_3H_5 or $HN{:}C(NH_2)_2$, the amidine of amidocarbonic acid. It occurs in beet juice. It was first prepared in 1861 by A. Strecker, who oxidized guanine with hydrochloric acid and potassium chlorate. It may be obtained synthetically by the action of ammonium iodide on cyanamide, $CN{\cdot}NH_2 + NH_4I = CN_3H_5{\cdot}HI{\cdot}$; by heating ortho-carbonic esters with ammonia to 150° C.; but best by heating ammonium thiocyanate to 180°-190° C., when the thiourea first formed is converted into guanidine thiocyanate, $2CS(NH_2)_2 = HN{:}C(NH_2)_2{\cdot}HCNS + H_2S$. It is a colourless crystalline solid, readily soluble in water and alcohol; it deliquesces on exposure to air. It has strong basic properties, absorbs carbon

dioxide readily, and forms well-defined crystalline salts. Baryta water hydrolyses it to urea. By direct union with glycocoll acid, it yields glycocyamine, $NH_2{\cdot}(HN){:}C{\cdot}NH{\cdot}CH_2{\cdot}CO_2H$, whilst with methyl glycocoll (sarcosine) it forms creatine, $NH_2{\cdot}(NH){:}C{\cdot}N(CH_3){\cdot}CH_2{\cdot}CO_2H$.

Many derivatives of guanidine were obtained by J. Thiele (*Ann.*, 1892, 270, p. 1; 1893, 273, p. 133; *Ber.*, 1893, 26, pp. 2598, 2645). By the action of nitric acid on guanidine in the presence of sulphuric acid, nitroguanidine, $HN{:}C(NH_2){\cdot}NH{\cdot}NO_2$ (a substance possessing acid properties) is obtained; from which, by reduction with zinc dust, amidoguanidine, $HN{:}C(NH_2){\cdot}NH{\cdot}NH_2$, is formed. This amidoguanidine decomposes on hydrolysis with the formation of semicarbazide, $NH_2{\cdot}CO{\cdot}NH{\cdot}NH_2$, which, in its turn, breaks down into carbon dioxide, ammonia and hydrazine. Amidoguanidine is a body of hydrazine type, for it reduces gold and silver salts and yields a benzylidine derivative. On oxidation with potassium permanganate, it gives azodicarbondiamidine nitrate, $NH_2{\cdot}(HN){:}C{\cdot}N{:}N{\cdot}C{:}(NH){\cdot}NH_2{\cdot}2HNO_3$, which, when reduced by sulphuretted hydrogen, is converted into the corresponding hydrazodicarbondiamidine, $NH_2{\cdot}(HN){:}C{\cdot}NH{\cdot}NH{\cdot}C{:}(NH){\cdot}NH_2$. By the action of nitrous acid on a nitric acid solution of amidoguanidine, diazoguanidine nitrate, $NH_2{\cdot}(HN){:}C{\cdot}NH{\cdot}N_2{\cdot}NO_3$, is obtained. This diazo compound is decomposed by caustic alkalis with the formation of cyanamide and hydrazoic acid, $CH_4N_5{\cdot}NO_3 = N_3H + CN{\cdot}NH_2 + HNO_3$, whilst acetates and carbonates convert it into amidotetrazotic acid,  . Amidotetrazotic acid yields addition compounds with amines, and by the further action of nitrous acid yields a very explosive derivative, diazotetrazol, CN_6. By fusing guanidine with urea, dicyandiamidine $H_2N{\cdot}(HN){:}C{\cdot}NH{\cdot}CO{\cdot}NH_2$, is formed.

GUANO (a Spanish word from the Peruvian *huanu*, dung), the excrement of birds, found as large deposits on certain islands off the coast of Peru, and on others situated in the Southern ocean and off the west coast of Africa. The large proportions of phosphorus in the form of phosphates and of nitrogen as ammonium oxalate and urate renders it a valuable fertilizer. Bat's guano, composed of the excrement of bats, is found in certain caves in New Zealand and elsewhere; it is similar in composition to Peruvian guano. (See MANURES AND MANURING.)

GUANTA, a port on the Caribbean coast of the state of Bermúdez, Venezuela, 12 m. N.E. of Barcelona, with which it is connected by rail. It dates from the completion of the railway to the coal mines of Naricual and Capiricual nearly 12 m. beyond Barcelona, and was created for the shipment of coal. The harbour is horseshoe-shaped, with its entrance, 1998 ft. wide, protected by an island less than 1 m. off the shore. The entrance is easy and safe, and the harbour affords secure anchorage for large vessels, with deep water alongside the iron railway wharf. These advantages have made Guanta the best port on this part of the coast, and the trade of Barcelona and that of a large inland district have been transferred to it. A prominent feature in its trade is the shipment of live cattle. Among its exports are sugar, coffee, cacáo, tobacco and fruit.

GUANTÁNAMO, the easternmost important town of the S. coast of Cuba, in the province of Santiago, about 40 m. E. of Santiago. Pop. (1907) 14,559. It is situated by the Guazo (or Guaso) river, on a little open plain between the mountains. The beautiful, land-locked harbour, 10 m. long from N. to S. and 4 m. wide in places, has an outer and an inner basin. The latter has a very narrow entrance, and 2 to 2.5 fathoms depth of water. From the port of Caimanera to the city of Guantánamo, 13 m. N., there is a railway, and the city has railway connexion with Santiago. Guantánamo is one of the two ports leased by Cuba to the United States for a naval station. It is the shipping-port and centre of a surrounding coffee-, sugar- and lime-growing district. In 1741 an English force under Admiral Edward Vernon and General Thomas

Wentworth landed here to attack Santiago. They named the harbour Cumberland bay. After their retreat fortifications were begun. The history of the region practically dates, however, from the end of the 18th century, when it gained prosperity from the settlement of French refugees from Santo Domingo; the town, as such, dates only from 1822. Almost all the old families are of French descent, and French was the language locally most used as late as the last third of the 19th century. In recent years, especially since the Spanish-American War of 1898, the region has greatly changed socially and economically. Guantánamo was once a fashionable summer residence resort for wealthy Cubans.

GUARANA (so called from the Guaranis, an aboriginal American tribe), the plant *Paullinia Cupana* (or *P. sorbilis*) of the natural order *Sapindaceae*, indigenous to the north and west of Brazil. It has a smooth erect stem; large pinnate alternate leaves, composed of 5 oblong-oval leaflets; narrow panicles of short-stalked flowers; and ovoid or pyriform fruit about as large as a grape, and containing usually one seed only, which is shaped like a minute horse-chestnut. What is commonly known as guarana, guarana bread or Brazilian cocoa, is prepared from the seeds as follows. In October and November, at which time they become ripe, the seeds are removed from their capsules and sun-dried, so as to admit of the ready removal by hand of the white aril; they are next ground in a stone mortar or deep dish of hard sandstone; the powder, moistened by the addition of a small quantity of water, or by exposure to the dews, is then made into a paste with a certain proportion of whole or broken seeds, and worked up sometimes into balls, but usually into rolls not unlike German sausages, 5 to 8 in. in length, and 12 to 16 oz. in weight. After drying by artificial or solar heat, the guarana is packed between broad leaves in sacks or baskets. Thus prepared, it is of extreme hardness, and has a brown hue, a bitter astringent taste, and an odour faintly resembling that of roasted coffee. An inferior kind, softer and of a lighter colour, is manufactured by admixture of cocoa or cassava. Rasped or grated into sugar and water, guarana forms a beverage largely consumed in S. America. Its manufacture, originally confined to the Mauhés Indians, has spread into various parts of Brazil.

> The properties of guarana as a nervous stimulant and restorative are due to the presence of what was originally described as a new principle and termed guaranine, but is now known to be identical with caffeine or theine. Besides this substance, which is stated to exist in it in the form of tannate, guarana yields on analysis the glucoside saponin, with tannin, starch, gum, three volatile oils, and an acrid green fixed oil (Fournier, *Journ. de Pharm.* vol. xxxix., 1861, p. 291).

GUARANIS, a tribe and stock of South American Indians, having their home in Paraguay, Uruguay and on the Brazilian coast. The Guaranis had developed some civilization before the arrival of the Spaniards, and being a peaceable people quickly submitted. They form to-day the chief element in the populations of Paraguay and Uruguay. Owing to its patronage by the Jesuit missionaries the Guarani language became a widespread medium of communication, and in a corrupted form is still the common language in Paraguay.

GUARANTEE (sometimes spelt “guarantie” or “guaranty”; an O. Fr. form of “warrant,” from the Teutonic word which appears in German as *wahren*, to defend or make safe and binding), a term more comprehensive and of higher import than either “warrant” or “security,” and designating either some international treaty whereby claims, rights or possessions are secured, or more commonly a mere private transaction, by means of which one person, to obtain some trust, confidence or credit for another, engages to be answerable for him.

In English law, a guarantee is a contract to answer for the payment of some debt, or the performance of some duty, by a third person who is *primarily* liable to such payment or

performance. It is a *collateral* contract, which does not extinguish the original liability or obligation to which it is accessory, but on the contrary is itself rendered null and void should the latter fail, as without a principal there can be no accessory. The liabilities of a surety are in law dependent upon those of the principal debtor, and when the latter cease the former do so likewise (*per* Collins, L.J., in *Stacey* v. *Hill*, 1901, 1 K.B., at p. 666; see *per* Willes, J., in *Bateson* v. *Gosling*, 1871, L.R. 7 C.P., at p. 14), except in certain cases where the discharge of the principal debtor is by operation of law (see *In re Fitzgeorge—ex parte Robson*, 1905, 1 K.B. p. 462). If, therefore, persons wrongly suppose that a third person is liable to one of them, and a guarantee is given on that erroneous supposition, it is invalid *ab initio*, by virtue of the *lex contractûs*, because its foundation (which was that another was taken to be liable) has failed (*per* Willes, J., in *Mountstephen* v. *Lakeman*, L.R. 7 Q.B. p. 202). According to various existing codes civil, a suretyship, in respect of an obligation "non-valable," is null and void save where the invalidity is the result of personal incapacity of the principal debtor (Codes Civil, France and Belgium, 2012; Spain, 1824; Portugal, 822; Italy, 1899; Holland, 1858; Lower Canada, 1932). In some countries, however, the mere personal incapacity of a son under age to borrow suffices to vitiate the guarantee of a loan made to him (Spain, 1824; Portugal, 822, s. 2, 1535, 1536). The Egyptian codes sanction guarantees expressly entered into "in view of debtor's want of legal capacity" to contract a valid principal obligation (Egyptian Codes, Mixed Suits, 605; Native Tribunals, 496). The Portuguese code (art. 822, s. 1) retains the surety's liability, in respect of an invalid principal obligation, until the latter has been legally rescinded.

The giver of a guarantee is called "the surety," or "the guarantor"; the person to whom it is given "the creditor," or "the guarantee"; while the person whose payment or performance is secured thereby is termed "the principal debtor," or simply "the principal." In America, but not apparently elsewhere, there is a recognized distinction between "a surety" and "a guarantor"; the former being usually bound with the principal, at the same time and on the same consideration, while the contract of the latter is his own separate undertaking, in which the principal does not join, and in respect of which he is not to be held liable, until due diligence has been exerted to compel the principal debtor to make good his default. There is no privity of contract between the surety and the principal debtor, for the surety contracts with the creditor, and they do not constitute in law one person, and are not jointly liable to the creditor (*per* Baron Parke in *Bain* v. *Cooper*, 1 Dowl. R. (N.S.) 11, 14).

No special phraseology is necessary to the formation of a guarantee; and what really distinguishes such a contract from one of insurance is not any essential difference between the two forms of words *insurance* and *guarantee*, but the substance of the contract entered into by the parties in each particular case (*per* Romer, L.J., in *Seaton* v. *Heath—Seaton* v. *Burnand*, 1899, 1 Q.B. 782, 792, C.A.; *per* Vaughan Williams, L.J., in *In re Denton's Estate Licenses Insurance Corporation and Guarantee Fund Ltd.* v. *Denton*, 1904, 2 Ch., at p. 188; and see *Dane* v. *Mortgage Insurance Corporation*, 1894, 1 Q.B. 54 C.A.) In this connexion it may be mentioned that the different kinds of suretyships have been classified as follows: (1) Those in which there is an agreement to constitute, for a particular purpose, the relation of principal and surety, to which agreement the creditor thereby secured is a party; (2) those in which there is a similar agreement between the principal and surety only, to which the creditor is a stranger; and (3) those in which, without any such contract of suretyship, there is a primary and a secondary liability of two persons for one and the same debt, the debt being, as between the two, that of one of those persons only, and not equally of both, so that the other, if he should be compelled to pay it, would be entitled to reimbursement from the person by whom (as between the two) it ought to have been paid (*per* Earl of Selborne, L.C., *in Duncan Fox and Co.* v. *North and South Wales Bank*, 6 App. Cas., at p. 11). According to several codes civil sureties are made divisible into conventional, legal and judicial (Fr. and Bel., 2015, 2040 et seq.; Spain, 1823; Lower Canada, 1930), while the Spanish code further divides them into gratuitous and for valuable consideration (art. 1, 823).

In England the common-law requisites of a guarantee in no way differ from those essential to the formation of any other contract. That is to say, they comprise the mutual assent of two or more parties, competency to contract, and, unless the guarantee be under seal, valuable consideration. An offer to guarantee is not binding until it has been accepted, being revocable till then by the party making it. Unless, however, as sometimes happens, the offer contemplates an express acceptance, one may be implied, and it may be a question for a jury whether an offer of guarantee has in fact been accepted. Where the surety's assent to a guarantee has been procured by fraud of the person to whom it is given, there is no binding contract. Such fraud may consist of suppression or concealment or misrepresentation. There is some conflict of authorities as to what facts must be spontaneously disclosed to the surety by the creditor, but it may be taken that the rule on the subject is less stringent than that governing insurances upon marine, life and other risks (*The North British Insurance Co.* v. *Lloyd*, 10 Exch. 523), though formerly this was denied (*Owen* v. *Homan*, 3 Mac. & G. 378,

397). Moreover, even where the contract relied upon is in the form of a policy guaranteeing the solvency of a surety for another's debt, and is therefore governed by the doctrine of *uberrima* fides, only such facts as are really material to the risk undertaken need be spontaneously disclosed (*Seaton* v. *Burnand—Burnand* v. *Seaton*, 1900, A.C. 135). As regards the competency of the parties to enter into a contract of guarantee, this may be affected by insanity or intoxication of the surety, if known to the creditor, or by disability of any kind. The ordinary disabilities are those of infants and married women—now in England greatly mitigated as regards the latter by the Married Women's Property Acts, 1870 to 1893, which enable a married woman to contract, as a *feme sole*, to the extent of her separate property. Every guarantee not under seal must according to English law have a consideration to support it, though the least spark of one suffices (*per* Wilmot, J., in *Pillan* v. *van Mierop and Hopkins*, 3 Burr., at p. 1666; *Haigh* v. *Brooks*, 10 A. & E. 309; *Barrell* v. *Trussell*, 4 Taunt. 117), which, as in other cases, may consist either of some right, interest, profit or benefit accruing to the one party, or some forbearance, detriment, loss or responsibility given, suffered or undertaken by the other. In some guarantees the consideration is entire—as where, in consideration of a lease being granted, the surety becomes answerable for the performance of the covenants; in other cases it is fragmentary, *i.e.* supplied from time to time—as where a guarantee is given to secure the balance of a running account at a banker's, or a balance of a running account for goods supplied (*per* Lush, L.J., in *Lloyd's* v. *Harper*, 16 Ch. Div., at p. 319). In the former case, the moment the lease is granted there is nothing more for the lessor to do, and such a guarantee as that of necessity runs on throughout the duration of the lease and is irrevocable. In the latter case, however, unless the guarantee stipulates to the contrary, the surety may at any time terminate his liability under the guarantee as to *future* advances, &c. The consideration for a guarantee must not be *past* or *executed*, but on the other hand it need not comprise a direct benefit or advantage to either the surety or the creditor, but may solely consist of anything done, or any promise made, for the benefit of the principal debtor. It is more frequently *executory* than *concurrent*, taking the form either of forbearance to sue the principal debtor, or of a future advance of money or supply of goods to him.

By the Indian Contract Act 1872, sect. 127, it is provided that the consideration for a guarantee may consist of anything done or any promise made for the benefit of the principal debtor by the creditor. Total failure of the consideration stipulated for by the party giving a guarantee will prevent its being enforced, as will also the existence of an illegal consideration. Though in all countries the mutual assent of two or more parties is essential to the formation of any contract (see *e.g.* Codes Civil, Fr. and Bel. 1108; Port. 643, 647 et seq.; Spain, 1258, 1261; Italy, 1104; Holl. 1356; Lower Canada, 984), a consideration is not everywhere regarded as a necessary element (see Pothier's *Law of Obligations*, Evans's edition, vol. ii. p. 19). Thus in Scotland a contract may be binding without a consideration to support it (Stair i. 10. 7).

The statutory requisites of a guarantee are, in England, prescribed by (1) the Statute of Frauds, which, with reference to guarantees, provides that "no action shall be brought whereby to charge the defendant upon any special promise to answer for the debt, default or miscarriages of another person, unless the agreement upon which such action shall be brought, or some memorandum or note thereof, shall be in writing and signed by the party to be charged therewith, or some other person thereunto by him lawfully authorized," and (2) Lord Tenterden's Act (9 Geo. IV. c. 14), which by § 6 enacts that "no action shall be brought whereby to charge any person upon or by reason of any representation or assurance made or given concerning or relating to the character, conduct, credit, ability, trade or dealings of any other person, to the intent or purpose that such other person may obtain credit, money or goods upon" (*i.e.* "upon credit," see *per* Parke, B., in *Lyde* v. *Barnard*, 1 M. & W., at p. 104), "unless such representation or assurance be made in writing signed by the party to be charged therewith." This latter enactment, which applies to incorporated companies as well as to individual persons (*Hirst* v. *West Riding Union Banking Co.*, 1901, 2 K.B. 560 C.A.), was rendered necessary by an evasion of the 4th section of the Statute of Frauds, accomplished by treating the special promise to answer for another's debt, default or miscarriage, when not in writing, as required by that section, as a false and fraudulent representation concerning another's credit, solvency or honesty, in respect of which damages, as for a tort, were held to be recoverable (*Pasley* v. *Freeman*, 3 T.R. 51). In Scotland, where, it should be stated, a guarantee is called a "cautionary obligation," similar enactments to those just specified are contained in § 6 of the Mercantile Law Amendment Act (Scotland) 1856, while in the Irish Statute of Frauds (7 Will. III. c. 12) there is a provision (§ 2) identical with that found in the English Statute of Frauds. In India a guarantee may be either oral or written (Indian Contract Act, § 126), while in the Australian colonies, Jamaica and Ceylon it must be in writing. The German code civil requires the surety's promise to be verified by writing where he has not executed the principal obligation (art. 766), and the Portuguese code renders a guarantee provable by all the modes established by law for the proof of the principal contract (art. 826). According to most codes civil now in force a guarantee like any other contract can usually be

made verbally in the presence of witnesses and in certain cases (where for instance considerable sums of money are involved) *sous signature privée* or else by judicial or notarial instrument (see Codes Civil, Fr. and Bel. 1341; Spain, 1244; Port. 2506, 2513; Italy, 1341 et seq.; Pothier's *Law of Obligations*, Evans's ed. i. 257; Burge on *Suretyship*, p. 19; van der Linden's *Institutes of Holland*, p. 120); the French and Belgian Codes, moreover, provide that suretyship is not to be presumed but must always be expressed (art. 2015).

The Statute of Frauds does not invalidate a verbal guarantee, but renders it unenforceable by action. It may therefore be available in support of a defence to an action, and money paid under it cannot be recovered. An indemnity is not a guarantee within the statute, unless it contemplates the primary liability of a third person. It need not, therefore, be in writing when it is a mere promise to become liable for a debt, whenever the person to whom the promise is made should become liable (*Wildes* v. *Dudlow*, L.R. 19 Eq. 198; *per* Vaughan Williams, L.J. in *Harburg India-Rubber Co.* v. *Martin*, 1902, 1 K.B. p. 786; *Guild* v. *Conrad*, 1894, 2 Q.B. 885 C.A.). Neither does the statute apply to the promise of a *del credere* agent, which binds him, in consideration of the higher commission he receives, to make no sales on behalf of his principal except to persons who are absolutely solvent, and renders him liable for any loss that may result from the non-fulfilment of his promise. A promise to *give* a guarantee is, however, within the statute, though not one to *procure* a guarantee.

The general principles which determine what are guarantees within the Statute of Frauds, as deduced from a multitude of decided cases, are briefly as follows: (1) the primary liability of a third person must exist or be contemplated as the foundation of the contract (*Birkmyr* v. *Darnell*, 1 Sm. L.C. 11th ed. p. 299; *Mountstephen* v. *Lakeman*, L.R. 7 Q.B. 196; L.R. 7 H.L. 17); (2) the promise must be made to the creditor; (3) there must be an absence of all liability on the part of the surety independently of his express promise of guarantee; (4) the main object of the transaction between the parties to the guarantee must be the fulfilment of a third party's obligation (see *Harburg India-rubber Comb Co.* v. *Martin*, 1902, 1 K.B. 778, 786); and (5) the contract entered into must not amount to a sale by the creditor to the promiser of a security for a debt or of the debt itself (see de Colyar's *Law of Guarantees and of Principal and Surety*, 3rd ed. pp. 65-161, where these principles are discussed in detail by the light of decided cases there cited).

As regards the kind of note or memorandum of the guarantee that will satisfy the Statute of Frauds, it is now provided by § 3 of the Mercantile Law Amendment Act 1856, that "no special promise to be made, by any person after the passing of this act, to answer for the debt, default or miscarriage of another person, being in writing and signed by the party to be charged therewith, or some other person by him thereunto lawfully authorized, shall be deemed invalid to support an action, suit or other proceeding, to charge the person by whom such promise shall have been made, by reason only that the consideration for such promise does not appear in writing or by necessary inference from a written document." Prior to this enactment, which is not retrospective in its operation, it was held in many cases that as the Statute of Frauds requires "the agreement" to be in writing, all parts thereof were required so to be, including the consideration moving to, as well as the promise by, the party to be charged (*Wain* v. *Walters*, 5 East, 10; *Sounders* v. *Wakefield*, 4 B. & Ald. 595). These decisions, however, proved to be burdensome to the mercantile community, especially in Scotland and the north of England, and ultimately led to the alteration of the law, so far as guarantees are concerned, by means of the enactment already specified. Any writing embodying the terms of the agreement between the parties, and signed by the party to be charged, is sufficient; and the idea of agreement need not be present to the mind of the person signing (*per* Lindley, L.J., in *In re* Hoyle—*Hoyle* v. *Hoyle*, 1893, 1 Ch., at p. 98). It is, however, necessary that the names of the contracting parties should appear somewhere in writing; that the party to be charged, or his agent, should sign the memorandum or note of agreement, or else should sign another paper referring thereto; and that, when the note or memorandum is made, a complete agreement shall exist. Moreover, the memorandum must have been made before action brought, though it need not be contemporaneous with the agreement itself. As regards the stamping of the memorandum or note of agreement, a guarantee cannot, in England, be given in evidence unless properly stamped (Stamp Act 1891). A guarantee for the payment of goods, however, requires no stamp, being within the exception contained in the first schedule of the act. Nor is it necessary to stamp a written representation or assurance as to character within 9 Geo. IV. c. 14, *supra*. If under seal, a guarantee requires sometimes an *ad valorem* stamp and sometimes a ten-shilling stamp; in other cases a sixpenny stamp generally suffices; and, on certain prescribed terms, the stamps can be affixed any time after execution (Stamp Act 1891, § 15, amended by § 15 of the Finance Act 1895).

The liability incurred by a surety under his guarantee depends upon its terms, and is not necessarily co-extensive with that of the principal debtor. It is, however, obvious that as the surety's obligation is merely accessory to that of the principal it cannot as

Extent of surety's liability. such exceed it (de Colyar, *Law of Guarantees*, 3rd ed. p. 233; Burge, *Suretyship*, p. 5). By the Roman law, if there were any such excess the surety's obligation was rendered *wholly* void and not merely void *pro tanto*. By many existing codes civil, however, a guarantee which imposes on the surety a greater liability than that of the principal is not thereby invalidated, but the liability is merely reducible to that of the principal (Fr. and Bel. 2013; Port. 823; Spain, 1826; Italy, 1900; Holland, 1859; Lower Canada, 1933). By sec. 128 of the Indian Contract Act 1872 the liability of the surety is, unless otherwise provided by contract, coextensive with that of the principal. Where the liability of the surety is *less* extensive in amount than that of the principal debtor, difficult questions have arisen in England and America as to whether the surety is liable only for *part* of the debt equal to the limit of his liability, or, up to such limit, for the *whole* debt (*Ellis* v. *Emmanuel*, 1 Ex. Div. 157; *Hobson* v. *Bass*, 6 Ch. App. 792; Brandt, *Suretyship*, sec. 219). The surety cannot be made liable except for a loss sustained by reason of the default guaranteed against. Moreover, in the case of a joint and several guarantee by several sureties, unless all sign it none are liable thereunder (*National Pro. Bk. of England* v. *Brackenbury*, 1906, 22 *Times* L.R. 797). It was formerly considered in England to be the duty of the party taking a guarantee to see that it was couched in language enabling the party giving it to understand clearly to what extent he was binding himself (*Nicholson* v. *Paget*, 1 C. & M. 48, 52). This view, however, can no longer be sustained, it being now recognized that a guarantee, like any other contract, must, in cases of ambiguity, be construed against the party bound thereby and in favour of the party receiving it (*Mayer* v. *Isaac*, 6 M. & W. 605, 612; *Wood* v. *Priestner*, L.R. 2 Exch. 66, 71). The surety is not to be changed beyond the limits prescribed by his contract, which must be construed so as to give effect to what may fairly be inferred to have been the intention of the parties, from what they themselves have expressed in writing. In cases of doubtful import, recourse to parol evidence is permissible, to explain, but not to contradict, the written evidence of the guarantee. As a general rule, the surety is not liable if the principal debt cannot be enforced, because, as already explained, the obligation of the surety is merely accessory to that of the principal debtor. It has never been actually decided in England whether this rule holds good in cases where the principal debtor is an infant, and on that account is not liable to the creditor. Probably in such a case the surety might be held liable by estoppel (see *Kimball* v. *Newell*, 7 Hill (N.Y.) 116). When directors guarantee the performance by their company of a contract which is ultra vires, and therefore not binding on the latter, the directors' suretyship liability is, nevertheless, enforceable against them (*Yorkshire Railway Waggon Co.* v. *Maclure*, 21 Ch. D. 309 C.A.).

It is not always easy to determine for how long a time liability under a guarantee endures. Sometimes a guarantee is limited to a single transaction, and is obviously intended to be security against one specific default only. On the other hand, it as often happens that it is not exhausted by one transaction on the faith of it, but extends to a series of transactions, and remains a standing security until it is revoked, either by the act of the parties or else by the death of the surety. It is then termed a continuing guarantee. No fixed rules of interpretation determine whether a guarantee is a continuing one or not, but each case must be judged on its individual merits; and frequently, in order to achieve a correct construction, it becomes necessary to examine the surrounding circumstances, which often reveal what was the subject-matter which the parties contemplated when the guarantee was given, and likewise what was the scope and object of the transaction between them. Most continuing guarantees are either ordinary mercantile securities, in respect of advances made or goods supplied to the principal debtor or else bonds for the good behaviour of persons in public or private offices or employments. With regard to the latter class of continuing guarantees, the surety's liability is, generally speaking, revoked by any change in the constitution of the persons to or for whom the guarantee is given. On this subject it is now provided by section 18 of the Partnership Act 1890, which applies to Scotland as well as England, that "a continuing guarantee or cautionary obligation given either to a firm or to a third person in respect of the transactions of a firm, is, in the absence of agreement to the contrary, revoked as to future transactions by any change in the constitution of the firm to which, or of the firm in respect of the transactions of which the guaranty or obligation was given." This section, like the enactment it replaces, namely, sec. 4 of the Mercantile Law Amendment Act 1856, is mainly declaratory of the English common law, as embodied in decided cases, which indicate that the changes in the persons to or for whom a guarantee is given may consist either of an increase in their number, of a diminution thereof caused by death or retirement from business, or of the incorporation or consolidation of the persons to whom the guarantee is given. In this connexion it may be stated that the Government Offices (Security) Act 1875, which has been amended by the Statute Law Revision Act 1883, contains certain provisions with regard to the acceptance by the heads of public departments of guarantees given by companies for the due performance of the duties of an office or employment in the public service, and enables the Commissioners of His Majesty's Treasury to vary the character of any security, for good behaviour by public

servants, given after the passing of the act.

Before the surety can be rendered liable on his guarantee, the principal debtor must have made default. When, however, this has occurred, the creditor, in the absence of express agreement to the contrary, may sue the surety, without even informing him of such default having taken place, or requiring him to pay, and before proceeding against the principal debtor or resorting to securities for the debt received from the latter. In those countries where the municipal law is based on the Roman civil law, sureties usually possess the right (which may, however, be renounced by them) originally conferred by the Roman law, of compelling the creditor to insist on the goods, &c. (if any) of the principal debtor being first "discussed," *i.e.* appraised and sold, and appropriated to the liquidation of the debt guaranteed (see Codes Civil, Fr. and Bel. 2021 et seq.; Spain, 1830, 1831; Port. 830; Germany, 771, 772, 773; Holland, 1868; Italy, 1907; Lower Canada, 1941-1942; Egypt [mixed suits] 612; *ibid.* [native tribunals] 502), before having recourse to the sureties. This right, according to a great American jurist (Chancellor Kent in *Hayes* v. *Ward*, 4 Johns. New York, Ch. Cas. p. 132), "accords with a common sense of justice and the natural equity of mankind." In England this right has never been fully recognized. Neither does it prevail in America nor, since the passing of the Mercantile Law Amendment Act (Scotland) 1856, s. 8, is it any longer available in Scotland where, prior to the last-named enactment, the benefit of discussion, as it is termed, existed. In England, however, before any demand for payment has been made by the creditor on the surety, the latter can, as soon as the principal debtor has made default, compel the creditor, on giving him an indemnity against costs and expenses, to sue the principal debtor if the latter be solvent and able to pay (*per* A. L. Smith, L.J., in *Rouse* v. *Bradford Banking Company*, 1894, 2 Ch. 75; *per* Lord Eldon in *Wright* v. *Simpson*, 6 Ves., at p. 733), and a similar remedy is also open to the surety in America (see Brandt on *Suretyship*, par. 205, p. 290) though in neither of these countries nor in Scotland can one of several sureties, when sued for the whole guaranteed debt by the creditor, compel the latter to divide his claim amongst all the solvent sureties, and reduce it to the share and proportion of each surety. However, this *beneficium divisionis*, as it is called in Roman law, is recognized by many existing codes (Fr. and Bel. 2025-2027; Spain, 1837; Portugal, 835-836; Germany, 426; Holland, 1873-1874; Italy, 1911-1912; Lower Canada, 1946; Egypt [mixed suits], 615, 616).

The usual mode in England of enforcing liability under a guarantee is by action in the High Court or in the county court. It is also permissible for the creditor to obtain redress by means of a set-off or counter-claim, in an action brought against him by the surety. On the other hand, the surety may now, in any court in which the action on the guarantee is pending, avail himself of any set-off which may exist between the principal debtor and the creditor. Moreover, if one of several sureties for the same debt is sued by the creditor or his guarantee, he can, by means of a proceeding termed a third-party notice, claim contribution from his co-surety towards the common liability. Independent proof of the surety's liability under his guarantee must always be given at the trial; as the creditor cannot rely either on admissions made by the principal debtor, or on a judgment or award obtained against him (*Ex parte Young In re Kitchin*, 17 Ch. Div. 668). Should the surety become bankrupt either before or after default has been made by the principal debtor, the creditor will have to prove against his estate. This right of proof is now in England regulated by the 37th section of the Bankruptcy Act, 1883, which is most comprehensive in its terms.

Rights of sureties.

A person liable as a surety for another under a guarantee possesses various rights against him, against the person to whom the guarantee is given, and also against those who may have become co-sureties in respect of the same debt, default or miscarriage. As regards the surety's rights against the principal debtor, the latter may, where the guarantee was made with his consent but not otherwise (see *Hodgson* v. *Shaw*, 3 Myl. & K. at p. 190), after he has made default, be compelled by the surety to exonerate him from liability by payment of the guaranteed debt (*per* Sir W. Grant, M.R., in *Antrobus* v. *Davidson*, 3 Meriv. 569, 579; *per* Lindley, L.J., in *Johnston* v. *Salvage Association*, 19 Q.B.D. 460, 461; and see *Wolmershausen* v. *Gullick*, 1893, 2 Ch. 514). The moment, moreover, the surety has himself paid any portion of the guaranteed debt, he is entitled to rank as a creditor for the amount so paid, and to compel repayment thereof. In the event of the principal debtor's bankruptcy, the surety can in England, if the creditor has not already proved in respect of the guaranteed debt, prove against the bankrupt's estate, not only in respect of payments made before the bankruptcy of the principal debtor, but also, it seems, in respect of the contingent liability to pay under the guarantee (see *Ex parte Delmar re Herepath*, 1889, 38 W.R. 752), while if the creditor has already proved, the surety who has paid the guaranteed debt has a right to all dividends received by the creditor from the bankrupt in respect thereof, and to stand in the creditor's place as to future dividends. This right is, however, often waived by the guarantee stipulating that, until the creditor has received full payment of all sums over and above the guaranteed debt, due to him from the

principal debtor, the surety shall not participate in any dividends distributed from the bankrupt's estate amongst his creditors. As regards the rights of the surety against the creditor, they are in England exercisable even by one who in the first instance was a principal debtor, but has since become a surety, by arrangement with his creditor, duly notified to the creditor, though not even sanctioned by him. This was decided by the House of Lords in the case of *Rouse* v. *The Bradford Banking Co.*, 1894, A.C. 586, removing a doubt created by the previous case of *Swire* v. *Redman*, 1 Q.B.D. 536, which must now be treated as overruled. The surety's principal right against the creditor entitles him, after payment of the guaranteed debt, to the benefit of all securities, whether known to him (the surety) or not, which the creditor held against the principal debtor; and where, by default or *laches* of the creditor, such securities have been lost, or rendered otherwise unavailable, the surety is discharged *pro tanto*. This right, which is *not* in abeyance till the surety is called on to pay (*Dixon* v. *Steel*, 1901, 2 Ch. 602), extends to all securities, whether satisfied or not, given before or after the contract of suretyship was entered into. On this subject the Mercantile Law Amendment Act, 1856, § 5, provides that "every person who being surety for the debt or duty of another, or being liable with another for any debt or duty, shall pay such debt or perform such duty, shall be entitled to have assigned to him, or to a trustee for him, every judgment, specialty, or other security, which shall be held by the creditor in respect of such debt or duty, whether such judgment, specialty, or other security shall or shall not be deemed at law to have been satisfied by the payment of the debt or performance of the duty, and such person shall be entitled to stand in the place of the creditor, and to use all the remedies, and, if need be, and upon a proper indemnity, to use the name of the creditor, in any action or other proceeding at law or in equity, in order to obtain from the principal debtor, or any co-surety, co-contractor, or co-debtor, as the case may be, indemnification for the advances made and loss sustained by the person who shall have so paid such debt or performed such duty; and such payment or performance so made by such surety shall not be pleadable in bar of any such action or other proceeding by him, provided always that no co-surety, co-contractor, or co-debtor shall be entitled to recover from any other co-surety, co-contractor, or co-debtor, by the means aforesaid, more than the just proportion to which, as between those parties themselves, such last-mentioned person shall be justly liable." This enactment is so far retrospective that it applies to a contract made before the act, where the breach thereof, and the payment by the surety, have taken place subsequently. The right of the surety to be subrogated, on payment by him of the guaranteed debt, to all the rights of the creditor against the principal debtor is recognized in America (*Tobin* v. *Kirk*, 80 New York S.C.R. 229), and many other countries (Codes Civil, Fr. and Bel. 2029; Spain, 1839; Port. 839; Germany, 774; Holland, 1877; Italy, 1916; Lower Canada, 2959; Egypt [mixed suits], 617; *ibid.* [native tribunals], 505).

As regards the rights of the surety against a co-surety, he is entitled to contribution from him in respect of their common liability. This particular right is not the result of any contract, but is derived from a general equity, on the ground of equality of burden and benefit, and exists whether the sureties be bound jointly, or jointly and severally, and by the same, or different, instruments. There is, however, no right of contribution where each surety is severally bound for a given portion only of the guaranteed debt; nor in the case of a surety for a surety; (see *In re Denton's Estate*, 1904, 2 Ch. 178 C.A.); nor where a person becomes a surety jointly with another and at the latter's request. Contribution may be enforced, either before payment, or as soon as the surety has paid more than his share of the common debt (*Wolmershausen* v. *Gullick*, 1803, 2 Ch. 514); and the amount recoverable is now always regulated by the number of solvent sureties, though formerly this rule only prevailed in equity. In the event of the bankruptcy of a surety, proof can be made against his estate by a co-surety for any excess over the latter's contributive share. The right of contribution is not the only right possessed by co-sureties against each other, but they are also entitled to the benefit of all securities which have been taken by any one of them as an indemnity against the liability incurred for the principal debtor. The Roman law did not recognize the right of contribution amongst sureties. It is, however, sanctioned by many existing codes (Fr. and Bel. 2033; Germany, 426, 474; Italy, 1920; Holland, 1881; Spain, 1844; Port. 845; Lower Canada, 1955; Egypt [mixed suits], 618, *ibid.* [native tribunals], 506), and also by the Indian Contract Act 1872, ss. 146-147.

The discharge of a surety from liability under his guarantee may be accomplished In various ways, he being regarded, especially in England and America, as a "favoured debtor" (*per* Turner, L.J., in *Wheatley* v. *Bastow*, 7 De G. M. & G. 279, 280; *per* Earl of Selborne, L.C., in *In re Sherry—London and County Banking Co.* v. *Terry*, 25 Ch. D., at p. 703; and see Brandt on *Suretyship*, secs. 79, 80). Thus, fraud subsequent to the execution of the guarantee (as where, for example, the creditor connives at the principal debtor's default) will certainly discharge the surety. Again, a material alteration made by the creditor in the instrument of guarantee after its execution may also have this effect. The most prolific ground of discharge, however, is usually traceable to causes originating in the creditor's laches or conduct, the governing

principle being that if the creditor violates any rights which the surety possessed when he entered into the suretyship, even though the damage be nominal only, the guarantee cannot be enforced. On this subject it suffices to state that the surety's discharge may be accomplished (1) by a variation of the terms of the contract between the creditor and the principal debtor, or of that subsisting between the creditor and the surety (see *Rickaby* v. *Lewis*, 22 T.L.R. 130); (2) by the creditor taking a new security from the principal debtor in lieu of the original one; (3) by the creditor discharging the principal debtor from liability; (4) by the creditor binding himself to give time to the principal debtor for payment of the guaranteed debt; or (5) by loss of securities received by the creditor in respect of the guaranteed debt.

In this connexion It may be stated in general terms that whatever extinguishes the principal obligation necessarily determines that of the surety (which is accessory thereto), not only in England but elsewhere also (Codes Civil, Fr. and Bel. 2034, 2038; Spain, 1847; Port. 848; Lower Canada, 1956; 1960; Egypt [mixed suits], 622, *ibid.* [native tribunals], 509; Indian Contract Act 1872, sec. 134), and that, by most of the codes civil now in force, the surety is discharged by *laches* or conduct of the creditor inconsistent with the surety's rights (see Fr. and Bel. 2037; Spain, 1852; Port. 853; Germany, 776; Italy, 1928; Egypt [mixed suits], 623), though it may be mentioned that the rule prevailing in England, Scotland, America and India which releases the surety from liability where the creditor, by binding contract with the principal, extends without the surety's consent the time for fulfilling the principal obligation, while recognized by two existing codes civil (Spain, 1851; Port. 852), is rejected by the majority of them (Fr. and Bel. 2039; Holland, 1887; Italy, 1930; Lower Canada, 1961; Egypt [mixed suits], 613; *ib.* [native tribunals], 503); (and see Morice, *English and Dutch Law*, p. 96; van der Linden, *Institutes of Holland*, pp. 120-121). A revocation of the contract of suretyship by act of the parties, or in certain cases by the death of the surety, may also operate to discharge the surety. The death of a surety does not *per se* determine the guarantee, but, save where from its nature the guarantee is irrevocable by the surety himself, it can be revoked by express notice after his death, or, it would appear, by the creditor becoming affected with constructive notice thereof; except where, under the testator's will, the executor has the option of continuing the guarantee, in which case the executor should, it seems, specifically withdraw the guarantee in order to determine it. Where one of a number of joint and several sureties dies, the future liability of the survivors under the guarantee continues, at all events until it has been determined by express notice. Moreover, when three persons joined in a guarantee to a bank, and their liability thereunder was not expressed to be several, it was held that the death of one surety did not determine the liability of the survivors. In such a case, however, the estate of the deceased surety would be relieved from liability.

The Statutes of Limitation bar the right of action on guarantees under seal after twenty years, and on other guarantees after six years, from the date when the creditor might have sued the surety.

AUTHORITIES.—De Colyar, *Law of Guarantees and of Principal and Surety* (3rd ed., 1897); American edition, by J. A. Morgan (1875); Throop, *Validity of Verbal Agreements*; Fell, *Guarantees* (2nd ed.); Theobald, *Law of Principal and Surety*; Brandt, *Law of Suretyships and Guarantee*; article by de Colyar in *Journal of Comparative Legislation* (1905), on "Suretyship from the Standpoint of Comparative Jurisprudence."

(H. A. DE C.)

GUARATINGUETÁ, a city of Brazil In the eastern part of the state of São Paulo, 124 m. N.E. of the city of São Paulo. Pop. (1890) of the municipality, which includes a large rural district and the villages of Apparecida and Roseira, 30,690. The city, which was founded in 1651, stands on a fertile plain 3 m. from the Parahyba river, and is the commercial centre of one of the oldest agricultural districts of the state. The district produces large quantities of coffee, and some sugar, Indian corn and beans. Cattle and pigs are raised. The city dwellings are for the most part constructed of rough wooden frames covered with mud, called *taipa* by the natives, and roofed with curved tiles. The São Paulo branch of the Brazilian Central railway passes through the city, by which it is connected with Rio de Janeiro on one side and São Paulo and Santos on the other.

GUARDA, an episcopal city and the capital of an administrative district bearing the same name, and formerly in the province of Beira, Portugal; on the Guarda-Abrantes and Lisbon-Villar Formoso railways. Pop. (1900) 6124. Guarda is situated 3370 ft. above sea-level, at the north-eastern extremity of the Serra da Estrella, overlooking the fertile valley of the river Côa. It is surrounded by ancient walls, and contains a ruined castle, a fine 16th-century cathedral and a sanatorium for consumptives. Its industries comprise the manufacture of coarse cloth and the sale of grain, wine and live stock. In 1199 Guarda was founded, on the site of the Roman Lencia Oppidana, by Sancho I. of Portugal, who intended it, as its name implies, to be a "guard" against Moorish invasion. The administrative district of Guarda coincides with north-eastern Beira; pop. (1900), 261,630; area, 1065 sq. m.

GUARDI, FRANCESCO (1712-1793), Venetian painter, was a pupil of Canaletto, and followed his style so closely that his pictures are very frequently attributed to his more celebrated master. Nevertheless, the diversity, when once perceived, is sufficiently marked—Canaletto being more firm, solid, distinct, well-grounded, and on the whole the higher master, while Guardi is noticeable for spirited touch, sparkling colour and picturesquely sketched figures—in these respects being fully equal to Canaletto. Guardi sometimes coloured Canaletto's designs. He had extraordinary facility, three or four days being enough for producing an entire work. The number of his performances is large in proportion to this facility and to the love of gain which characterized him. Many of his works are to be found in England and seven in the Louvre.

GUARDIAN, one who guards or defends another, a protector. The O. Fr. *guarden*, *garden*, mod. *gardien*, from *guarder*, *garder*, is of Teutonic origin, from the base *war-*, to protect, cf. O.H. Ger. *warten*, and Eng. "ward"; thus "guardian" and "warden" are etymologically identical, as are "guard" and "ward"; cf. the use of the correlatives "guardian" and "ward," *i.e.* a minor, or person incapable of managing his affairs, under the protection or in the custody of a guardian. For the position of guardians of the poor see Poor Law, and for the legal relations between a guardian and his ward see Infant, Marriage and Roman Law.

GUARDS, AND **HOUSEHOLD TROOPS.** The word *guard* is an adaptation of the Fr. *guarde*, mod. *garde*, O. Ger. *ward*; see Guardian. The practice of maintaining bodyguards is of great antiquity, and may indeed be considered the beginning of organized armies. Thus there is often no clear distinction between the inner ring of personal defenders and the select corps of trained combatants who are at the chief's entire disposal. Famous examples of corps that fell under one or both these headings are the "Immortals" of Xerxes, the Mamelukes, Janissaries, the *Huscarles* of the Anglo-Saxon kings, and the Russian Strelitz (*Stryeltsi*). In modern times the distinction of function is better marked, and the fighting men who are more intimately connected with the sovereign than the bulk of the army can be classified as to duties into "Household Troops," who are in a sense personal retainers, and "Guards," who are a *corps d'élite* of combatants. But the dividing line is not so clear as to any given body of troops. Thus the British Household Cavalry is part of the combatant army as well as the sovereign's escort.

The oldest of the household or bodyguard corps in the United Kingdom is the King's Bodyguard of the *Yeomen of the Guard* (*q.v.*), formed at his accession by Henry VII. The "nearest guard," the personal escort of the sovereign, is the "King's Bodyguard of the Honourable Corps of *Gentlemen-at-Arms*," created by Henry VIII. at his accession in 1509. Formed possibly on the pattern of the "Pensionnaires" of the French kings—retainers of noble birth who were the predecessors of the *Maison du Roi* (see below)—the new corps was originally called "the Pensioners." The importance of such guards regiments in the general development of organized armies is illustrated by a declaration of the House of Commons,

made in 1674, that the militia, the pensioners and the Yeomen of the Guard were the only lawful armed forces in the realm. But with the rise of the professional soldier and the corresponding disuse of arms by the nobles and gentry, the Gentlemen-at-Arms (a title which came into use in James II.'s time, though it did not become that of the corps until William IV.'s) retaining their noble character, became less and less military. Burke attempted without success in 1782 to restrict membership to officers of the army and navy, but the necessity of giving the corps an effective military character became obvious when, on the occasion of a threatened Chartist riot, it was called upon to do duty as an armed body at St James's Palace. The corps was reconstituted on a purely military basis in 1862, and from that date only military officers of the regular services who have received a war decoration are eligible for appointment. The office of captain, however, is political, the holder (who is always a peer) vacating it on the resignation of the government of which he is a member. The corps consists at present of captain, lieutenant, standard bearer, clerk of the cheque (adjutant), sub-officer and 39 gentlemen-at-arms. The uniform consists of a scarlet swallow-tailed coat and blue overalls, with gold epaulettes, brass dragoon helmet with drooping white plume and brass box-spurs, these last contrasting rather forcibly with the partizan, an essentially infantry weapon, that they carry.

The Royal Company of Archers.—The king's bodyguard for Scotland was constituted in its present form in the year 1670, by an act of the privy council of Scotland. An earlier origin has been claimed for the company, some connecting it with a supposed archer guard of the kings of Scotland. In the above-mentioned year, 1676, the minutes of the Royal Company begin by stating, that owing to "the noble and usefull recreation of archery being for many years much neglected, several noblemen and gentlemen did associate themselves in a company for encouragement thereof ... and did apply to the privy council for their approbation ... which was granted." For about twenty years at the end of the 17th century, perhaps owing to the adhesion of the majority to the Stuart cause, its existence seems to have been suspended. But in 1703 a new captain-general, Sir George Mackenzie, Viscount Tarbat, afterwards earl of Cromarty (1630-1714), was elected, and he procured for the company a new charter from Queen Anne. The rights and privileges renewed or conferred by this charter were to be held of the crown for the *reddendo* of a pair of barbed arrows. This *reddendo* was paid to George IV. at Holyrood in 1822, to Queen Victoria in 1842 and to King Edward VII. in 1903. The history of the Royal Company since 1703 has been one of great prosperity. Large parades were frequently held, and many distinguished men marched in the ranks. Several of the leading insurgents in 1745 were members, but the company was not at that time suspended in any way.

In 1822 when King George IV. visited Scotland, it was thought appropriate that the Royal Company should act as his majesty's bodyguard during his stay, especially as there was a tradition of a former archer bodyguard. They therefore performed the duties usually assigned to the gentlemen-at-arms. When Queen Victoria visited the Scottish capital in 1842, the Royal Company again did duty; the last time they were called out in her reign in their capacity of royal bodyguard was in 1860 on the occasion of the great volunteer review in the Queen's Park, Edinburgh. They acted in the same capacity when King Edward VII. reviewed the Scottish Volunteers there on the 18th of September 1905.

King George IV. authorized the company to take, in addition to their former name, that of "The King's Body Guard for Scotland," and presented to the captain-general a gold stick, thus constituting the company part of the royal household. In virtue of this stick the captain-general of the Royal Company takes his place at a coronation or similar pageant immediately behind the gold stick of England. The lieutenants-general of the company have silver sticks; and the council, which is the executive body of the company, possess seven ebony ones. George IV. further appointed a full dress uniform to be worn by members of the company at court, when not on duty as guards, in which latter case the ordinary field dress is used. The court dress is green with green velvet facings, gold epaulettes and lace, crimson silk sash, and cocked hat with green plume. The officers wear a gold sash in place of a crimson one, and an *aiguillette* on the left shoulder. All ranks wear swords. The field dress at present consists of a dark-green tunic, shoulder-wings and gauntleted cuffs and trousers trimmed with black and crimson; a bow-case worn as a sash, of the same colour as the coat, black waistbelt with sword, and Balmoral bonnet with thistle ornament and eagle's feather. The officers of the company are the captain-general, 4 captains, 4 lieutenants, 4 ensigns, 12 brigadiers and adjutant.

Corps of the gentlemen-at-arms or yeoman type do not of course count as combatant troops —if for no other reason at least because they are armed with the weapons of bygone times. Colonel Clifford Walton states in his *History of the British Standing Army* that neither the Yeomen of the Guard nor the Pensioners were ever subject to martial law. The British guards and household troops that are armed, trained and organized as part of the army are the *Household Cavalry* and the *Foot Guards*.

The Household Cavalry consists at the present day of three regiments, and has its origin, as

have certain of the Foot guard regiments, in the ashes of the “New Model” army disbanded at the restoration of Charles II. in 1660. In that year the “1st or His Majesty’s Own Troop of Guards” formed during the king’s exile of his cavalier followers, was taken on the strength of the army. The 2nd troop was formerly in the Spanish service as the “Duke of York’s Guards,” and was also a cavalier unit. In 1670, on Monk’s death, the original 3rd troop (Monk’s Life Guards, renamed in 1660 the “Lord General’s Troop of Guards”) became the 2nd (the queen’s) troop, and the duke of York’s troop the 3rd. In 1685 the 1st and 2nd troops were styled Life Guards of Horse, and two years later the blue-uniformed “Royal Regiment of Horse,” a New Model regiment that had been disbanded and at once re-raised in 1660, was made a household cavalry corps. Later under the colonelcy of the earl of Oxford it was popularly called “The Oxford Blues.” There were also from time to time other troops (*e.g.* Scots troops 1700-1746) that have now disappeared. In 1746 the 2nd troop was disbanded, but it was revived in 1788, when the two senior corps were given their present title of 1st and 2nd Life Guards. From 1750 to 1819 the Blues bore the name of “Royal Horse Guards Blue,” which in 1819 was changed to “Royal Horse Guards (The Blues).” The general distinction between the uniforms of the red Life Guard and the blue Horse Guard still exists. The 1st and the 2nd regiments of Life Guards wear scarlet tunics with blue collars and cuffs, and the Royal Horse Guards blue tunics with scarlet collars and cuffs. All three wear steel cuirasses on state occasions and on guard duty. The head-dress is a steel helmet with drooping horse-hair plume (white for Life Guards, red for Horse Guards). In full dress white buckskin pantaloons and long knee boots are worn. Amongst the peculiarities of these *corps d’élite* is the survival of the old custom of calling non-commissioned officers “corporal of horse” instead of sergeant, and corporal-major instead of sergeant-major, the wearing by trumpeters and bandsmen in full dress of a black velvet cap, a richly laced coat with a full skirt extending to the wearer’s knees and long white gaiters. There is little distinction between the two Life Guards regiments’ uniforms, the most obvious point being that the cord running through the white leather pouch belt is red for the 1st and blue for the 2nd.

The Foot Guards comprise the Grenadier Guards, the Coldstream Guards, the Scots Guards and the Irish Guards, each (except the last) of three battalions. The Grenadiers, originally the First Foot Guards, represent a royalist infantry regiment which served with the exiled princes in the Spanish army and returned at the Restoration in 1660. The Coldstream Guards are a New Model regiment, and were originally called the Lord General’s (Monk’s) regiment of Foot Guards. Their popular title, which became their official designation in 1670, is derived from the fact that the army with which Monk restored the monarchy crossed the Tweed into England at the village of Coldstream, and that his troops (which were afterwards, except the two units of horse and foot of which Monk himself was colonel, disbanded) were called the Coldstreamers. The two battalions of Scots Foot Guards, which regiment was separately raised and maintained in Scotland after the Restoration, marched to London in 1686 and 1688 and were brought on to the English Establishment in 1707. In George III.’s reign they were known as the Third Guards, and from 1831 to 1877 (when the present title was adopted) as the Scots Fusilier Guards.

The Irish Guards (one battalion) were formed in 1902, after the South African War, as a mark of Queen Victoria’s appreciation of the services rendered by the various Irish regiments of the line.[1] The dress of the Foot Guards is generally similar in all four regiments, scarlet tunic with blue collars, cuffs and shoulder-straps, blue trousers and high, rounded bearskin cap. The regimental distinctions most easily noticed are these. The Grenadiers wear a small white plume in the bearskin, the Coldstreams a similar red one, the Scots none, the Irish a blue-green one. The buttons on the tunic are spaced evenly for the Grenadiers, by twos for the Coldstreams, by threes for the Scots and by fours for the Irish. The band of the modern cap is red for the Grenadiers, white for the Coldstreams, “diced” red and white (chequers) for the Scots and green for the Irish. Former privileges of foot guard regiments, such as higher brevet rank in the army for their regimental officers, are now abolished, but Guards are still subject exclusively to the command of their own officers, and the officers of the Foot Guards, like those of the Household Cavalry, have special duties at court. Neither the cavalry nor the infantry guards serve abroad in peace time as a rule, but in 1907 a battalion of the Guards, which it was at that time proposed to disband, was sent to Egypt. “Guards’ Brigades” served in the Napoleonic Wars, in the Crimea, in Egypt at various times from 1887 to 1898 and in South Africa 1899-1902. The last employment of the Household Cavalry as a brigade in war was at Waterloo, but composite regiments made up from officers and men of the Life Guards and Blues were employed in Egypt and in S. Africa.

> The sovereigns of France had guards in their service in Merovingian times, and their household forces appear from time to time in the history of medieval wars. Louis XI. was, however, the first to regularize their somewhat loose organization, and he did so to such good purpose that Francis I. had no less than 8000 guardsmen organized, subdivided and

permanently under arms. The senior unit of the *Gardes du Corps* was the famous company of Scottish archers (*Compagnie écossaise de la Garde du Corps du Roi*), which was originally formed (1418) from the Scottish contingents that assisted the French in the Hundred Years' War. Scott's *Quentin Durward* gives a picture of life in the corps as it was under Louis XI. In the following century, however, its regimental history becomes somewhat confused. Two French companies were added by Louis XI. and Francis I. and the *Gardes du Corps* came to consist exclusively of cavalry. About 1634 nearly all the Scots then serving went into the "regiment d'Hébron" and thence later into the British regular army (see HEPBURN, SIR JOHN). Thereafter, though the titles, distinctions and privileges of the original Archer Guard were continued, it was recruited from native Frenchmen, preference being (at any rate at first) given to those of Scottish descent. At its disbandment in 1791 along with the rest of the *Gardes du Corps*, it contained few, if any, native Scots. There was also, for a short time (1643-1660), an infantry regiment of *Gardes écossaises*.

In 1671 the title of *Maison Militaire du Roi* was applied to that portion of the household that was distinctively military. It came to consist of 4 companies of the *Gardes du Corps*, 2 companies of *Mousquetaires* (cavalry) (formed 1622 and 1660), 1 company of *Chevaux légers* (1570), 1 of *Gendarmes de la Maison Rouge*, and 1 of *Grenadiers à Cheval* (1676), with 1 company of *Gardes de la Porte* and one called the *Cent-Suisses*, the last two being semi-military. This large establishment, which did not include all the guard regiments, was considerably reduced by the Count of St Germain's reforms in 1775, all except the *Gardes du Corps* and the *Cent-Suisses* being disbanded. The whole of the *Maison du Roi*, with the exception of the semi-military bodies referred to, was cavalry.

The *Gardes françaises*, formed in 1563, did not form part of the *Maison*. They were an infantry regiment, as were the famous *Gardes suisses*, originally a Swiss mercenary regiment in the Wars of Religion, which was, for good conduct at the combat of Arques, incorporated in the permanent establishment by Henry IV. in 1589 and in the guards in 1615. At the Revolution, contrary to expectation, the French Guards sided openly with the Constitutional movement and were disbanded. The Swiss Guards, however, being foreigners, and therefore unaffected by civil troubles, retained their exact discipline and devotion to the court to the day on which they were sacrificed by their master to the bullets of the Marseillais and the pikes of the mob (August 10, 1792). Their tragic fate is commemorated by the well-known monument called the "Lion of Lucerne," the work of Thorvaldsen, erected near Lucerne in 1821. The "Constitutional," "Revolutionary" and other guards that were created after the abolition of the *Maison* and the slaughter of the Swiss are unimportant, but through the "Directory Guards" they form a nominal link between the household troops of the monarchy and the corps which is perhaps the most famous "Guard" in history. The Imperial Guard of Napoleon had its beginnings in an escort squadron called the Corps of Guides, which accompanied him in the Italian campaign of 1796-1797 and in Egypt. On becoming First Consul in 1799 he built up out of this and of the guard of the Directory a small corps of horse and foot, called the Consular Guard, and this, which was more of a fighting unit than a personal bodyguard, took part in the battle of Marengo. The Imperial Guard, into which it was converted on the establishment of the Empire, was at first of about the strength of a division. As such it took part in the Austerlitz and Jena campaigns, but after the conquest of Prussia Napoleon augmented it, and divided it into the "Old Guard" and the "Young Guard." Subsequently the "Middle Guard" was created, and by successive augmentations the corps of the guard had grown to be 57,000 strong in 1811-1812 and 81,000 in 1813. It preserved its general character as a *corps d'élite* of veterans to the last, but from about 1813 the "Young Guard" was recruited directly from the best of the annual conscript contingent. The officers held a higher rank in the army than their regimental rank in the Guards. At the first Restoration an attempt was made to revive the *Maison du Roi*, but in the constitutional régime of the second Restoration this semi-medieval form of bodyguard was given up and replaced by the *Garde Royale*, a selected fighting corps. This took part in the short war with Spain and a portion of it fought in Algeria, but it was disbanded at the July Revolution. Louis Philippe had no real guard troops, but the memories of the Imperial Guard were revived by Napoleon III., who formed a large guard corps in 1853-1854. This, however, was open to an even greater degree than Napoleon I.'s guard to the objection that it took away the best soldiers from the line. Since the fall of the Empire in 1870 there have been no guard troops in France. The duty of watching over the safety of the president is taken in the ordinary roster of duty by the troops stationed in the capital. The "Republican Guard" is the Paris gendarmerie, recruited from old soldiers and armed and trained as a military body.

In *Austria-Hungary* there are only small bodies of household troops (Archer Body Guard, Trabant Guard, Hungarian Crown Guards, &c.) analogous to the British Gentlemen at Arms or Yeomen of the Guard. Similar forces, the "Noble Guard" and the "Swiss Guard," are maintained in the Vatican. The court troops of Spain are called "halberdiers" and armed with the halbert.

In *Russia* the Guard is organized as an army corps. It possesses special privileges, particularly as regards officers' advancement.

In *Germany* the distinction between armed retainers and “Guards” is well marked. The army is for practical purposes a unit under imperial control, while household troops (“castle-guards” as they are usually called) belong individually to the various sovereigns within the empire. The “Guards,” as a combatant force in the army are those of the king of *Prussia* and constitute a strong army corps. This has grown gradually from a bodyguard of archers, and, as in Great Britain, the functions of the heavy cavalry regiments of the Guard preserve to some extent the name and character of a body guard (*Gardes du Corps*). The senior foot guard regiment is also personally connected with the royal family. The conversion of a palace-guard to a combatant force is due chiefly to Frederick William I., to whom drill was a ruling passion, and who substituted effective regiments for the ornamental “Trabant Guards” of his father. A further move was made by Frederick the Great in substituting for Frederick William’s expensive “giant” regiment of guards a larger number of ordinary soldiers, whom he subjected to the same rigorous training and made a *corps d’élite*. Frederick the Great also formed the Body Guard alluded to above. Nevertheless in 1806 the Guard still consisted only of two cavalry regiments and four infantry regiments, and it was the example of Napoleon’s imperial guard which converted this force into a corps of all arms. In 1813 its strength was that of a weak division, but in 1860 by slight but frequent augmentations it had come to consist of an army corps, complete with all auxiliary services. A few guard regiments belonging to the minor sovereigns are counted in the line of the German army. In war the Guard is employed as a unit, like other army corps. It is recruited by the assignment of selected young men of each annual contingent, and is thus free from the reproach of the French Imperial Guard, which took the best-trained soldiers from the regiments of the line.

1 The “Irish Guards” of the Stuarts took the side of James II., fought against William III. in Ireland and lost their regimental identity in the French service to which the officers and soldiers transferred themselves on the abandonment of the struggle.

GUARD-SHIP, a warship stationed at some port or harbour to act as a guard, and in former times in the British navy to receive the men impressed for service. She usually was the flagship of the admiral commanding on the coast. A guard-boat is a boat which goes the round of a fleet at anchor to see that due watch is kept at night.

GUÁRICO, a large inland state of Venezuela created by the territorial redivision of 1904, bounded by Aragua and Miranda on the N., Bermúdez on the E., Bolívar on the S., and Zamora on the W. Pop. (1905 estimate), 78,117. It extends across the northern *llanos* to the Orinoco and Apure rivers and is devoted almost wholly to pastoral pursuits, exporting cattle, horses and mules, hides and skins, cheese and some other products. The capital is Calabozo, and the other principal towns are Camaguán (pop. 3648) on the Portugueza river, Guayabal (pop. 3146), on a small tributary of the Guárico river, and Zaraza (pop. 14,546) on the Unare river, nearly 150 m. S.E. of Carácas.

GUARIENTO, sometimes incorrectly named Guerriero, the first Paduan painter who distinguished himself. The only date distinctly known in his career is 1365, when, having already acquired high renown in his native city, he was invited by the Venetian authorities to paint a Paradise, and some incidents of the war of Spoleto, in the great council-hall of Venice. These works were greatly admired at the time, but have long ago disappeared under repaintings. His works in Padua have suffered much. In the church of the Eremitani are allegories of the Planets, and, in its choir, some small sacred histories in dead colour, such as an Ecce Homo; also, on the upper walls, the life of St Augustine, with some other subjects. A few fragments of other paintings by Guariento are still extant in Padua. In the gallery of Bassano is a Crucifixion, carefully executed, and somewhat superior to a merely traditional method of handling, although on the whole Guariento must rather be classed in that school of

art which preceded Cimabue than as having advanced in his vestiges; likewise two other works in Bassano, ascribed to the same hand. The painter is buried in the church of S. Bernardino, Padua.

GUARINI, CAMILLO-GUARINO (1624-1683), Italian monk, writer and architect, was born at Modena in 1624. He was at once a learned mathematician, professor of literature and philosophy at Messina, and, from the age of seventeen, was architect to Duke Philibert of Savoy. He designed a very large number of public and private buildings at Turin, including the palaces of the duke of Savoy and the prince of Cacignan, and many public buildings at Modena, Verona, Vienna, Prague, Lisbon and Paris. He died at Milan in 1683.

GUARINI, GIOVANNI BATTISTA (1537-1612), Italian poet, author of the *Pastor fido*, was born at Ferrara on the 10th of December 1537, just seven years before the birth of Tasso. He was descended from Guarino da Verona. The young Battista studied both at Pisa and Padua, whence he was called, when not yet twenty, to profess moral philosophy in the schools of his native city. He inherited considerable wealth, and was able early in life to marry Taddea de' Bendedei, a lady of good birth. In 1567 he entered the service of Alphonso II., duke of Ferrara, thus beginning the court career which was destined to prove a constant source of disappointment and annoyance to him. Though he cultivated poetry for pastime, Guarini aimed at state employment as the serious business of his life, and managed to be sent on various embassies and missions by his ducal master. There was, however, at the end of the 16th century no opportunity for a man of energy and intellectual ability to distinguish himself in the petty sphere of Italian diplomacy. The time too had passed when the profession of a courtier, painted in such glowing terms by Castiglione, could confer either profit or honour. It is true that the court of Alphonso presented a brilliant spectacle to Europe, with Tasso for titular poet, and an attractive circle of accomplished ladies. But the last duke of Ferrara was an illiberal patron, feeding his servants with promises, and ever ready to treat them with the brutality that condemned the author of the *Gerusalemme liberata* to a madhouse. Guarini spent his time and money to little purpose, suffered from the spite and ill-will of two successive secretaries,—Pigna and Montecatini,—quarrelled with his old friend Tasso, and at the end of fourteen years of service found himself half-ruined, with a large family and no prospects. When Tasso was condemned to S. Anna, the duke promoted Guarini to the vacant post of court poet. There is an interesting letter extant from the latter to his friend Cornelio Bentivoglio, describing the efforts he made to fill this place appropriately. "I strove to transform myself into another person, and, like a player, reassumed the character, costume and feelings of my youth. Advanced in manhood, I forced myself to look young; I turned my natural melancholy into artificial gaiety, affected loves I did not feel, exchanged wisdom for folly, and, in a word, passed from a philosopher into a poet." How ill-adapted he felt himself to this masquerade life may be gathered from the following sentence: "I am already in my forty-fourth year, the father of eight children, two of whom are old enough to be my censors, while my daughters are of an age to marry." Abandoning so uncongenial a strain upon his faculties, Guarini retired in 1582 to his ancestral farm, the Villa Guarina, in the lovely country that lies between the Adige and Po, where he gave himself up to the cares of his family, the nursing of his dilapidated fortunes and the composition of the *Pastor fido*. He was not happy in his domestic lot; for he had lost his wife young, and quarrelled with his elder sons about the division of his estate. Litigation seems to have been an inveterate vice with Guarini; nor was he ever free from legal troubles. After studying his biography, the conclusion is forced upon our minds that he was originally a man of robust and virile intellect, ambitious of greatness, confident in his own powers, and well qualified for serious affairs, whose energies found no proper scope for their exercise. Literary work offered but a poor sphere for such a character, while the enforced inactivity of court life soured a naturally capricious and choleric temper. Of poetry he spoke with a certain tone of condescension, professing to practise it only in his leisure moments; nor are his miscellaneous verses of a quality to secure for their author a very lasting reputation. It is therefore not a little remarkable that the fruit of his retirement—a disappointed courtier past the prime of early manhood—should have been a dramatic masterpiece worthy to be ranked with the classics of Italian literature. Deferring a further

account of the *Pastor fido* for the present, the remaining incidents of Guarini's restless life may be briefly told. In 1585 he was at Turin superintending the first public performance of his drama, whence Alphonso recalled him to Ferrara, and gave him the office of secretary of state. This reconciliation between the poet and his patron did not last long. Guarini moved to Florence, then to Rome, and back again to Florence, where he established himself as the courtier of Ferdinand de' Medici. A dishonourable marriage, pressed upon his son Guarino by the grand-duke, roused the natural resentment of Guarini, always scrupulous upon the point of honour. He abandoned the Medicean court, and took refuge with Francesco Maria of Urbino, the last scion of the Montefeltro-della-Rovere house. Yet he found no satisfaction at Urbino. "The old court is a dead institution," he writes to a friend; "one may see a shadow of it, but not the substance in Italy of to-day. Ours is an age of appearances, and one goes a-masquerading all the year." This was true enough. Those dwindling deadly-lively little residence towns of Italian ducal families, whose day of glory was over, and who were waiting to be slowly absorbed by the capacious appetite of Austria, were no fit places for a man of energy and independence. Guarini finally took refuge in his native Ferrara, which, since the death of Alphonso, had now devolved to the papal see. Here, and at the Villa Guarina, his last years were passed in study, law-suits, and polemical disputes with his contemporary critics, until 1612, when he died at Venice in his seventy-fifth year.

The *Pastor fido* (first published in 1590) is a pastoral drama composed not without 660
reminiscences of Tasso's *Aminta*. The scene is laid in Arcadia, where Guarini supposes it to have been the custom to sacrifice a maiden yearly to Diana. But an oracle has declared that when two scions of divine lineage are united in marriage, and a faithful shepherd has atoned for the ancient error of a faithless woman, this inhuman rite shall cease. The plot turns upon the unexpected fulfilment of this prophecy, contrary to all the schemes which had been devised for bringing it to accomplishment, and in despite of apparent improbabilities of divers kinds. It is extremely elaborate, and, regarded as a piece of cunning mechanism, leaves nothing to be desired. Each motive has been carefully prepared, each situation amply developed. Yet, considered as a play, the *Pastor fido* disappoints a reader trained in the school of Sophocles or Shakespeare. The action itself seems to take place off the stage, and only the results of action, stationary tableaux representing the movement of the drama, are put before us in the scenes. The art is lyrical, not merely in form but in spirit, and in adaptation to the requirements of music which demands stationary expressions of emotion for development. The characters have been well considered, and are exhibited with great truth and vividness; the cold and eager hunter Silvio contrasting with the tender and romantic Mirtillo, and Corisca's meretricious arts enhancing the pure affection of Amarilli. Dorinda presents another type of love so impulsive that it prevails over a maiden's sense of shame, while the courtier Carino brings the corruption of towns into comparison with the innocence of the country. In Carino the poet painted his own experience, and here his satire upon the court of Ferrara is none the less biting because it is gravely measured. In Corisca he delineated a woman vitiated by the same town life, and a very hideous portrait has he drawn. Though a satirical element was thus introduced into the *Pastor fido* in order to relieve its ideal picture of Arcadia, the whole play is but a study of contemporary feeling in Italian society. There is no true rusticity whatever in the drama. This correspondence with the spirit of the age secured its success during Guarini's lifetime; this made it so dangerously seductive that Cardinal Bellarmine told the poet he had done more harm to Christendom by his blandishments than Luther by his heresy. Without anywhere transgressing the limits of decorum, the *Pastor fido* is steeped in sensuousness; and the immodesty of its pictures is enhanced by rhetorical concealments more provocative than nudity. Moreover, the love described is effeminate and wanton, felt less as passion than as lust enveloped in a veil of sentiment. We divine the coming age of *cicisbei* and *castrati*. Of Guarini's style it would be difficult to speak in terms of too high praise. The thought and experience of a lifetime have been condensed in these five acts, and have found expression in language brilliant, classical, chiselled to perfection. Here and there the taste of the 17th century makes itself felt in frigid conceits and forced antitheses; nor does Guarini abstain from sententious maxims which reveal the moralist rather than the poet. Yet these are but minor blemishes in a masterpiece of diction, glittering and faultless like a polished bas-relief of hard Corinthian bronze. That a single pastoral should occupy so prominent a place in the history of literature seems astonishing, until we reflect that Italy, upon the close of the 16th century, expressed itself in the *Pastor fido*, and that the influence of this drama was felt through all the art of Europe till the epoch of the Revolution. It is not a mere play. The sensual refinement proper to an age of social decadence found in it the most exact embodiment, and made it the code of gallantry for the next two centuries.

The best edition of the *Pastor fido* is the 20th, published at Venice (Ciotti) in 1602. The most convenient is that of Barbéra (Florence, 1866). For Guarini's miscellaneous *Rime*, the Ferrara edition, in 4 vols., 1737, may be consulted. His polemical writings, *Verato primo* and *secondo*, and his prose comedy called *Idropica*, were published at Venice, Florence and Rome, between

1588 and 1614.

(J. A. S.)

GUARINO, also known as Varinus, and surnamed from his birthplace Favorinus, Phavorinus or Camers (*c.* 1450-1537), Italian lexicographer and scholar, was born at Favera near Camerino, studied Greek and Latin at Florence under Politian, and afterwards became for a time the pupil of Lascaris. Having entered the Benedictine order, he now gave himself with great zeal to Greek lexicography; and in 1496 published his *Thesaurus cornucopiae et horti Adonidis*, a collection of thirty-four grammatical tracts in Greek. He for some time acted as tutor to Giovanni dei Medici (afterwards Leo X.), and also held the appointment of keeper of the Medicean library at Florence. In 1514 Leo appointed him bishop of Nocera. In 1517 he published a translation of the *Apophthegmata* of Joannes Stobaeus, and in 1523 appeared his *Etymologicum magnum, sive thesaurus universae linguae Graecae ex multis variisque autoribus collectus*, a compilation which has been frequently reprinted, and which has laid subsequent scholars under great though not always acknowledged obligations.

GUARINO [GUARINUS] DA VERONA (1370-1460), one of the Italian restorers of classical learning, was born in 1370 at Verona, and studied Greek at Constantinople, where for five years he was the pupil of Manuel Chrysoloras. When he set out on his return to Italy he was the happy possessor of two cases of precious Greek MSS. which he had been at great pains to collect; it is said that the loss of one of these by shipwreck caused him such distress that his hair turned grey in a single night. He supported himself as a teacher of Greek, first at Verona and afterwards in Venice and Florence; in 1436 he became, through the patronage of Lionel, marquis of Este, professor of Greek at Ferrara; and in 1438 and following years he acted as interpreter for the Greeks at the councils of Ferrara and Florence. He died at Ferrara on the 14th of December 1460.

His principal works are translations of Strabo and of some of the *Lives* of Plutarch, a compendium of the Greek grammar of Chrysoloras, and a series of commentaries on Persius, Juvenal, Martial and on some of the writings of Aristotle and Cicero. See Rosmini, *Vita e disciplina di Guarino* (1805-1806); Sabbadini, *Guarino Veronese* (1885); Sandys, *Hist. Class. Schol.* ii. (1908).

GUARNIERI, or Guarnerius, a celebrated family of violin-makers of Cremona. The first was Andreas (*c.* 1626-1698), who worked with Antonio Stradivari in the workshop of Nicolo Amati (son of Geronimo). Violins of a model original to him are dated from the sign of “St Theresa” in Cremona. His son Joseph (1666-*c.* 1739) made instruments at first like his father’s, but later in a style of his own with a narrow waist; his son, Peter of Venice (b. 1695), was also a fine maker. Another son of Andreas, Peter (Pietro Giovanni), commonly known as “Peter of Cremona” (b. 1655), moved from Cremona and settled at Mantua, where he too worked “sub signo Sanctae Teresae.” Peter’s violins again showed considerable variations from those of the other Guarnieri. Hart, in his work on the violin, says, “There is increased breadth between the sound-holes; the sound-hole is rounder and more perpendicular; the middle bouts are more contracted, and the model is more raised.”

The greatest of all the Guarnieri, however, was a nephew of Andreas, Joseph del Gesù (1687-1745), whose title originates in the I.H.S. inscribed on his tickets. His master was Gaspar di Salo. His conception follows that of the early Brescian makers in the boldness of outline and the massive construction which aim at the production of tone rather than visual perfection of form. The great variety of his work in size, model, &c., represents his various experiments in the direction of discovering this tone. A stain or sap-mark, parallel with the finger-board on both sides, appears on the bellies of most of his instruments. Since the middle of the 18th

century a great many spurious instruments ascribed to this master have poured over Europe. It was not until Paganini played on a “Joseph” that the taste of amateurs turned from the sweetness of the Amati and the Stradivarius violins in favour of the robuster tone of the Joseph Guarnerius. See Violin.

GUASTALLA, a town and episcopal see of Emilia, Italy, in the province of Reggio, from which it is 18 m. N. by road, on the S. bank of the Po, 79 ft. above sea-level. It is also connected by rail with Parma and Mantua (via Suzzara). Pop. (1901), 2658 (town); 11,091 (commune). It has 16th-century fortifications. The cathedral, dating from the 10th century, has been frequently restored. Guastalla was founded by the Lombards in the 7th century; in the church of the Pieve Pope Paschal II. held a council in 1106. In 1307 it was seized by Giberto da Correggio of Parma. In 1403 it passed to Guido Torello, cousin of Filippo Maria Visconti of Milan. In 1539 it was sold by the last female descendant of the Torelli to Ferrante Gonzaga. In 1621 it was made the seat of a duchy, but in 1748 it was added to those of Parma and Piacenza, whose history it subsequently followed.

GUATEMALA (sometimes incorrectly written Guatimala), a name now restricted to the republic of Guatemala and to its chief city, but formerly given to a captaincy-general of Spanish America, which included the fifteen provinces of Chiapas, Suchitepeques, Escuintla, Sonsonate, San Salvador, Vera Paz and Peten, Chiquimula, Honduras, Nicaragua, Costa Rica, Totonicapam, Quezaltenango, Sololá, Chimaltenango and Sacatepeques,—or, in other words, the whole of Central America (except Panama) and part of Mexico. The name is probably of Aztec origin, and is said by some authorities to mean in its native form Quauhtematlan, “Land of the Eagle,” or “Land of Forest”; others, writing it U-ha-tez-ma-la, connect it with the volcano of Agua (*i.e.* “water”), and interpret it as “mountain vomiting water.”

The republic of Guatemala is situated between 13° 42′ and 17° 49′ N., and 88° 10′ and 92° 30′ W. (For map, see Central America.) Pop. (1903), 1,842,134; area about 48,250 sq. m. Guatemala is bounded on the W. and N. by Mexico, N.E. by British Honduras, E. by the Gulf of Honduras, and the republic of Honduras, S.E. by Salvador and S. by the Pacific Ocean. The frontier towards Mexico was determined by conventions of the 27th of September 1882, the 17th of October 1883, the 1st of April 1895, and the 8th of May 1899. Starting from the Pacific, it ascends the river Suchiate, then follows an irregular line towards the north-east, till it reaches the parallel of 17° 49′ N., along which it runs to the frontier of British Honduras. This frontier, by the convention of the 9th of July 1893, coincides with the meridian of 89° 20′ W., till it meets the river Sarstoon or Sarstun, which it follows eastwards to the Gulf of Honduras.

Physical Description.—Guatemala is naturally divided into five regions—the lowlands of the Pacific coast, the volcanic mountains of the Sierra Madre, the so-called plateaus immediately north of these, the mountains of the Atlantic versant and the plain of Peten. (1) The coastal plains extend along the entire southern seaboard, with a mean breadth of 50 m., and link together the belts of similar territory in Salvador and the district of Soconusco in Chiapas. Owing to their tropical heat, low elevation above sea-level, and marshy soil, they are thinly peopled, and contain few important towns except the seaports. (2) The precipitous barrier of the Sierra Madre, which closes in the coastal plains on the north, is similarly prolonged into Salvador and Mexico. It is known near Guatemala city as the Sierra de las Nubes, and enters Mexico as the Sierra de Istatan. It forms the main watershed between the Pacific and Atlantic river systems. Its summit is not a well-defined crest, but is often rounded or flattened into a table-land. The direction of the great volcanic cones, which rise in an irregular line above it, is not identical with the main axis of the Sierra itself, except near the Mexican frontier, but has a more southerly trend, especially towards Salvador; here the base of many of the igneous peaks rests among the southern foothills of the range. It is, however, impossible to subdivide the Sierra Madre into a northern and a volcanic chain; for the volcanoes are isolated by stretches of comparatively low country; at least thirteen considerable streams flow down between them, from the main watershed to the sea. Viewed from the coast, the volcanic cones seem to rise directly from the central heights of the Sierra Madre, above which they tower; but in reality

their bases are, as a rule, farther south. East of Tacana, which marks the Mexican frontier, and is variously estimated at 13,976 ft. and 13,090 ft., and if the higher estimate be correct is the loftiest peak in Central America, the principal volcanoes are—Tajamulco or Tajumulco (13,517 ft.); Santa Maria (12,467 ft.), which was in eruption during 1902, after centuries of quiescence, in which its slopes had been overgrown by dense forests; Atitlán (11,719), overlooking the lake of that name; Acatenango (13,615). which shares the claim of Tacana to be the highest mountain of Central America; Fuego (*i.e.* "fire," variously estimated at 12,795 ft. and 12,582 ft.), which received its name from its activity at the time of the Spanish conquest; Agua (*i.e.* "water," 12,139 ft.), so named in 1541 because it destroyed the former capital of Guatemala with a deluge of water from its flooded crater; and Pacaya (8390), a group of igneous peaks which were in eruption in 1870. (3) The so-called plateaus which extend north of the Sierra Madre are in fact high valleys, rather than table-lands, enclosed by mountains. A better idea of this region is conveyed by the native name Altos, or highlands, although that term includes the northern declivity of the Sierra Madre. The mean elevation is greatest in the west (Altos of Quezaltenango) and least in the east (Altos of Guatemala). A few of the streams of the Pacific slope actually rise in the Altos, and force a way through the Sierra Madre at the bottom of deep ravines. One large river, the Chixoy, escapes northwards towards the Atlantic. (4) The relief of the mountainous country which lies north of the Altos and drains into the Atlantic is varied by innumerable terraces, ridges and underfalls; but its general configuration is admirably compared by E. Reclus with the appearance of "a stormy sea breaking into parallel billows" (*Universal Geography*, ed. E. G. Ravenstein, div. xxxiii., p. 212). The parallel ranges extend east and west with a slight southerly curve towards their centres. A range called the Sierra de Chama, which, however, changes its name frequently from place to place, strikes eastward towards British Honduras, and is connected by low hills with the Cockscomb Mountains; another similar range, the Sierra de Santa Cruz, continues east to Cape Cocoli between the Polochic and the Sarstoon; and a third, the Sierra de las Minas or, in its eastern portion, Sierra del Mico, stretches between the Polochic and the Motagua. Between Honduras and Guatemala the frontier is formed by the Sierra de Merendon. (5) The great plain of Peten, which comprises about one-third of the whole area of Guatemala, belongs geographically to the Yucatan Peninsula, and consists of level or undulating country, covered with grass or forest. Its population numbers less than two per sq. m., although many districts have a wonderfully fertile soil and abundance of water. The greater part of this region is uncultivated, and only utilized as pasture by the Indians, who form the majority of its inhabitants.

Guatemala is richly watered. On the western side of the sierras the versant is short, and the streams, while very numerous, are consequently small and rapid; but on the eastern side a number of the rivers attain a very considerable development. The Motagua, whose principal head stream is called the Rio Grande, has a course of about 250 m., and is navigable to within 90 m. of the capital, which is situated on one of its confluents, the Rio de las Vacas. It forms a delta on the south of the Gulf of Honduras. Of similar importance is the Polochic, which is about 180 m. in length, and navigable about 20 m. above the river-port of Telemán. Before reaching the Golfo Amatique it passes through the Golfo Dulce, or Izabal Lake, and the Golfete Dulce. A vast number of streams, among which are the Chixoy, the Guadalupe, and the Rio de la Pasion, unite to form the Usumacinta, whose noble current passes along the Mexican frontier, and flowing on through Chiapas and Tabasco, falls into the Bay of Campeche. The Chiapas follows a similar course.

There are several extensive lakes in Guatemala. The Lake of Peten or Laguna de Flores, in the centre of the department of Peten, is an irregular basin about 27 m. long, with an extreme breadth of 13 m. In an island in the western portion stands Flores, a town well known to American antiquaries for the number of ancient idols which have been recovered from its soil. On the shore of the lake is the stalactite cave of Jobitsinal, of great local celebrity; and in its depths, according to the popular legend, may still be discerned the stone image of a horse that belonged to Cortes. The Golfo Dulce is, as its name implies, a fresh-water lake, although so near the Atlantic. It is about 36 m. long, and would be of considerable value as a harbour if the bar at the mouth of the Rio Dulce did not prevent the upward passage of seafaring vessels. As a contrast the Lake of Atitlán (*q.v.*) is a land-locked basin encompassed with lofty mountains. About 9 m. S. of the capital lies the Lake of Amatitlán (*q.v.*) with the town of the same name. On the borders of Salvador and Guatemala there is the Lake of Guija, about 20 m. long and 12 broad, at a height of 2100 ft. above the sea. It is connected by the river Ostuma with the Lake of Ayarza which lies about 1000 ft. higher at the foot of the Sierra Madre.

The geology, fauna and flora of Guatemala are discussed under Central America. The bird-life of the country is remarkably rich; one bird of magnificent plumage, the quetzal, quijal or quesal (*Trogon resplendens*), has been chosen as the national emblem.

Climate.—The climate is healthy, except on the coasts, where malarial fever is prevalent. The rainy season in the interior lasts from May to October, but on the coast sometimes continues till December. The coldest month is January, and the warmest is May. The average temperatures for these months at places of different altitudes, as given by Dr Karl Sapper, are shown on the following page.

The average rainfall is very heavy, especially on the Atlantic slope, where the prevailing winds are charged with moisture from the Gulf of Mexico or the Caribbean Sea; at Tual, a high station on the Atlantic slope, it reaches 195 in.; in central Guatemala it is only 27 in. Towards the Atlantic rain often occurs in the dry season, and there is a local saying near the Golfo Dulce that "it rains thirteen months in the year." Fogs are not rare. In Guatemala, as in other parts of Central America (*q.v.*), each of the three climatic zones, cold, temperate and hot (*tierra fria*, *tierra templada*, *tierra caliente*) has its special characteristics, and it is not easy to generalize about the climate of the country as a whole.

Locality.	Altitude (Feet).	Fahrenheit Degrees.	
		January.	May.
Puerto Barrios	6	74	81
Salamá	3020	68	77
Campur	3050	64	73
Chimax	4280	61	68
Guatemala	4870	60	67
Quezaltenango	7710	50	62

Natural Products.—The minerals discovered in Guatemala include gold, silver, lead, tin, copper, mercury, antimony, coal, salt and sulphur; but it is uncertain if many of these exist in quantities sufficient to repay exploitation. Gold is obtained at Las Quebradas near Izabal, silver in the departments of Santa Rosa and Chiquimula, salt in those of Santa Rosa and Alta Vera Paz. During the 17th century gold-washing was carried on by English miners in the Motagua valley, and is said to have yielded rich profits; hence the name of "Gold Coast" was not infrequently given to the Atlantic littoral near the mouth of the Motagua.

The area of forest has only been seriously diminished in the west, and amounted to 2030 sq. m. in 1904. Besides rubber, it yields many valuable dye-woods and cabinet-woods, such as cedar, mahogany and logwood. Fruits, grain and medicinal plants are obtained in great abundance, especially where the soil is largely of volcanic origin, as in the Altos and Sierra Madre. Parts of the Peten district are equally fertile, maize in this region yielding two hundredfold from unmanured soil. The vegetable products of Guatemala include coffee, cocoa, sugar-cane, bananas, oranges, vanilla, aloes, agave, ipecacuanha, castor-oil, sarsaparilla, cinchona, tobacco, indigo and the wax-plant (*Myrica cerifera*).

Inhabitants.—The inhabitants of Guatemala, who tend to increase rapidly owing to the high birth-rate, low mortality, and low rate of emigration, numbered in 1903 1,842,134, or more than one-third of the entire population of Central America. Fully 60% are pure Indians, and the remainder, classed as *Ladinos* or "Latins" (*i.e.* Spaniards in speech and mode of life), comprise a large majority of half-castes (*mestizos*) and civilized Indians and a smaller proportion of whites. It includes a foreign population of about 12,000 Europeans and North Americans, among them being many Jews from the west of the United States. There are important German agricultural settlements, and many colonists from north Italy who are locally called *Tiroleses*, and despised by the Indians for their industry and thrift. About half the births among the Indians and one-third among the whites are illegitimate.

No part of Central America contains a greater diversity of tribes, and in 1883 Otto Stoll estimated the number of spoken languages as eighteen, although east of the meridian of Lake Amatitlán the native speech has almost entirely disappeared and been replaced by Spanish. The Indians belong chiefly to the Maya stock, which predominates throughout Peten, or to the allied Quiché race which is well represented in the Altos and central districts. The Itzas, Mopans, Lacandons, Chols, Pokonchi and the Pokomans who inhabit the large settlement of Mixco near the capital, all belong to the Maya family; but parts of central and eastern Guatemala are peopled by tribes distinct from the Mayas and not found in Mexico. In the 16th century the Mayas and Quichés had attained a high level of civilization (see Central America, *Archaeology*), and at least two of the Guatemalan languages, Quiché and Cakchiquel, possess the rudiments or the relics of a literature. The Quiché *Popol Vuh*, or "Book of History," which was translated into Spanish by the Dominican friar Ximenes, and edited with a French version by Brasseur de Bourbourg, is an important document for students of the local myths. In appearance the various Guatemalan tribes differ very little; in almost all the characteristic type of Indian is short but muscular, with low forehead, prominent cheek-bones and straight black hair. In character the Indians are, as a rule, peaceable, though conscious of their numerical superiority and at times driven to join in the revolutions which so often disturb the course of local politics; they are often intensely religious, but with a few exceptions are thriftless, indolent and inveterate gamblers. Their *confradias*, or brotherhoods, each with its patron saint and male and female chiefs, exist largely to organize public festivals, and to purchase wooden masks, costumes and decorations for the dances and dramas in which the Indians delight. These dramas, which deal with religious and historical subjects, are of Indian

origin, and somewhat resemble the mystery-plays of medieval Europe, a resemblance heightened by the introduction, due to Spanish missionaries, of Christian saints and heroes such as Charlemagne. The Indians are devoted to bull-fighting and cock-fighting. Choral singing is a popular amusement, and is accompanied by the Spanish guitar and native wind-instruments. The Indians have a habit of consuming a yellowish edible earth containing sulphur; on pilgrimages they obtain images moulded of this earth at the shrines they visit, and eat the images as a prophylactic against disease. Maize, beans and bananas, varied occasionally with dried meat and fresh pork, form their staple diet; drunkenness is common on pay-days and festivals, when large quantities of a fiery brandy called *chicha* are consumed.

Chief Towns.—The capital of the republic, Guatemala or Guatemala la Nueva (pop. 1905 about 97,000) and the cities of Quezaltenango (31,000), Totonicapam (28,000), Coban (25,000), Sololá (17,000), Escuintla (12,000), Huehuetanango (12,000), Amatitlán (10,000) and Atitlán (9000) are described under separate headings. All the chief towns except the seaports are situated within the mountainous region where the climate is temperate. Retalhuleu, among the southern foothills of the Sierra Madre, is one of the centres of coffee production, and is connected by rail with the Pacific port of Champerico, a very unhealthy place in the wet season. Both Retalhuleu and Champerico were, like Quezaltenango, Sololá, and other towns, temporarily ruined by the earthquake of the 18th of April 1902. Santa Cruz Quiché, 25 m. N.E. of Totonicapam, was formerly the capital of the Quiché kings, but has now a Ladino population. Livingston, a seaport at the mouth of the Polochic (here called the Rio Dulce), was founded in 1806, and subsequently named after the author of a code of Guatemalan laws; few vestiges remain of the Spanish settlement of Sevilla la Nueva, founded in 1844, and of the English colony of Abbotsville, founded in 1825,—both near Livingston. La Libertad, also called by its Indian name of Sacluc, is the principal town of Peten.

Shipping and Communications.—The republic is in regular steam communication on the Atlantic side with New Orleans, New York and Hamburg, by vessels which visit the ports of Barrios (Santo Tomas) and Livingston. On the southern side the ports of San José, Champerico and Ocós are visited by the Pacific mail steamers, by the vessels of a Hamburg company and by those of the South American (Chilean) and the Pacific Steam Navigation Companies. Iztapa, formerly the principal harbour on the south coast, has been almost entirely abandoned since 1853. Gualan, on the Motagua, and Panzos, on the Polochic, are small river-ports. The principal towns are connected by wagon roads, towards the construction and maintenance of which each male inhabitant is required to pay two pesos or give four days' work a year. There are coach routes between the capital and Quezaltenango, but over a great portion of the country transport is still on mule-back. All the railway lines have been built since 1875. The main lines are the Southern, belonging to an American company and running from San José to the capital; the Northern, a government line from the capital to Puerto Barrios, which completes the interoceanic railroad; and the Western, from Champerico to Quezaltenango, belonging to a Guatemalan company, but largely under German management. For local traffic there are several lines; one from Iztapa, near San José, to Naranjo, and another from Ocós to the western coffee plantations. On the Atlantic slope transport is effected mainly by river tow-boats from Livingston along the Golfo Dulce and other lakes, and the Polochic river as far as Panzos. The narrow-gauge railway that serves the German plantations in the Vera Paz region is largely owned by Germans.

Guatemala joined the Postal Union in 1881; but its postal and telegraphic services have suffered greatly from financial difficulties. The telephonic systems of Guatemala la Nueva, Quezaltenango and other cities are owned by private companies.

Commerce and Industry.—The natural resources of Guatemala are rich but undeveloped; and the capital necessary for their development is not easily obtained in a country where war, revolution and economic crises recur at frequent intervals, where the premium on gold has varied by no less than 500% in a single year, and where many of the wealthiest cities and agricultural districts have been destroyed by earthquake in one day (18th of April 1902). At the beginning of the 19th century, Guatemala had practically no export trade; but between 1825 and 1850 cochineal was largely exported, the centre of production being the Amatitlán district. This industry was ruined by the competition of chemical dyes, and a substitute was found in the cultivation of coffee. Guatemala is surpassed only by Brazil and the East Indies in the quantity of coffee it exports. The chief plantations are owned and managed by Germans; more than half of the crop is sent to Germany, while three-fifths of the remainder go to the United States and one-fifth to Great Britain. The average yearly product is about 70,000,000 ℔, worth approximately £1,300,000, and subject to an export duty of one gold dollar (4s.) per quintal (101 ℔). Sugar, bananas, tobacco and cocoa are also cultivated; but much of the sugar and bananas, most of the cocoa, and all the tobacco are consumed in the country. During the colonial period, the cocoa of western Guatemala and Soconusco was reserved on account of its fine flavour for the Spanish court. The indigo and cotton plantations yield little profit, owing to foreign competition, and have in most cases been converted to other uses. The cultivation of bananas tends to increase, though more slowly than in other Central American countries.

Grain, sweet potatoes and beans are grown for home consumption. Cattle-farming is carried on in the high pasture-lands and the plains of Peten; but the whole number of sheep (77,000 in 1900) and pigs (30,000) in the republic is inferior to the number kept in many single English counties. Much of the wool is sold, like the native cotton, to Indian and Ladino women, who manufacture coarse cloth and linen in their homes.

By the Land Act of 1894 the state domains, except on the coasts and frontiers, were divided into lots for sale. The largest holding tenable by one person under this act was fixed at 50 caballerias, or 5625 acres; the price varies from £40 to £80 per caballeria of 112½ acres. Free grants of uncultivated land are sometimes made to immigrants (including foreign companies), to persons who undertake to build roads or railways through their allotments, to towns, villages and schools. The condition of the Indians on the plantations is often akin to slavery, owing to the system adopted by some planters of making payments in advance; for the Indians soon spend their earnings, and thus contract debts which can only be repaid by long service.

In addition to the breweries, rum and brandy distilleries, sugar mills and tobacco factories, which are sometimes worked as adjuncts to the plantations, there are many purely urban industries, such as the manufacture of woollen and cotton goods on a large scale, and manufactures of building material and furniture; but these industries are far less important than agriculture.

During the five years 1900 to 1904 inclusive, the average value of Guatemalan imports, which consisted chiefly of textiles, iron and machinery, sacks, provisions, flour, beer, wine and spirits, amounted to £776,000; about one-half came from the United States, and nearly one-fourth from the United Kingdom. The exports during the same period had an average value of £1,528,000, and ranked as follows in order of value: coffee (£1,300,000), timber, hides, rubber, sugar, bananas, cocoa.

Finance.—Within the republic there are six banks of issue, to which the government is deeply indebted. There is practically neither gold nor silver in circulation, and the value of the bank-notes is so fluctuating that trade is seriously hampered. On the 25th of June 1903, the issue of bank-notes without a guarantee was restricted; and thenceforward all banks were compelled to retain gold or silver to the value of 10% of the notes issued in 1904, 20% in 1905 and 30% in 1906. This reform has not, to any appreciable extent, rendered more stable the value of the notes issued. The silver peso, or dollar, of 100 centavas is the monetary unit, weighs 25 grammes .900 fine, and has a nominal value of 4s. Being no longer current it has been replaced by the paper peso. The nickel coins include the real (nominal value 6d.), half-real and quarter-real. The metric system of weights and measures has been adopted, but the old Spanish standards remain in general use.

Of the revenue, about 64% is derived from customs and excise; 9% from property, road, military, slaughter and salt taxes; 1.7% from the gunpowder monopoly; and the remainder from various taxes, stamps, government lands, and postal and telegraph services. The estimated revenue for 1905-1906 was 23,000,000 pesos (about £328,500); the estimated expenditure was 27,317,659 pesos (£390,200), of which £242,800 were allotted to the public debt, £42,000 to internal development and justice, £29,000 to the army and the remainder largely to education. The gold value of the currency peso (75 = £1 in 1903, 70 = £1 in 1904, 58 = £1 in 1905) fluctuates between limits so wide that conversion into sterling (especially for a series of years), with any pretension to accuracy, is impracticable. In 1899 the rate of exchange moved between 710% and 206% premium on gold. According to the official statement, the gold debt, which runs chiefly at 4% and is held in Germany and England, amounted to £1,987,905 on the 1st of January 1905; the currency debt (note issues, internal loans, &c.) amounted to £704,730; total £2,692,635, a decrease since 1900 of about £300,000.

Government.—According to the constitution of December 1879 (modified in 1885, 1887, 1889 and 1903) the legislative power is vested in a national assembly of 69 deputies (1 for every 20,000 inhabitants) chosen for 4 years by direct popular vote, under universal manhood suffrage. The president of the republic is elected in a similar manner, but for 6 years, and he is theoretically not eligible for the following term. He is assisted by 6 ministers, heads of government departments, and by a council of state of 13 members, partly appointed by himself and partly by the national assembly.

Local Government.—Each of the twenty-two departments is administered by an official called a *jefe politico*, or political chief, appointed by the president, and each is subdivided into municipal districts. These districts are administered by one or more *alcaldes* or mayors, assisted by municipal councils, both alcaldes and councils being chosen by the people.

Justice.—The judicial power is vested in a supreme court, consisting of a chief justice and four associate justices elected by the people; six appeal courts, each with three judges, also elected by the people; and twenty-six courts of first instance, each consisting of one judge appointed by the president and two by the chief justice of the supreme court.

Religion and Instruction.—The prevailing form of religion is the Roman Catholic, but the state recognizes no distinction of creed. The establishment of conventual or monastic institutions is prohibited. Of the population in 1893, 90% could neither read nor write, 2% could only read, and 8% could read and write. Primary instruction is nominally compulsory, and, in government schools, is provided at the cost of the state. In 1903 there were 1064 government primary schools. There are besides about 128 private (occasionally aided) schools of similar character, owners of plantations on which there are more than ten children being obliged to provide school accommodation. Higher instruction is given in two national institutes at the capital, one for men with 500 pupils and one for women with 300. At Quezaltenango there are two similar institutes, and at Chiquimula there are other two. To each of the six there is a school for teachers attached, and within the republic there are four other schools for teachers. For professional instruction (law, medicine, engineering) there are schools supported by private funds, but aided occasionally by the government. Other educational establishments are a school of art, a national conservatory of music, a commercial college, four trades' schools with more than 600 pupils and a national library. There is a German school, endowed by the German government.

Defence.—For the white and mixed population military service is compulsory; from the eighteenth to the thirtieth year of age in the active army, and from the thirtieth to the fiftieth in the reserve. The effective force of the active army is 56,900, of the reserve 29,400. About 7000 officers and men are kept in regular service. Military training is given in all public and most private schools.

History.—Guatemala was conquered by the Spaniards under Pedro de Alvarado between 1522 and 1524. Up to the years 1837-1839 its history differs only in minor details from that of the neighbouring states of Central America (*q.v.*). The colonial period was marked by the destruction of the ancient Indian civilization, the extermination of many entire tribes, and the enslavement of the survivors, who were exploited to the utmost for the benefit of Spanish officials and adventurers. But although the administration was weak, corrupt and cruel, it succeeded in establishing the Roman Catholic religion, and in introducing the Spanish language among the Indians and Ladinos, who thus obtained a tincture of civilization and ultimately a desire for more liberal institutions. The Central American provinces revolted in 1821, were annexed to the Mexican empire of Iturbide from 1822 to 1823, and united to form a federal republic from 1823 to 1839. In Guatemala the Clerical, Conservative or anti-Federal party was supreme; after a protracted struggle it overthrew the Liberals or Federalists, and declared the country an independent republic, with Rafael Carrera (1814-1865) as president. In 1845 an attempt to restore the federal union failed; in 1851 Carrera defeated the Federalist forces of Honduras and Salvador at La Arada near Chiquimula, and was recognized as the pacificator of the republic. In 1851 a new constitution was promulgated, and Carrera was appointed president till 1856, a dignity which was in 1854 bestowed upon him for life. His rivalry with Gerardo Barrios (d. 1865), president of Salvador, resulted in open war in 1863. At Coatepeque the Guatemalans suffered a severe defeat, which was followed by a truce. Honduras now joined with Salvador, and Nicaragua and Costa Rica with Guatemala. The contest was finally settled in favour of Carrera, who besieged and occupied San Salvador and made himself dominant also in Honduras and Nicaragua. During the rest of his rule, which lasted till his death in April 1865, he continued to act in concert with the Clerical party, and endeavoured to maintain friendly relations with the European governments. Carrera's successor was General Cerna, who had been recommended by him for election. The Liberal party began to rise in influence about 1870, and in May 1871 Cerna was deposed. The archbishop of Guatemala and the Jesuits were driven into exile as intriguers in the interests of the Clericals. Pres. Rufino Barrios (1835-1885), elected in 1873, governed the country after the manner of a dictator; he expelled the Jesuits, confiscated their property and disestablished and disendowed the church. But though he encouraged education, promoted railway and other enterprises, and succeeded in settling difficulties as to the Mexican boundary, the general result of his policy was baneful. Conspiracies against him were rife, and in 1884 he narrowly escaped assassination. His ambition was to be the restorer of the federal union of the Central American states, and when his efforts towards this end by peaceful means failed he had recourse to the sword. Counting on the support of Honduras and Salvador, he proclaimed himself, in February 1885, the supreme military chief of Central America, and claimed the command of all the forces within the five states. President Zaldívar, of Salvador, had been his friend, but after the issue of the decree of union he entered into a defensive alliance with Costa Rica and Nicaragua. In March Barrios invaded Salvador, and on the 2nd of April a battle was fought, in which the Guatemalan president was killed. He was succeeded by General Manuel Barillas. No further effort was made to force on the union, and on the 16th of April the war was formally ended. Peace, however, only provided opportunity for domestic conspiracy, with assassination and revolution in view. In 1892 General José Maria Reina Barrios was elected president, and in 1897 he was re-elected; but on the 8th of February 1898 he was

assassinated. Señor Morales, vice-president, succeeded him; but in the same year Don Manuel Estrada Cabrera (b. 1857) was elected president for the term ending 1905. Cabrera promoted education, commerce and the improvement of communications, but his re-election for the term 1905-1911 caused widespread discontent. He was charged with aiming at a dictatorship, with permitting or even encouraging the imprisonment, torture and execution without trial of political opponents, with maladministration of the finances and with aggression against the neighbouring states. A well-armed force, which included a body of adventurers from San Francisco (U.S.A.) was organized by General Barillas, the ex-president, and invaded Guatemala in March 1906 from Mexico, British Honduras and Salvador. Barillas (1845-1907) proclaimed his intention of establishing a silver currency, and gained, to a great extent, the sympathy of the German and British residents; he had been the sole Guatemalan president who had not sought to prolong his own tenure of office. Ocós was captured by his lieutenant, General Castillo, and the revolution speedily became a war, in which Honduras, Costa Rica and Salvador were openly involved against Guatemala, while Nicaragua was hostile. But Cabrera held his ground, and even gained several indecisive victories. The intervention of President Roosevelt and of President Diaz of Mexico brought about an armistice on the 19th of July, and the so-called "Marblehead Pact" was signed on the following day on board the United States cruiser "Marblehead." Its terms were embodied in a treaty signed (28th of September) by representatives of the four belligerent states, Nicaragua taking no part in the negotiations. The treaty included regulations for the improvement of commerce and navigation in the area affected by the war, and provided for the settlement of subsequent disputes by the arbitration of the United States and Mexico.

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GUATEMALA, or GUATEMALA LA NUEVA (*i.e.* "New Guatemala," sometimes written Nueva Guatemala, and formerly Santiago de los Caballeros de Guatemala), the capital of the republic of Guatemala, and until 1821 of the Spanish captaincy-general of Guatemala, which comprised Chiapas in Mexico and all Central America except Panama. Pop. (1905) about 97,000. Guatemala is built more than 5000 ft. above sea-level, in a wide table-land traversed by the Rio de las Vacas, or Cow River, so called from the cattle introduced here by Spanish colonists in the 16th century. Deep ravines mark the edge of the table-land, and beyond it lofty mountains rise on every side, the highest peaks being on the south, where the volcanic summits of the Sierra Madre exceed 12,000 ft. Guatemala has a station on the transcontinental railway from Puerto Barrios on the Atlantic (190 m. N.E.) to San José on the Pacific (75 m. S. by W.). It is thrice the size of any other city in the republic, and has a corresponding commercial superiority. Its archbishop is the primate of Central America (excluding Panama). Like most Spanish-American towns Guatemala is laid out in wide and regular streets, often planted with avenues of trees, and it has extensive suburbs. The houses, though usually of only one storey, are solidly and comfortably constructed; many of them are surrounded by large gardens and courts. Among the open spaces the chief are the Plaza Mayor, which contains the cathedral, erected in 1730, the archiepiscopal palace, the government buildings, the mint and other public offices; and the more modern Reforma Park and Plaza de la Concordia, now the favourite resorts of the inhabitants. There are many large schools for both sexes, besides

hospitals and an orphanage. Many of the principal buildings, such as the military academy, were originally convents. The theatre, founded in 1858, is one of the best in Central America. A museum, founded in 1831, is maintained by the Sociedad Economica, which in various ways has done great service to the city and the country. There are two fortresses, the Castello Matamoros, built by Rafael Carrera (see GUATEMALA [republic] under *History*), and the Castello de San José. Water is brought from a distance of about 8 m. by two old aqueducts from the towns of Mixco and Pinula; fuel and provisions are largely supplied by the Pokoman Indians of Mixco. The general prosperity, and to some extent the appearance, of Guatemala have procured it the name of the Paris of Central America. It is lighted by electricity and has a good telephone service. Its trade is chiefly in coffee, but it also possesses cigar factories, wool and cotton factories, breweries, tanneries and other industrial establishments. The foreign trade is chiefly controlled by Germans.

The first city named Guatemala, now called Ciudad Vieja or "Old City," was founded in 1527 by Pedro de Alvarado, the conqueror of the country, on the banks of the Rio Pensativo, and at the foot of the volcano of Agua (*i.e.* "Water"). In 1541 it was overwhelmed by a deluge of water from the flooded crater of Agua; and in 1542 Alvarado founded Santiago de los Caballeros la Nueva, now Antigua. This city flourished greatly, and by the middle of the 18th century had become the most populous place in Central America, with 60,000 inhabitants and more than 100 churches and convents. But in 1773 it was ruined by an earthquake. It was rebuilt, and ultimately became capital of the department of Sacatepeques, and a health-resort locally celebrated for its thermal springs. But the Guatemalans determined to found a new capital on the site occupied by the hamlet of Ermita, 27 m. N.E. Here the third and last city of Guatemala was built, and became the seat of government in 1779. The remarkable regularity of the streets is due to the construction of the city on a uniform plan. The wide area covered, and the lowness of the houses, were similarly due to an ordinance which, in order to minimize the danger from earthquakes, forbade the erection of any building more than 20 ft. high. Many of the belfries of convents or churches, added after the ordinance had fallen into abeyance, were overthrown by the earthquake of 1874, which also destroyed a large part of Antigua.

GUATOS, a tribe of South American Indians of the upper Paraguay. They are of a European fairness and wear beards. They live almost entirely in canoes, building rough shelters in the swamps. They aided the Brazilians in the war with Paraguay 1865-70. Very few survive.

GUATUSOS, a tribe of American Indians of Costa Rica. They are an active, hardy people, who have always maintained hostility towards the Spaniards and retain their independence. From their language they appear to be a distinct stock. They were described by old writers as being very fair, with flaxen hair, and these reports led to a belief, since exploded, that they were European hybrids. There are very few surviving.

GUAVA (from the Mexican *guayaba*), the name applied to the fruits of species of *Psidium*, a genus belonging to the natural order *Myrtaceae*. The species which produces the bulk of the guava fruits of commerce is *Psidium Guajava*, a small tree from 15 to 20 ft. high, a native of the tropical parts of America and the West Indies. It bears short-stalked ovate or oblong leaves, with strongly marked veins, and covered with a soft tomentum or down. The flowers are borne on axillary stalks, and the fruits vary much in size, shape and colour, numerous forms and varieties being known and cultivated. The variety of which the fruits are most valued is that which is sometimes called the white guava (*P. Guajava*, var. *pyriferum*). The fruits are pear-shaped, about the size of a hen's egg, covered with a thin bright yellow or whitish skin filled with soft pulp, also of a light yellowish tinge, and having a pleasant sweet-acid and somewhat aromatic flavour. *P. Guajava*, var. *pomiferum*, produces a more globular or

apple-shaped fruit, sometimes called the red guava. The pulp of this variety is mostly of a darker colour than the former and not of so fine a flavour, therefore the first named is most esteemed for eating in a raw state; both, however, are used in the preparation of two kinds of preserve known as guava jelly and guava cheese, which are made in the West Indies and imported thence to England; the fruits are of much too perishable a nature to allow of their importation in their natural state. Both varieties have been introduced into various parts of India, as well as in other countries of the East, where they have become perfectly naturalized. Though of course much too tender for outdoor planting in England, the guava thrives there in hothouses or stoves.

Psidium variabile (also known as *P. Cattleyanum*), a tree of from 10 to 20 ft. high, a native of Brazil (the Araçá or Araçá de Praya), is known as the purple guava. The fruit, which is very abundantly produced in the axils of the leaves, is large, spherical, of a fine deep claret colour; the rind is pitted, and the pulp is soft, fleshy, purplish, reddish next the skin, but becoming paler towards the middle and in the centre almost or quite white. It has a very agreeable acid-sweet flavour, which has been likened to that of a strawberry.

GUAYAMA, a small city and the capital of a municipal district and department of the same name, on the southern coast of Porto Rico, 53 m. S. of San Juan. Pop. (1899) of the city, 5334; (1910) 8321; (1899) of the district, 12,749. The district (156 sq. m.) includes Arroyo and Salinas. The city stands about 230 ft. above the sea and has a mild, healthy climate. It is connected with Ponce by railway (1910), and with the port of Arroyo by an excellent road, part of the military road extending to Cayey, and it exports sugar, rum, tobacco, coffee, cattle, fruit and other products of the department, which is very fertile. The city was founded in 1736, but was completely destroyed by fire in 1832. It was rebuilt on a rectangular plan and possesses several buildings of note. Drinking-water is brought in through an aqueduct.

GUAYAQUIL, or Santiago de Guayaquil, a city and port of Ecuador, capital of the province of Guayas, on the right bank of the Guayas river, 33 m. above its entrance into the Gulf of Guayaquil, in 2° 12′ S., 79° 51′ W. Pop. (1890) 44,772; (1897, estimate) 51,000, mostly half-breeds. The city is built on a comparatively level *pajonal* or savanna, extending southward from the base of three low hills, called Los Cerros de la Cruz, between the river and the partially filled waters of the Estero Salado. It is about 30 ft. above sea-level, and the lower parts of the town are partially flooded in the rainy season. The old town is the upper or northern part, and is inhabited by the poorer classes, its streets being badly paved, crooked, undrained, dirty and pestilential. The great fire of 1896 destroyed a large part of the old town, and some of its insanitary conditions were improved in rebuilding. The new town, or southern part, is the business and residential quarter of the better classes, but the buildings are chiefly of wood and the streets are provided with surface drainage only. Among the public buildings are the governor’s and bishop’s palaces, town-hall, cathedral and 9 churches, national college, episcopal seminary and schools of law and medicine, theatre, two hospitals, custom-house, and several asylums and charitable institutions. Guayaquil is also the seat of a university corporation with faculties of law and medicine. A peculiarity of Guayaquil is that the upper floors in the business streets project over the walks, forming covered arcades. The year is divided into a wet and dry season, the former from January to June, when the hot days are followed by nights of drenching rain. The mean annual temperature is about 82° to 83° F.; malarial and bilious fevers are common, the latter being known as “Guayaquil fever,” and epidemics of yellow fever are frequent. The dry or summer season is considered pleasant and healthy. The water-supply is now brought in through iron mains from the Cordilleras 53 m. distant. The mains pass under the Guayas river and discharge into a large distributing reservoir on one of the hills N. of the city. The city is provided with tramway and telephone services, the streets are lighted with gas and electricity, and telegraph communication with the outside world is maintained by means of the West Coast cable, which lands at the small port of Santa Elena, on the Pacific coast, about 65 m. W. of Guayaquil. Railway connexion with Quito (290 m.) was established in June 1908. There is also steamboat connexion with the producing districts of the province on the Guayas river and its tributaries, on which boats run

regularly as far up as Bodegas (80 m.) in the dry season, and for a distance of 40 m. on the Daule. For smaller boats there are about 200 m. of navigation on this system of rivers. The exports of the province are almost wholly transported on these rivers, and are shipped either at Guayaquil, or at Puna, its deep-water port, 6½ m. outside the Guayas bar, on the E. end of Puna Island. The Guayas river is navigable up to Guayaquil for steamers drawing 22 ft. of water; larger vessels anchor at Puna, 40 m. from Guayaquil, where cargoes and passengers are transferred to lighters and tenders. There is a quay on the river front, but the depth alongside does not exceed 18 ft. The principal exports are cacao, rubber, coffee, tobacco, hides, cotton, Panama hats, cinchona bark and ivory nuts, the value of all exports for the year 1905 being 14,148,877 *sucres*, in a total of 18,565,668 *sucres* for the whole republic. In 1908 the exports were: cacao, about 64,000,000 lb, valued at $6,400,000; hides, valued at $135,000; rubber, valued at $235,000; coffee, valued at $273,000; and vegetable ivory, valued at $102,000. There are some small industries in the city, including a shipyard, saw-mills, foundry, sugar refineries, cotton and woollen mills, brewery, and manufactures of soap, cigars, chocolate, ice, soda-water and liqueurs.

Santiago de Guayaquil was founded on St James's day, the 25th of July 1535, by Sebastian de Benalcazar, but was twice abandoned before its permanent settlement in 1537 by Francesco de Orellana. It was captured and sacked several times in the 17th and 18th centuries by pirates and freebooters—by Jacob Clark in 1624, by French pirates in 1686, by English freebooters under Edward David in 1687, by William Dampier in 1707 and by Clapperton in 1709. Defensive works were erected in 1730, and in 1763, when the town was made a governor's residence, a castle and other fortifications were constructed. Owing to the flimsy construction of its buildings Guayaquil has been repeatedly burned, the greater fires occurring in 1707, 1764, 1865, 1896 and 1899. The city was made the see of a bishopric in 1837.

GUAYAS, or El Guayas, a coast province of Ecuador, bounded N. by Manabí and Pichincha, E. by Los Rios, Cañar and Azuay, S. by El Oro and the Gulf of Guayaquil, and W. by the same gulf, the Pacific Ocean and the province of Manabí. Pop. (1893, estimate) 98,100; area, 11,504 sq. m. It is very irregular in form and comprises the low alluvial districts surrounding the Gulf of Guayaquil between the Western Cordilleras and the coast. It includes (since 1885) the Galápagos Islands, lying 600 m. off the coast. The province of Guayas is heavily forested and traversed by numerous rivers, for the most part tributaries of the Guayas river, which enters the gulf from the N. This river system has a drainage area of about 14,000 sq. m. and an aggregate of 200 m. of navigable channels in the rainy season. Its principal tributaries are the Daule and Babahoyo or Chimbo (also called Bodegas), and of the latter the Vinces and Yaguachi. The climate is hot, humid and unhealthy, bilious and malarial fevers being prevalent. The rainfall is abundant and the soil is deep and fertile. Agriculture and the collection of forest products are the chief industries. The staple products are cacao, coffee, sugar-cane, cotton, tobacco and rice. The cultivation of cacao is the principal industry, the exports forming about one-third the world's supply. Stock-raising is also carried on to a limited extent. Among forest products are rubber, cinchona bark, toquilla fibre and ivory nuts. The manufacture of so-called Panama hats from the fibre of the toquilla palm (commonly called *jipijapa*, after a town in Manabí famous for this industry) is a long-established domestic industry among the natives of this and other coast provinces, the humidity of the climate greatly facilitating the work of plaiting the delicate straws, which would be broken in a dry atmosphere. Guayas is the chief industrial and commercial province of the republic, about nineteen-twentieths of the commerce of Ecuador passing through the port of its capital, Guayaquil. There are no land transport routes in the province except the Quito & Guayaquil railway, which traverses its eastern half. The sluggish river channels which intersect the greater part of its territory afford excellent facilities for transporting produce, and a large number of small boats are regularly engaged in that traffic. There are no large towns in Guayas other than Guayaquil. Durán, on the Guayas river opposite Guayaquil, is the starting point of the Quito railway and contains the shops and offices of that line. The port of Santa Elena on a bay of the same name, about 65 m. W. of Guayaquil, is a landing-point of the West Coast cable, and a port of call for some of the regular steamship lines. Its exports are chiefly Panama hats and salt.

GUAYCURUS, a tribe of South American Indians on the Paraguay. The name has been used generally of all the mounted Indians of Gran Chaco. The Guaycurus are a wild, fierce people, who paint their bodies and go naked. They are fearless horsemen and are occupied chiefly in cattle rearing.

GUAYMAS, or San José de Guaymas, a seaport of Mexico, in the state of Sonora, on a small bay opening into the Gulf of California a few miles W. of the mouth of the Yaqui river, in lat. 27° 58′ N., long. 110° 58′ W. Pop. (1900) 8648. The harbour is one of the best on the W. coast of Mexico, and the port is a principal outlet for the products of the large state of Sonora. The town stands on a small, arid plain, nearly shut in by mountains, and has a very hot, dry climate. It is connected with the railways of the United States by a branch of the Southern Pacific from Benson, Arizona, and is 230 m. S. by W. of the frontier town of Nogales, where that line enters Mexico. The exports include gold, silver, hides and pearls.

GUBBIO (anc. *Iguvium*, *q.v.*; med. *Eugubium*), a town and episcopal see of Umbria, Italy, in the province of Perugia, from which it is 23 m. N.N.E. by road; by rail it is 13 m. N.W. of Fossato di Vico (on the line between Foligno and Ancona) and 70 m. E.S.E. of Arezzo. Pop. (1901) 5783 (town); 26,718 (commune). Gubbio is situated at the foot and on the steep slopes of Monte Calvo, from 1568 to 1735 ft. above sea-level, at the entrance to the gorge which ascends to Scheggia, probably on the site of the ancient Umbrian town. It presents a markedly medieval appearance. The most prominent building is the Palazzo dei Consoli, on the N. side of the Piazza della Signoria; it is a huge Gothic edifice with a tower, erected in 1332-1346, according to tradition, by Matteo di Giovanello of Gubbio, the name of Angelo da Orvieto occurs on the arch of the main door, but his work may be limited to the sculptures of this arch. It has two stories above the ground floor, and, being on the slope of the hill, is, like the whole piazza, raised on arched substructures. On the S. side of the piazza is the Palazzo Pretorio, or della Podestà, begun in 1349 and now the municipal palace. It contains the famous *Tabulae Iguvinae*, and a collection of paintings of the Umbrian school, of furniture and of majolica. On the E. side is the modern Palazzo Ranghiasci-Brancaleone, which until 1882 contained fine collections, now dispersed. Above the Piazza della Signoria, at the highest point of the town, is the Palazzo Ducale, erected by the dukes of Urbino in 1474-1480; the architect was, in all probability, Lucio da Laurana, to whom is due the palace at Urbino, which this palace resembles, especially in its fine colonnaded court. The Palazzo Beni, lower down, belongs to a somewhat earlier period of the 15th century. Pope Martin V. lodged here for a few days in 1420. The Palazzo Accoramboni, on the other hand, is a Renaissance structure, with a fine entrance arch. Here Vittoria Accoramboni was born in 1557. Opposite the Palazzo Ducale is the cathedral, dedicated to SS. Mariano e Jacopo, a structure of the 12th century, with a façade, adorned with contemporary sculptures, partly restored in 1514-1550. The interior contains some good pictures by Umbrian artists, a fine episcopal throne in carved wood, and a fine Flemish cope given by Pope Marcellus II. (1555) in the sacristy. The exterior of the Gothic church of S. Francesco, in the lower part of the town, built in 1259, preserves its original style, but the interior has been modernized; and the same fate has overtaken the Gothic churches of S. Maria Nuova and S. Pietro. S. Agostino, on the other hand, has its Gothic interior better preserved. The whole town is full of specimens of medieval architecture, the pointed arch of the 13th century being especially prevalent. A remarkable procession takes place in Gubbio on the 15th of May in each year, in honour of S. Ubaldo, when three colossal wooden pedestals, each over 30 ft. high, and crowned by statues of SS. Ubaldo, Antonio and Giorgio, are carried through the town, and then, in a wild race, up to the church of S. Ubaldo on the mountain-side (2690 ft.). See H. M. Bower, *The Elevation and Procession of the Ceri at Gubbio* (Folk-lore Society, London, 1897).

After its reconstruction with the help of Narses (see Iguvium) the town remained subject to the exarchs of Ravenna, and, after the destruction of the Lombard kingdom in 774, formed part of the donation of Charlemagne to the pope. In the 11th century the beginnings of its independence may be traced. In the struggles of that time it was generally on the Ghibelline side. In 1151 it repelled an attack of several neighbouring cities, and formed from this time a

republic governed by consuls. In 1155 it was besieged by the emperor Frederick I., but saved by the intervention of its bishop, S. Ubaldo, and was granted privileges by the emperor. In 1203 it had its first podestà, and from this period dates the rise of its importance. In 1387, after various political changes, it surrendered to Antonio da Montefeltro of Urbino, and remained under the dominion of the dukes of Urbino until, in 1624, the whole duchy was ceded to the pope.

Gubbio was the birthplace of Oderisio, a famous miniature painter (1240-1299), mentioned by Dante as the honour of his native town (*Purg.* xi. 80 "*l'onor d'Agobbio*"), but no authentic works by him exist. In the 14th and 15th centuries a branch of the Umbrian school of painting flourished here, the most famous masters of which were Guido Palmerucci (1280-1345?) and several members of the Nelli family, particularly Ottaviano (d. 1444), whose best work is the "Madonna del Belvedere" in S. Maria Nuova at Gubbio (1404), extremely well preserved, with bright colouring and fine details. Another work by him is the group of frescoes including a large "Last Judgment," and scenes from the life of St Augustine, in the church of S. Agostino, discovered in 1902 under a coating of whitewash. These painters seem to have been influenced by the contemporary masters of the Sienese school.

Gubbio occupies a far more important place in the history of majolica. In a decree of 1438 a *vasarius vasorum pictorum* is mentioned, who probably was not the first of his trade. The art was brought to perfection by Giorgio Andreoli, whose father had emigrated hither from Pavia, and who in 1498 became a citizen of Gubbio. The works by his hand are remarkable for their ruby tint, with a beautiful metallic lustre; but only one small tazza remains in Gubbio itself. His art was carried on by his sons, Cencio and Ubaldo, but was afterwards lost, and only recovered in 1853 by Angelico Fabbri and Luigi Carocci.

Two miles outside Porta Metauro to the N.E. is the Bottaccione, a large water reservoir, constructed in the 12th or 14th century; the water is collected in the bed of a stream by a massive dam.

See A. Colasanti, *Gubbio* (Bergamo, 1905); L. McCracken, *Gubbio* (London, 1905).

(T. As.)

GUBEN, a town of Germany, in the kingdom of Prussia, at the confluence of the Lubis with the Neisse, 28 m. S.S.E. of Frankfort-on-Oder, at the junction of railways to Breslau, Halle and Forst. Pop. (1875) 23,704; (1905) 36,666. It possesses three Evangelical churches, a Roman Catholic church, a synagogue, a gymnasium, a modern school, a museum and a theatre. The principal industries are the spinning and weaving of wool, dyeing, tanning, and the manufacture of pottery ware, hats, cloth, paper and machinery. The vine is cultivated in the neighbourhood to some extent, and there is also some trade in fruit and vegetables. Guben is of Wendish origin. It is mentioned in 1207 and received civic rights in 1235. It was surrounded by walls in 1311, about which time it came into the possession of the margrave of Brandenburg, from whom it passed to Bohemia in 1368. It was twice devastated by the Hussites, and in 1631 and 1642 it was occupied by the Swedes. By the peace of Prague in 1635 it came into the possession of the elector of Saxony, and in 1815 it was, with the rest of Lower Lusatia, united to Prussia.

GUBERNATIS, ANGELO DE, Count (1840-), Italian man of letters, was born at Turin and educated there and at Berlin, where he studied philology. In 1862 he was appointed professor of Sanskrit at Florence, but having married a cousin of the Socialist Bakunin and become interested in his views he resigned his appointment and spent some years in travel. He was reappointed, however, in 1867; and in 1891 he was transferred to the university of Rome. He became prominent both as an orientalist, a publicist and a poet. He founded the *Italia letteraria* (1862), the *Rivista orientale* (1867), the *Civitta italiana* and *Rivista europea* (1869), the *Bollettino italiano degli studii orientali* (1876) and the *Revue internationale* (1883), and in 1887 became director of the *Giornale della società asiatica*. In 1878 he started the *Dizionario biografico degli scrittori contemporanei*. His Oriental and mythological works include the *Piccola enciclopedia indiana* (1867), the *Fonti vediche* (1868), a famous work on

zoological mythology (1872), and another on plant mythology (1878). He also edited the encyclopaedic *Storia universale della letteratura* (1882-1885). His work in verse includes the dramas *Cato*, *Romolo*, *Il re Nala*, *Don Rodrigo*, *Savitri*, &c.

GUDBRANDSDAL, a district in the midlands of southern Norway, comprising the upper course of the river Lougen or Laagen from Lillehammer at the head of Lake Mjösen to its source in Lake Lesjekogen and tributary valleys. Lillehammer, the centre of a rich timber district, is 114 m. N. of Christiania by rail. The railway continues through the well-wooded and cultivated valley to Otta (70 m.). Several tracks run westward into the wild district of the Jotunheim. From Otto good driving routes run across the watershed and descend the western slope, where the scenery is incomparably finer than in Gudbrandsdal itself—(*a*) past Sörum, with the 13th-century churches of Vaagen and Lom (a fine specimen of the Stavekirke or timber-built church), Aanstad and Polfos, with beautiful falls of the Otta river, to Grotlid, whence roads diverge to Stryn on the Nordfjord, and to Marok on the Geirangerfjord; (*b*) past Domaas (with branch road north to Stören near Trondhjem, skirting the Dovrefjeld), over the watershed formed by Lesjekogen Lake, which drains in both directions, and down through the magnificent Romsdal.

GUDE (Gudius), **MARQUARD** (1635-1689), German archaeologist and classical scholar, was born at Rendsburg in Holstein on the 1st of February 1635. He was originally intended for the law, but from an early age showed a decided preference for classical studies. In 1658 he went to Holland in the hope of finding work as a teacher of classics, and in the following year, through the influence of J. F. Gronovius, he obtained the post of tutor and travelling companion to a wealthy young Dutchman, Samuel Schars. During his travels Gude seized the opportunity of copying inscriptions and MSS. At the earnest request of his pupil, who had become greatly attached to him, Gude refused more than one professional appointment, and it was not until 1671 that he accepted the post of librarian to Duke Christian Albert of Holstein-Gottorp. Schars, who had accompanied Gude, died in 1675, and left him the greater part of his property. In 1678 Gude, having quarrelled with the duke, retired into private life; but in 1682 he entered the service of Christian V. of Denmark as counsellor of the Schleswig-Holstein chancellery, and remained in it almost to the time of his death on the 26th of November 1689. Gude's great life-work, the collection of Greek and Latin inscriptions, was not published till 1731. Mention may also be made of his *editio princeps* (1661) of the treatise of Hippolytus the Martyr on Antichrist, and of his notes on Phaedrus (with four new fables discovered by him) published in P. Burmann's edition (1698).

His correspondence (ed. P. Burmann, 1697) is the most important authority for the events of Gude's life, besides containing valuable information on the learning of the times. See also J. Moller, *Cimbria literata*, iii., and C. Bursian in *Allgemeine deutsche Biographie*, x.

GUDEMAN, ALFRED (1862-), American classical scholar, was born in Atlanta, Georgia, on the 26th of August 1862. He graduated at Columbia University in 1883 and studied under Hermann Diels at the University of Berlin. From 1890 to 1893 he was reader in classical philology at Johns Hopkins University, from 1893 to 1902 professor in the University of Pennsylvania, and from 1902 to 1904 professor in Cornell University. In 1904 he became a member of the corps of scholars preparing the Wölfflin *Thesaurus linguae Latinae*—a unique distinction for an American Latinist, as was the publication of his critical edition, with German commentary, of Tacitus' *Agricola* in 1902 by the Weidmannsche Buchhandlung of Berlin. He wrote *Latin Literature of the Empire* (2 vols., *Prose and Poetry*, 1898-1899), a *History of Classical Philology* (1902) and *Sources of Plutarch's Life of Cicero* (1902); and edited Tacitus' *Dialogus de oratoribus* (text with commentary, 1894 and 1898) and *Agricola* (1899; with

Germania, 1900), and Sallust's *Catiline* (1903).

GUDGEON (*Gobio fluviatilis*), a small fish of the Cyprinid family. It is nearly related to the barbel, and has a small barbel or fleshy appendage at each corner of the mouth. It is the *gobione* of Italy, *goujon* of France (whence adapted in M. English as *gojon*), and *Grässling* or *Gründling* of Germany. Gudgeons thrive in streams and lakes, keeping to the bottom, and seldom exceeding 8 in. in length. In China and Japan there are varieties differing only slightly from the common European type.

GUDRUN (Kudrun), a Middle High German epic, written probably in the early years of the 13th century, not long after the *Nibelungenlied*, the influence of which may be traced upon it. It is preserved in a single MS. which was prepared at the command of Maximilian I., and was discovered as late as 1820 in the Castle of Ambras in Tirol. The author was an unnamed Austrian poet, but the story itself belongs to the cycle of sagas, which originated on the shores of the North Sea. The epic falls into three easily distinguishable parts—the adventures of King Hagen of Ireland, the romance of Hettel, king of the Hegelingen, who woos and wins Hagen's daughter Hilde, and lastly, the more or less parallel story of how Herwig, king of Seeland, wins, in opposition to her father's wishes, Gudrun, the daughter of Hettel and Hilde. Gudrun is carried off by a king of Normandy, and her kinsfolk, who are in pursuit, are defeated in a great battle on the island of Wülpensand off the Dutch coast. The finest parts of the epic are those in which Gudrun, a prisoner in the Norman castle, refuses to become the wife of her captor, and is condemned to do the most menial work of the household. Here, thirteen years later, Herwig and her brother Ortwin find her washing clothes by the sea; on the following day they attack the Norman castle with their army and carry out the long-delayed retribution.

The epic of *Gudrun* is not unworthy to stand beside the greater *Nibelungenlied*, and it has been aptly compared with it as the *Odyssey* to the *Iliad*. Like the *Odyssey*, Gudrun is an epic of the sea, a story of adventure; it does not turn solely round the conflict of human passions; nor is it built up round one all-absorbing, all-dominating idea like the *Nibelungenlied*. Scenery and incident are more varied, and the poet has an opportunity for a more lyric interpretation of motive and character. *Gudrun* is composed in stanzas similar to those of the *Nibelungenlied*, but with the essential difference that the last line of each stanza is identical with the others, and does not contain the extra accented syllable characteristic of the *Nibelungen* metre.

Gudrun was first edited by von der Hagen in vol. i. of his *Heldenbuch* (1820). Subsequent editions by A. Ziemann and A. J. Vollmer followed in 1837 and 1845. The best editions are those by K. Bartsch (4th ed., 1880), who has also edited the poem for Kürschner's *Deutsche Nationalliteratur* (vol. 6, 1885), by B. Symons (1883) and by E. Martin (2nd ed., 1901). L. Ettmüller first applied Lachmann's ballad-theory to the poem (1841), and K. Müllenhoff (*Kudrun, die echten Teile des Gedichts*, 1845) rejected more than three-quarters of the whole as "not genuine." There are many translations of the epic into modern German, the best known being that of K. Simrock (15th ed., 1884). A translation into English by M. P. Nichols appeared at Boston, U.S.A., in 1889.

See K. Bartsch, *Beiträge zur Geschichte und Kritik der Kudrun* (1865); H. Keck, *Die Gudrunsage* (1867); W. Wilmanns, *Die Entwickelung der Kudrundichtung* (1873); A. Fécamp, *Le Poème de Gudrun, ses origines, sa formation et son histoire* (1892); F. Panzer, *Hilde-Gudrun* (1901). For later versions and adaptations of the saga see O. Benedict, *Die Gudrunsage in der neueren Literatur* (1902.)

GUÉBRIANT, JEAN BAPTISTE BUDES, Comte de (1602-1643), marshal of France, was born at Plessis-Budes, near St Brieuc, of an old Breton family. He served first in Holland, and in the Thirty Years' War he commanded from 1638 to 1639 the French contingent in the army

of his friend Bernard of Saxe-Weimar, distinguishing himself particularly at the siege of Breisach in 1638. Upon the death of Bernard he received the command of his army, and tried, in conjunction with J. Baner (1596-1641), the Swedish general, a bold attack upon Regensburg (1640). His victories of Wolfenbüttel on the 29th of June 1641 and of Kempen in 1642 won for him the marshal's bâton. Having failed in an attempt to invade Bavaria in concert with Torstensson he seized Rottweil, but was mortally wounded there on the 17th of November 1643.

A biography was published by Le Laboureur, *Histoire du mareschal de Guébriant*, in 1656. See A. Brinzinger in *Württembergische Vierteljahrschrift für Landesgeschichte* (1902).

GUELDER ROSE, so called from Guelderland, its supposed source, termed also marsh elder, rose elder, water elder (Ger. *Wasserholder*, *Schneeball*; Fr. *viorne-obier*, *l'obier d'Europe*), known botanically as *Viburnum Opulus*, a shrub or small tree of the natural order Caprifoliaceae, a native of Britain, and widely distributed in the temperate and colder parts of Europe, Asia and North America. It is common in Ireland, but rare in Scotland. In height it is from 6 to 12 ft., and it thrives best in moist situations. The leaves are smooth, 2 to 3 in. broad, with 3 to 5 unequal serrate lobes, and glandular stipules adnate to the stalk. In autumn the leaves change their normal bright green for a pink or crimson hue. The flowers, which appear in June and July, are small, white, and arranged in cymes 2 to 4 in. in diameter. The outer blossoms in the wild plant have an enlarged corolla, ¾ in. in diameter, and are devoid of stamens or pistils; in the common cultivated variety all the flowers are sterile and the inflorescence is globular, hence the term "snowball tree" applied to the plant, the appearance of which at the time of flowering has been prettily described by Cowper in his *Winter Walk at Noon*. The guelder rose bears juicy, red, elliptical berries, ⅓ in. long, which ripen in September, and contain each a single compressed seed. In northern Europe these are eaten, and in Siberia, after fermentation with flour, they are distilled for spirit. The plant has, however, emetic, purgative and narcotic properties; and Taylor (*Med. Jurisp.* i. 448, 2nd ed., 1873) has recorded an instance of the fatal poisoning of a child by the berries. Both they and the bark contain valerianic acid. The woody shoots of the guelder rose are manufactured into various small articles in Sweden and Russia. Another member of the genus, *Viburnum*, *Lantana*, wayfaring tree, is found in dry copses and hedges in England, except in the north.

GUELPH, a city of Ontario, Canada, 45 m. W. of Toronto, on the river Speed and the Grand Trunk and Canadian Pacific railways. Pop. (1901) 11,496. It is the centre of a fine agricultural district, and exports grain, fruit and live-stock in large quantities. It contains, in addition to the county and municipal buildings, the Ontario Agricultural College, which draws students from all parts of North and South America. The river affords abundant water-power for flour-mills, saw-mills, woollen-mills and numerous factories, of which agricultural implements, sewing machines and musical instruments are the chief.

GUELPHS AND GHIBELLINES. These names are doubtless Italianized forms of the German words Welf and Waiblingen, although one tradition says that they are derived from Guelph and Gibel, two rival brothers of Pistoia. Another theory derives Ghibelline from Gibello, a word used by the Sicilian Arabs to translate Hohenstaufen. However, a more popular story tells how, during a fight around Weinsberg in December 1140 between the German king Conrad III. and Welf, count of Bavaria, a member of the powerful family to which Henry the Lion, duke of Saxony and Bavaria, belonged, the soldiers of the latter raised the cry "Hie Welf!" to which the king's troops replied with "Hie Waiblingen!" this being the name of one of Conrad's castles. But the rivalry between Welf and Hohenstaufen, of which family Conrad was a member, was anterior to this event, and had been for some years a prominent fact in the

history of Swabia and Bavaria, although its introduction into Italy—in a slightly modified form, however—only dates from the time of the Italian expeditions of the emperor Frederick I. It is about this time that the German chronicler, Otto of Freising, says, “Duae in Romano orbe apud Galliae Germaniaeve fines famosae familiae actenus fuere, una Heinricorum de Gueibelinga, alia Guelforum de Aldorfo, altera imperatores, altera magnos duces producere solita.” Chosen German king in 1152, Frederick was not only the nephew and the heir of Conrad, he was related also to the Welfs; yet, although his election abated to some extent the rivalry between Welf and Hohenstaufen in Germany, it opened it upon a larger and fiercer scale in Italy.

During the long and interesting period covered by Frederick’s Italian campaigns, his enemies, prominent among whom were the cities of the Lombard League, became known as Welfs, or Guelphs, while his partisans seized upon the rival term of Waiblingen, or Ghibelline, and the contest between these two parties was carried on with a ferocity unknown even to the inhabitants of southern Germany. The distracted state of northern Italy, the jealousies between various pairs of towns, the savage hatred between family and family, were some of the causes which fed this feud, and it reached its height during the momentous struggle between Frederick II. and the Papacy in the 13th century. The story of the contest between Guelph and Ghibelline, however, is little less than the history of Italy in the middle ages. At the opening of the 13th century it was intensified by the fight for the German and imperial thrones between Philip, duke of Swabia, a son of Frederick I., and the Welf, Otto of Brunswick, afterwards the emperor Otto IV., a fight waged in Italy as well as in Germany. Then, as the heir of Philip of Swabia and the rival of Otto of Brunswick, Frederick II. was forced to throw himself into the arms of the Ghibellines, while his enemies, the popes, ranged themselves definitely among the Guelphs, and soon Guelph and Ghibelline became synonymous with supporter of pope and emperor.

After the death of Frederick II. in 1250 the Ghibellines looked for leadership to his son and successor, the German king, Conrad IV., and then to his natural son, Manfred, while the Guelphs called the French prince, Charles of Anjou, to their aid. But the combatants were nearing exhaustion, and after the execution of Conradin, the last of the Hohenstaufen, in 1268, this great struggle began to lose force and interest. Guelph and Ghibelline were soon found representing local and family rather than papal and imperial interests; the names were taken with little or no regard for their original significance, and in the 15th century they began to die out of current politics. However, when Louis XII. of France conquered Milan at the beginning of the 16th century the old names were revived; the French king’s supporters were called Guelphs and the friends of the emperor Maximilian I. were referred to as Ghibellines.

The feud of Guelph and Ghibelline penetrated within the walls of almost every city of northern Italy, and the contest between the parties, which practically makes the history of Florence during the 13th century, is specially noteworthy. First one side and then the other was driven into exile; the Guelph defeat at the battle of Monte Aperto in 1260 was followed by the expulsion of the Ghibellines by Charles of Anjou in 1266, and on a smaller scale a similar story may be told of many other cities (see Florence).

The Guelph cause was buttressed by an idea, yet very nebulous, of Italian patriotism. Dislike of the German and the foreigner rather than any strong affection for the Papacy was the feeling which bound the Guelph to the pope, and so enabled the latter to defy the arms of Frederick II. The Ghibelline cause, on the other hand, was aided by the dislike of the temporal power of the pope and the desire for a strong central authority. This made Dante a Ghibelline, but the hopes of this party, kindled anew by the journey of Henry VII. to Italy in 1310, were extinguished by his departure. J. A. Symonds thus describes the constituents of the two parties: “The Guelph party meant the burghers of the consular Communes, the men of industry and commerce, the upholders of civil liberty, the friends of democratic expansion. The Ghibelline party included the naturalized nobles, the men of arms and idleness, the advocates of feudalism, the politicians who regarded constitutional progress with disfavour. That the banner of the church floated over the one camp, while the standard of the empire rallied to itself the hostile party, was a matter of comparatively superficial moment.” In another passage the same writer thus describes the sharp and universal division between Guelph and Ghibelline: “Ghibellines wore the feathers in their caps upon one side, Guelphs upon the other. Ghibellines cut fruit at table crosswise, Guelphs straight down ... Ghibellines drank out of smooth and Guelphs out of chased goblets. Ghibellines wore white and Guelphs red roses.” It is interesting to note that while Dante was a Ghibelline, Petrarch was a Guelph.

See J. A. Symonds, *The Renaissance in Italy*, vol. i. (1875).

GUENEVERE (Lat. *Guanhumara*; Welsh, *Gwenhwyfar*; O. Eng. *Gaynore*), in Arthurian romance the wife of King Arthur. Geoffrey of Monmouth, who calls her Guanhumara, makes her a Roman lady, but the general tradition is that she was of Cornish birth and daughter to King Leodegrance. Wace, who, while translating Geoffrey, evidently knew, and used, popular tradition, combines these two, asserting that she was of Roman parentage on the mother's side, but cousin to Cador of Cornwall by whom she was brought up. The tradition relating to Guenevere is decidedly confused and demands further study. The Welsh triads know no fewer than three Gwenhwyfars; Giraldus Cambrensis, relating the discovery of the royal tombs at Glastonbury, speaks of the body found as that of Arthur's second wife; the prose *Merlin* gives Guenevere a bastard half-sister of the same name, who strongly resembles her; and the *Lancelot* relates how this lady, trading on the likeness, persuaded Arthur that she was the true daughter of Leodegrance, and the queen the bastard interloper. This episode of the false Guenevere is very perplexing.

To the majority of English readers Guenevere is best known in connexion with her liaison with Lancelot, a story which, in the hands of Malory and Tennyson, has assumed a form widely different from the original conception, and at once more picturesque and more convincing. In the French romances Lancelot is a late addition to the Arthurian cycle, his birth is not recorded till long after the marriage of Arthur and Guenevere, and he is at least twenty years the junior of the queen. The relations between them are of the most conventional and courtly character, and are entirely lacking in the genuine dramatic passion which marks the love story of Tristan and Iseult. The *Lancelot-Guenevere* romance took form and shape in the artificial atmosphere encouraged by such patronesses of literature as Eleanor of Aquitaine and her daughter Marie, Comtesse de Champagne (for whom Chrétien de Troyes wrote his *Chevalier de la Charrette*), and reflects the low social morality of a time when love between husband and wife was declared impossible. But though Guenevere has changed her lover, the tradition of her infidelity is of much earlier date and formed a part of the primitive Arthurian legend. Who the original lover was is doubtful; the *Vita Gildae* relates how she was carried off by Melwas, king of Aestiva Regis, to Glastonbury, whither Arthur, at the head of an army, pursued the ravisher. A fragment of a Welsh poem seems to confirm this tradition, which certainly lies at the root of her later abduction by Meleagaunt. In the *Lanzelet* of Ulrich von Zatzikhoven the abductor is Falerîn. The story in these forms represents an other-world abduction. A curious fragment of Welsh dialogues, printed by Professor Rhys in his *Studies on the Arthurian Legend*, appears to represent Kay as the abductor. In the pseudo-Chronicles and the romances based upon them the abductor is Mordred, and in the chronicles there is no doubt that the lady was no unwilling victim. On the final defeat of Mordred she retires to a nunnery, takes the veil, and is no more heard of. Wace says emphatically—

Ne fu oie ne véue,
Ne fu trovée, ne séue
Por la vergogne del mesfait
Et del pecié qu ele avoit fait (ll. 13627-30).

Layamon, who in his translation of Wace treats his original much as Wace treated Geoffrey, says that there was a tradition that she had drowned herself, and that her memory and that of Mordred were hateful in every land, so that none would offer prayer for their souls. On the other hand certain romances, *e.g.* the *Perceval*, give her an excellent character. The truth is probably that the tradition of his wife's adultery and treachery was a genuine part of the Arthurian story, which, neglected for a time, was brought again into prominence by the social conditions of the courts for which the later romances were composed; and it is in this later and conventionalized form that the tale has become familiar to us (see also LANCELOT).

See *Studies on the Arthurian Legend* by Professor Rhys; *The Legend of Sir Lancelot*, Grimm Library, xii., Jessie L. Weston; *Der Karrenritter*, ed. Professor Foerster.

(J. L. W.)

GUENON (from the French, = one who grimaces, hence an ape), the name applied by naturalists to the monkeys of the African genus *Cercopithecus*, the Ethiopian representative of the Asiatic macaques, from which they differ by the absence of a posterior heel to the last molar in the lower jaw.

GUÉRET, a town of central France, capital of the department of Creuse, situated on a mountain declivity 48 m. N.E. of Limoges on the Orleans railway. Pop. (1906), town, 6042; commune (including troops, &c.), 8058. Apart from the Hôtel des Monneyroux (used as prefecture), a picturesque mansion of the 15th and 16th centuries, with mansard roofs and mullioned windows, Guéret has little architectural interest. It is the seat of a prefect and a court of assizes, and has a tribunal of first instance, a chamber of commerce and lycées and training colleges, for both sexes. The industries include brewing, saw-milling, leather-making and the manufacture of basket-work and wooden shoes, and there is trade in agricultural produce and cattle. Guéret grew up round an abbey founded in the 7th century, and in later times became the capital of the district of Marche.

GUEREZA, the native name of a long-tailed, black and white Abyssinian monkey, *Colobus guereza* (or *C. abyssinicus*), characterized by the white hairs forming a long pendent mantle. Other east African monkeys with a similar type of colouring, which, together with the wholly black west African *C. satanas*, collectively constitute the subgenus *Guereza*, may be included under the same title; and the name may be further extended to embrace all the African thumbless monkeys of the genus *Colobus*. These monkeys are the African representatives of the Indo-Malay langurs (*Semnopithecus*), with which they agree in their slender build, long limbs and tail, and complex stomachs, although differing by the rudimentary thumb. The members of the subgenus *Guereza* present a transition from a wholly black animal (*C. satanas*) to one (*C. caudatus*) in which the sides of the face are white, and the whole flanks, as well as the tail, clothed with a long fringe of pure white hairs.

GUERICKE, HEINRICH ERNST FERDINAND (1803-1878), German theologian, was born at Wettin in Saxony on the 25th of February 1803 and studied theology at Halle, where he was appointed professor in 1829. He greatly disliked the union between the Lutheran and the Reformed churches, which had been accomplished by the Prussian government in 1817, and in 1833 he definitely threw in his lot with the Old Lutherans. In 1835 he lost his professorship, but he regained it in 1840. Among his works were a Life of *August Hermann Francke* (1827, Eng. trans. 1837), *Church History* (1833, Eng. trans. by W. T. Shedd, New York, 1857-1863), *Allgemeine christliche Symbolik* (1839). In 1840 he helped to found the *Zeitschrift für die gesammte lutherische Theologie und Kirche*, and he died at Halle on the 4th of February 1878.

GUERICKE, OTTO VON (1602-1686), German experimental philosopher, was born at Magdeburg, in Prussian Saxony, on the 20th of November 1602. Having studied law at Leipzig, Helmstadt and Jena, and mathematics, especially geometry and mechanics, at Leiden, he visited France and England, and in 1636 became engineer-in-chief at Erfurt. In 1627 he was elected alderman of Magdeburg, and in 1646 mayor of that city and a magistrate of Brandenburg. His leisure was devoted to scientific pursuits, especially in pneumatics. Incited by the discoveries of Galileo, Pascal and Torricelli, he attempted the creation of a vacuum. He began by experimenting with a pump on water placed in a barrel, but found that when the water was drawn off the air permeated the wood. He then took a globe of copper fitted with pump and stopcock, and discovered that he could pump out air as well as water. Thus he became the inventor of the air-pump (1650). He illustrated his discovery before the emperor Ferdinand III. at the imperial diet which assembled at Regensburg in 1654, by the experiment of the “Magdeburg hemispheres.” Taking two hollow hemispheres of copper, the edges of which fitted nicely together, he exhausted the air from between them by means of his pump, and it is recorded that thirty horses, fifteen back to back, were unable to pull them asunder until the air was readmitted. Besides investigating other phenomena connected with a vacuum, he constructed an electrical machine which depended on the excitation of a rotating ball of sulphur; and he made successful researches in astronomy, predicting the periodicity of

the return of comets. In 1681 he gave up office, and retired to Hamburg, where he died on the 11th of May 1686.

His principal observations are given in his work, *Experimenta nova, ut vocant, Magdeburgica de vacuo spatio* (Amsterdam, 1672). He is also the author of a *Geschichte der Belagerung und Eroberung von Magdeburg*. See F. W. Hoffmann, *Otto von Guericke* (Magdeburg, 1874).

GUÉRIDON, a small table to hold a lamp or vase, supported by a tall column or a human or mythological figure. This piece of furniture, often very graceful and elegant, originated in France towards the middle of the 17th century. In the beginning the table was supported by a negro or other exotic figure, and there is some reason to believe that it took its name from the generic appellation of the young African groom or "tiger," who was generally called "Guéridon," or as we should say in English "Sambo." The swarthy figure and brilliant costume of the "Moor" when reproduced in wood and picked out in colours produced a very striking effect, and when a small table was supported on the head by the upraised hands the idea of passive service was suggested with completeness. The guéridon is still occasionally seen in something approaching its original form; but it had no sooner been introduced than the artistic instinct of the French designer and artificer converted it into a far worthier object. By the death of Louis XIV. there were several hundreds of them at Versailles, and within a generation or two they had taken an infinity of forms—columns, tripods, termini and mythological figures. Some of the simpler and more artistic forms were of wood carved with familiar decorative motives and gilded. Silver, enamel, and indeed almost any material from which furniture can be made, have been used for their construction. A variety of small "occasional" tables are now called in French *guéridons*.

GUÉRIN, JEAN BAPTISTE PAULIN (1783-1855), French painter, was born at Toulon, on the 25th of March 1783, of poor parents. He learnt, as a lad, his father's trade of a locksmith, whilst at the same time he followed the classes of the free school of art. Having sold some copies to a local amateur, Guérin started for Paris, where he came under the notice of Vincent, whose counsels were of material service. In 1810 Guérin made his first appearance at the Salon with some portraits, which had a certain success. In 1812 he exhibited "Cain after the murder of Abel" (formerly in Luxembourg), and, on the return of the Bourbons, was much employed in works of restoration and decoration at Versailles. His "Dead Christ" (Cathedral, Baltimore) obtained a medal in 1817, and this success was followed up by a long series of works, of which the following are the more noteworthy: "Christ on the knees of the Virgin" (1819); "Anchises and Venus" (1822) (formerly in Luxembourg); "Ulysses and Minerva" (1824) (Musée de Rennes); "the Holy Family" (1829) (Cathedral, Toulon); and "Saint Catherine" (1838) (St Roch). In his treatment of subject, Guérin attempted to realize rococo graces of conception, the liveliness of which was lost in the strenuous effort to be correct. His chief successes were attained by portraits, and those of Charles Nodier and the Abbé Lamennais became widely popular. He died on the 19th of January 1855.

GUÉRIN, PIERRE NARCISSE, Baron (1774-1833), French painter, was born at Paris on the 13th of May 1774. Becoming a pupil of Jean Baptiste Regnault, he carried off one of the three "grands prix" offered in 1796, in consequence of the competition not having taken place since 1793. The *pension* was not indeed re-established, but Guérin fulfilled at Paris the conditions imposed upon a *pensionnaire*, and produced various works, one of which brought him prominently before the public. This work, "Marcus Sextus" (Louvre), exhibited at the Salon of 1799, excited wild enthusiasm, partly due to the subject,—a victim of Sulla's proscription returning to Rome to find his wife dead and his house in mourning—in which an allusion was found to the actual situation of the *émigrés*. Guérin on this occasion was publicly

crowned by the president of the Institute, and before his departure for Rome (on the re-establishment of the École under Suvée) a banquet was given to him by the most distinguished artists of Paris. In 1800, unable to remain in Rome on account of his health, he went to Naples, where he painted the “Grave of Amyntas.” In 1802 Guérin produced “Phaedra and Hippolytus” (Louvre); in 1810, after his return to Paris, he again achieved a great success with “Andromache and Pyrrhus” (Louvre); and in the same year also exhibited “Cephalus and Aurora” (Collection Sommariva) and “Bonaparte and the Rebels of Cairo” (Versailles). The Restoration brought to Guérin fresh honours; he had received from the first consul in 1803 the cross of the Legion of Honour, and in 1815 Louis XVIII. named him Academician. The success of Guérin’s “Hippolytus” of “Andromache,” of “Phaedra” and of “Clytaemnestra” (Louvre) had been ensured by the skilful selection of highly melodramatic situations, treated with the strained and pompous dignity proper to the art of the first empire; in “Aeneas relating to Dido the disasters of Troy” (Louvre), which appeared side by side with “Clytaemnestra” at the Salon of 1817, the influence of the Restoration is plainly to be traced. In this work Guérin sought to captivate the public by an appeal to those sensuous charms which he had previously rejected, and by the introduction of picturesque elements of interest. But with this work Guérin’s public successes came to a close. He was, indeed, commissioned to paint for the Madeleine a scene from the history of St Louis, but his health prevented him from accomplishing what he had begun, and in 1822 he accepted the post of director of the École de Rome, which in 1816 he had refused. On returning to Paris in 1828, Guérin, who had previously been made chevalier of the order of St Michel, was ennobled. He now attempted to complete “Pyrrhus and Priam,” a work which he had begun at Rome, but in vain; his health had finally broken down, and in the hope of improvement he returned to Italy with Horace Vernet. Shortly after his arrival at Rome Baron Guérin died, on the 6th of July 1833, and was buried in the church of La Trinità de’ Monti by the side of Claude Lorraine.

A careful analysis and criticism of his principal works will be found in Meyer’s *Geschichte der französischen Malerei*.

GUÉRIN DU CAYLA, GEORGES MAURICE DE (1810-1839), French poet, descended from a noble but poor family, was born at the chateau of Le Cayla in Languedoc, on the 4th of August 1810. He was educated for the church at a religious seminary at Toulouse, and then at the Collège Stanislas, Paris, after which he entered the society at La Chesnaye in Brittany, founded by Lamennais. It was only after great hesitation, and without being satisfied as to his religious vocation, that under the influence of Lamennais he joined the new religious order in the autumn of 1832; and when, in September of the next year, Lamennais, who had come under the displeasure of Rome, severed connexion with the society, Maurice de Guérin soon followed his example. Early in the following year he went to Paris, where he was for a short time a teacher at the College Stanislas. In November 1838 he married a Creole lady of some fortune; but a few months afterwards he was attacked by consumption and died on the 19th of July 1839. In the *Revue des deux mondes* for May 15th, 1840, there appeared a notice of Maurice de Guérin by George Sand, to which she added two fragments of his writings—one a composition in prose entitled the *Centaur*, and the other a short poem. His *Reliquiae* (2 vols., 1861), including the *Centaur*, his journal, a number of his letters and several poems, was edited by G. S. Trébutien, and accompanied with a biographical and critical notice by Sainte-Beuve; a new edition, with the title *Journal, lettres et poèmes*, followed in 1862; and an English translation of it was published at New York in 1867. Though he was essentially a poet, his prose is more striking and original than his poetry. Its peculiar and unique charm arises from his strong and absorbing passion for nature, a passion whose intensity reached almost to adoration and worship, but in which the pagan was more prominent than the moral element. According to Sainte-Beuve, “no French poet or painter has rendered so well the feeling for nature—the feeling not so much for details as for the ensemble and the divine universality, the feeling for the origin of things and the sovereign principle of life.”

The name of Eugénie de Guérin (1805-1848), the sister of Maurice, cannot be omitted from any notice of him. Her *Journals* (1861, Eng. trans., 1865) and her *Lettres* (1864, Eng. trans., 1865) indicated the possession of gifts of as rare an order as those of her brother, though of a somewhat different kind. In her case mysticism assumed a form more strictly religious, and she continued to mourn her brother’s loss of his early Catholic faith. Five years older than he, she cherished a love for him which was blended with a somewhat motherly anxiety. After his death she began the collection and publication of the scattered fragments of his writings. She died, however, on the 31st of May 1848, before her task was completed.

See the notices by George Sand and Sainte-Beuve referred to above; Sainte-Beuve, *Causeries du lundi* (vol. xii.) and *Nouveaux Lundis* (vol. iii.); G. Merlet, *Causeries sur les femmes et les livres* (Paris, 1865); Selden, *L'Esprit des femmes de notre temps* (Paris, 1864); Marelle, *Eugénie et Maurice de Guérin* (Berlin, 1869); Harriet Parr, *M. and E. de Guérin, a monograph* (London, 1870); and Matthew Arnold's essays on Maurice and Eugénie de Guérin, in his *Essays in Criticism*.

GUERNIERI, or Werner, a celebrated mercenary captain who lived about the middle of the 14th century. He was a member of the family of the dukes of Urslingen, and probably a descendant of the dukes of Spoleto. From 1340 to 1343 he was in the service of the citizens of Pisa, but afterwards he collected a troop of adventurers which he called the Great Company, and with which he plundered Tuscany and Lombardy. He then entered the service of Louis I. the Great, king of Hungary and Poland, whom he assisted to obtain possession of Naples; but when dismissed from this service his ravages became more terrible than ever, culminating in the dreadful sack of Anagni in 1358, shortly after which Guernieri disappeared from history. He is said to have worn a breastplate with the inscription, "The enemy of God, of pity and of mercy."

GUERNSEY (Fr. *Guernesey*), one of the Channel Islands, belonging to Britain, the second in size and westernmost of the important members of the group. Its chief town, St Peter Port, on the east coast, is in 2° 33′ W., 49° 27′ N., 74 m. S. of Portland Bill on the English coast, and 30 m. from the nearest French coast to the east. The island, roughly triangular in form, is 9¼ m. long from N.E. to S.W. and has an extreme breadth of 5¼ m. and an area of 15,691 acres or 24.5 sq. m. Pop. (1901), 40,446, the density being thus 162 per sq. m.

The surface of the island rises gradually from north to south, and reaches its greatest elevation at Haut Nez (349 ft.) above Point Icart on the south coast. The coast scenery, which forms one of the principal attractions to the numerous summer visitors to the island, is finest on the south. This coast, between Jerbourg and Pleinmont Points, respectively at the south-eastern and south-western corners of the island, is bold, rocky and indented with many exquisite little bays. Of these the most notable are Moulin Huet, Saint's, and Petit Bot, all in the eastern half of the south coast. The cliffs, however, culminate in the neighbourhood of Pleinmont. Picturesque caves occur at several points, such as the Creux Mahie. On the west coast there is a succession of larger bays—Rocquaine Perelle, Vazon, and Cobo. Off the first lies Lihou Island, the Hanois and other islets, and all three bays are sown with rocks. The coast, however, diminishes in height, until at the north-eastern extremity of the island the land is so low across the Vale or Braye du Val, from shore to shore, that the projection of L'Ancresse is within a few feet of being isolated. The east coast, on which, besides the town and harbour of St Peter Port, is that of St Sampson, presents no physical feature of note. The interior of the island is generally undulating, and gains in beauty from its rich vegetation. Picturesque glens descend upon some of the southern bays (the two converging upon Petit Bot are notable), and the high-banked paths, arched with foliage, which follow the small rills down to Moulin Huet Bay, are much admired under the name of water-lanes.

The soil is generally light sandy loam, overlying an angular gravel which rests upon the weathered granite. This soil requires much manure, and a large proportion of the total area (about three-fifths) is under careful cultivation, producing a considerable amount of grain, but more famous for market-gardening. Vegetables and potatoes are exported, with much fruit, including grapes and flowers. Granite is quarried and exported from St Sampson, and the fisheries form an important industry.

For administrative purposes Guernsey is united with Alderney, Sark, Herm and the adjacent islets to form the bailiwick of Guernsey, separate from Jersey. The peculiar constitution, machinery of administration and justice, finance, &c., are considered under the heading Channel Islands. Guernsey is divided into the ten parishes of St Peter Port, St Sampson, Vale, Câtel, St Saviour, St Andrew, St Martin, Forest, St Peter du Bois and Torteval. The population of St Peter Port in 1901 was 18,264; of the other parishes that of St Sampson was 5614 and

that of Vale 5082. The population of the bailiwick of Guernsey nearly doubled between 1821 and 1901, and that of the island increased from 35,243 in 1891 to 40,446 in 1901. The island roads are excellent, Guernsey owing much in this respect to Sir John Doyle (d. 1834), the governor whose monument stands on the promontory of Jerbourg. Like Jersey and the neighbouring part of France, Guernsey retains considerable traces of early habitation in cromlechs and menhirs, of which the most notable is the cromlech in the north at L'Ancresse. As regards ecclesiastical architecture, all the parish churches retain some archaeological interest. There is good Norman work in the church of St Michael, Vale, and the church of St Peter Port is a notable building of various periods from the early 14th century. Small remains of monastic buildings are seen at Vale and on Lihou Island.

GUERRAZZI, FRANCESCO DOMENICO (1804-1873), Italian publicist, born at Leghorn, was educated for the law at Pisa, and began to practise in his native place. But he soon took to politics and literature, under the influence of Byron, and his novel, the *Battagli di Benevento* (1827), brought him into notice. Mazzini made his acquaintance, and with Carlo Bini they started a paper, the *Indicatore*, at Leghorn in 1829, which was quickly suppressed. Guerrazzi himself had to endure several terms of imprisonment for his activity in the cause of Young Italy, and it was in Portoferrato in 1834 that he wrote his most famous novel *Assidio di Firenze*. He was the most powerful Liberal leader at Leghorn, and in 1848 became a minister, with some idea of exercising a moderating influence in the difficulties with the grand-duke of Tuscany. In 1849, when the latter fled, he was first one of the triumvirate with Mazzini and Montanelli, and then dictator, but on the restoration he was arrested and imprisoned for three years. His *Apologia* was published in 1852. Released from prison, he was exiled to Corsica, but subsequently was restored and was for some time a deputy at Turin (1862-1870), dying of apoplexy at Leghorn on the 25th of September 1873. He wrote a number of other works besides the novels already mentioned, notably *Isabella Orsini* (1845) and *Beatrice Cenci* (1854), and his *Opere* were collected at Milan (1868).

See the *Life and Works* by Bosio (1877), and Carducci's edition of his letters (1880).

GUERRERO, a Pacific coast state of Mexico, bounded N.W. by Michoacan, N. by Mexico (state) and Morelos, N.E. and E. by Puebla and Oaxaca, and S. and W. by the Pacific. Area, 24,996 sq. m. Pop., largely composed of Indians and mestizos (1895), 417,886; (1900) 479,205. The state is roughly broken by the Sierra Madre and its spurs, which cover its entire surface with the exception of the low coastal plain (averaging about 20 m. in width) on the Pacific. The valleys are usually narrow, fertile and heavily forested, but difficult of access. The state is divided into two distinct zones—the *tierras calientes* of the coast and lower river courses where tropical conditions prevail, and the *tierras templadas* of the mountain region where the conditions are subtropical. The latter is celebrated for its agreeable and healthy climate, and for the variety and character of its products. The principal river of the state is the Rio de las Balsas or Mescala, which, having its source in Tlaxcala, flows entirely across the state from W. to E., and then southward to the Pacific on the frontier of Michoacan. This river is 429 m. long and receives many affluents from the mountainous region through which it passes, but its course is very precipitous and its mouth obstructed by sand bars. The agricultural products include cotton, coffee, tobacco and cereals, and the forests produce rubber, vanilla and various textile fibres. Mining is undeveloped, although the mineral resources of the state include silver, gold, mercury, lead, iron, coal, sulphur and precious stones. The capital, Chilpancingo, or Chilpancingo de los Bravos (pop. 7497 in 1900), is a small town in the Sierra Madre about 110 m. from the coast and 200 m. S. of the Federal capital. It is a healthy well-built town on the old Acapulco road, is lighted by electricity and is temporarily the western terminus of the Interoceanic railway from Vera Cruz. It is celebrated in the history of Mexico as the meeting-place of the revolutionary congress of 1813, which issued a declaration of independence. Chilpancingo was badly damaged by an earthquake in January 1902, and again on the 16th of April 1907. Other important towns of the state are Tixtla, or Tixtla de Guerrero, formerly the capital (pop. 6316 in 1900), 3 m. N.E. of Chilpancingo; Chilapa (8256 in 1895), the most populous town of the state, partially destroyed by a hurricane in 1889, and again by the

earthquake of 1907; Iguala (6631 in 1895); and Acapulco. Guerrero was organized as a state in 1849, its territory being taken from the states of Mexico, Michoacan and Puebla.

GUERRILLA (erroneously written “guerilla,” being the diminutive of the Span. *guerra*, war), a term currently used to denote war carried on by bands in any irregular and unorganized manner. At the Hague Conference of 1899 the position of irregular combatants was one of the subjects dealt with, and the rules there adopted were reaffirmed at the Conference of 1907. They provide that irregular bands in order to enjoy recognition as belligerent forces shall (*a*) have at their head a person responsible for his subordinates, (*b*) wear some fixed distinctive badge recognizable at a distance, (*c*) carry arms openly, and (*d*) conform in their operations to the laws and customs of war. The rules, however, also provide that in case of invasion the inhabitants of a territory who on the approach of the invading enemy spontaneously take up arms to resist it, shall be regarded as belligerent troops if they carry arms openly and respect the laws and customs of war, although they may not have had time to become organized in accordance with the above provisions. These rules were borrowed almost word for word from the project drawn up at the Brussels international conference of 1874, which, though never ratified, was practically incorporated in the army regulations issued by the Russian government in connexion with the war of 1877-78.

(T. Ba.)

GUERRINI, OLINDO (1845-), Italian poet, was born at Sant’ Alberto, Ravenna, and after studying law took to a life of letters, becoming eventually librarian at Bologna University. In 1877 he published *Postuma*, a volume of *canzoniere*, under the name of Lorenzo Stechetti, following this with *Polemica* (1878), *Canti popolari romagnoli* (1880) and other poetical works, and becoming known as the leader of the “verist” school among Italian lyrical writers.

GUESDE, JULES BASILE (1845-), French socialist, was born in Paris on the 11th of November 1845. He had begun his career as a clerk in the French Home Office, but at the outbreak of the Franco-German War he was editing *Les Droits de l’homme* at Montpellier, and had to take refuge at Geneva in 1871 from a prosecution instituted on account of articles which had appeared in his paper in defence of the Commune. In 1876 he returned to France to become one of the chief French apostles of Marxian collectivism, and was imprisoned for six months in 1878 for taking part in the first Parisian International Congress. He edited at different times *Les Droits de l’homme*, *Le Cri du peuple*, *Le Socialiste*, but his best-known organ was the weekly *Égalité*. He had been in close association with Paul Lafargue, and through him with Karl Marx, whose daughter he married. It was in conjunction with Marx and Lafargue that he drew up the programme accepted by the national congress of the Labour party at Havre in 1880, which laid stress on the formation of an international labour party working by revolutionary methods. Next year at the Reims congress the orthodox Marxian programme of Guesde was opposed by the “possibilists,” who rejected the intransigeant attitude of Guesde for the opportunist policy of Benoît Malon. At the congress of St-Étienne the difference developed into separation, those who refused all compromise with a capitalist government following Guesde, while the opportunists formed several groups. Guesde took his full share in the consequent discussion between the Guesdists, the Blanquists, the possibilists, &c. In 1893 he was returned to the Chamber of Deputies for Lille (7th circonscription) with a large majority over the Christian Socialist and Radical candidates. He brought forward various proposals in social legislation forming the programme of the Labour party, without reference to the divisions among the Socialists, and on the 20th of November 1894 succeeded in raising a two days’ discussion of the collectivist principle in the Chamber. In 1902 he was not re-elected, but resumed his seat in 1906. In 1903 there was a formal reconciliation at the Reims congress of the sections of the party, which then took the name of the Socialist party of

France. Guesde, nevertheless, continued to oppose the opportunist policy of Jaurès, whom he denounced for supporting one bourgeois party against another. His defence of the principle of freedom of association led him, incongruously enough, to support the religious Congregations against Émile Combes. Besides his numerous political and socialist pamphlets he published in 1901 two volumes of his speeches in the Chamber of Deputies entitled *Quatre ans de lutte de classe 1893-1898*.

GUEST, EDWIN (1800-1880), English antiquary, was born in 1800. He was educated at King Edward's school, Birmingham, and at Caius College, Cambridge, where he graduated as eleventh wrangler, subsequently becoming a fellow of his college. Called to the bar in 1828, he devoted himself, after some years of legal practice, to antiquarian and literary research. In 1838 he published his exhaustive *History of English Rhythms*. He also wrote a very large number of papers on Roman-British history, which, together with a mass of fresh material for a history of early Britain, were published posthumously under the editorship of Dr Stubbs under the title *Origines Celticae* (1883). In 1852 Guest was elected master of Caius College, becoming LL.D. in the following year, and in 1854-1855 he was vice-chancellor of Cambridge University. Guest was a fellow of the Royal Society, and an honorary member of the Society of Antiquaries. He died on the 23rd of November 1880.

GUEST (a word common to Teutonic languages; cf. Ger. *Gast*, and Swed. *gäst*; cognate with Lat. *hostis*, originally a stranger, hence enemy; cf. "host"), one who receives hospitality in the house of another, his "host"; hence applied to a parasite.

GUETTARD, JEAN ÉTIENNE (1715-1786), French naturalist and mineralogist, was born at Étampes, on the 22nd of September 1715. In boyhood he gained a knowledge of plants from his grandfather, who was an apothecary, and later he qualified as a doctor in medicine. Pursuing the study of botany in various parts of France and other countries, he began to take notice of the relation between the distribution of plants and the soils and subsoils. In this way his attention came to be directed to minerals and rocks. In 1746 he communicated to the Academy of Sciences in Paris a memoir on the distribution of minerals and rocks, and this was accompanied by a map on which he had recorded his observations. He thus, as remarked by W. D. Conybeare, "first carried into execution the idea, proposed by [Martin] Lister years before, of geological maps." In the course of his journeys he made a large collection of fossils and figured many of them, but he had no clear ideas about the sequence of strata. He made observations also on the degradation of mountains by rain, rivers and sea; and he was the first to ascertain the existence of former volcanoes in the district of Auvergne. He died in Paris on the 7th of January 1786.

His publications include: *Observations sur les plantes* (2 vols., 1747); *Histoire de la découverte faite en France de matières semblables à celles dont la porcelaine de la Chine est composée* (1765); *Mémoires sur différentes parties des sciences et arts* (5 vols., 1768-1783); *Mémoire sur la minéralogie du Dauphiné* (2 vols., 1779). See *The Founders of Geology*, by Sir A. Geikie (1897).

GUEUX, LES, or "The Beggars," a name assumed by the confederacy of nobles and other malcontents, who in 1566 opposed Spanish tyranny in the Netherlands. The leaders of the

nobles, who signed a solemn league known as “the Compromise,” by which they bound themselves to assist in defending the rights and liberties of the Netherlands against the civil and religious despotism of Philip II., were Louis, count of Nassau, and Henry, count of Brederode. On the 5th of April 1566 permission was obtained for the confederates to present a petition of grievances, called “the Request,” to the regent, Margaret, duchess of Parma. About 250 nobles marched to the palace accompanied by Louis of Nassau and Brederode. The regent was at first alarmed at the appearance of so large a body, but one of her councillors, Berlaymont by name, was heard to exclaim, “What, madam, is your highness afraid of these beggars (*ces gueux*)?” The appellation was not forgotten. At a great feast held by some 300 confederates at the Hôtel Culemburg three days later, Brederode in a speech declared that if need be they were all ready to become “beggars” in their country’s cause. The words caught on, and the hall resounded with loud cries of “*Vivent les gueux!*” The name became henceforward a party appellation. The patriot party adopted the emblems of beggarhood, the wallet and the bowl, as trinkets to be worn on their hats or their girdles, and a medal was struck having on one side the head of Philip II., on the other two clasped hands with the motto “*Fidèle au roy, jusques à porter la besace*.” The original league of “Beggars” was short-lived, crushed by the iron hand of Alva, but its principles survived and were to be ultimately triumphant.

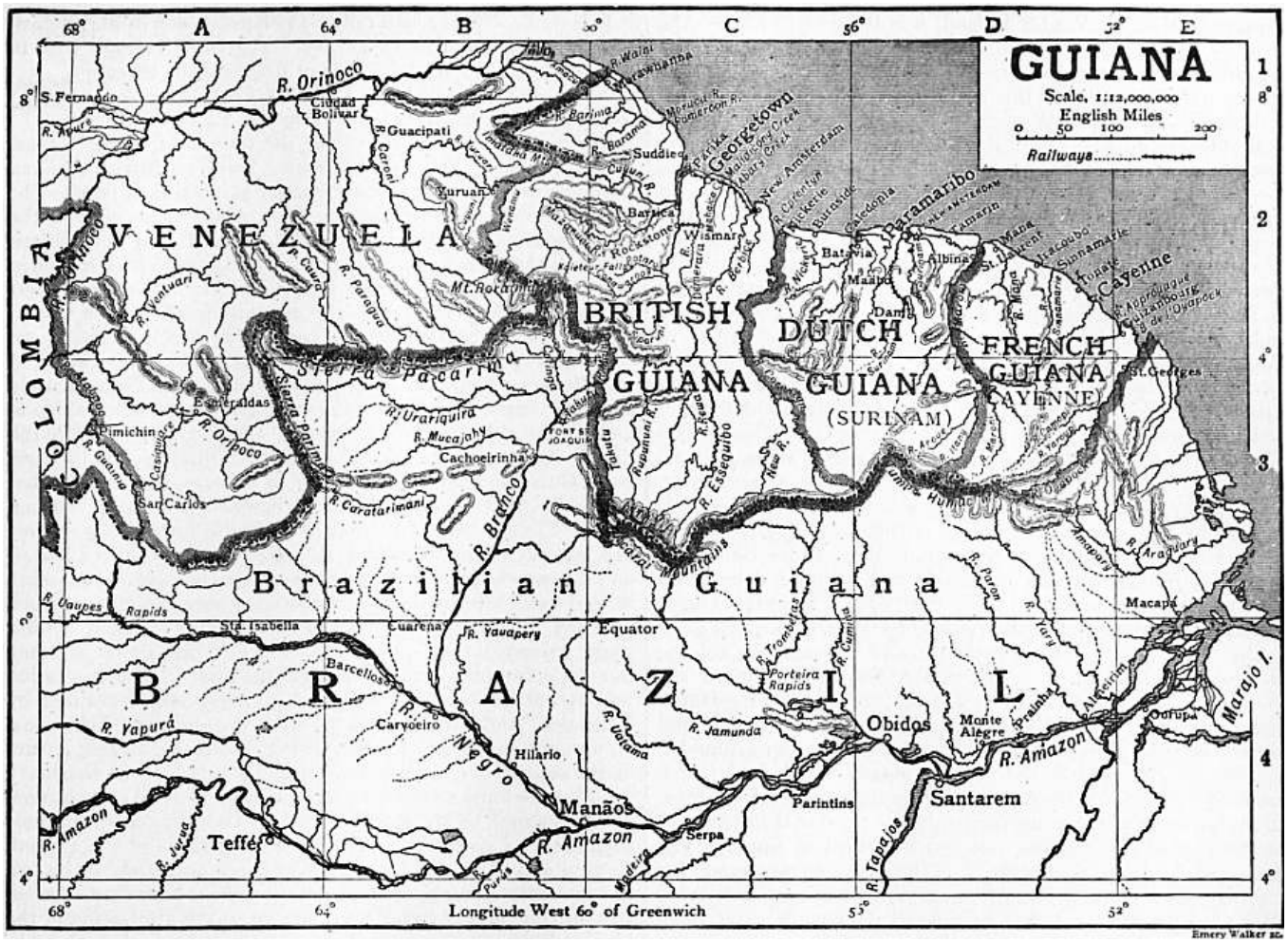
In the year 1569 the prince of Orange, who had now openly placed himself at the head of the party of revolt, granted letters of marque to a number of vessels manned by crews of desperadoes drawn from all nationalities. These fierce corsairs under the command of a succession of daring and reckless leaders—the best-known of whom is William de la Marek, lord of Lumey—were called “*Gueux de mer*,” or “Sea Beggars.” At first they were content with plundering both by sea and land and carrying their booty to the English ports where they were able to refit and replenish their stores. This went on till 1572, when Queen Elizabeth suddenly refused to admit them to her harbours. Having no longer any refuge, the Sea Beggars in desperation made an attack upon Brill, which they seized by surprise in the absence of the Spanish garrison on the 1st of April 1572. Encouraged by their unhoped-for success, they now sailed to Flushing, which was also taken by a *coup de main*. The capture of these two towns gave the signal for a general revolt of the northern Netherlands, and is regarded as the real beginning oí the War of Dutch Independence.

GUEVARA, ANTONIO DE (*c*. 1490-1544), Spanish chronicler and moralist, was a native of the province of Alava, and passed some of his earlier years at the court of Isabella, queen of Castile. In 1528 he entered the Franciscan order, and afterwards accompanied the emperor Charles V. during his journeys to Italy and other parts of Europe. After having held successively the offices of court preacher, court historiographer, bishop of Guadix and bishop of Mondoñedo, he died in 1544. His earliest work, entitled *Reloj de principes*, published at Valladolid in 1529, and, according to its author, the fruit of eleven years’ labour, is a didactic novel, designed, after the manner of Xenophon’s *Cyropaedia*, to delineate, in a somewhat ideal way for the benefit of modern sovereigns, the life and character of an ancient prince, Marcus Aurelius, distinguished for wisdom and virtue. It was often reprinted in Spanish; and before the close of the century had also been translated into Latin, Italian, French and English, an English translation being by J. Bourchier (London, 1546) and another being by T. North. It is difficult now to account for its extraordinary popularity, its thought being neither just nor profound, while its style is stiff and affected. It gave rise to a literary controversy, however, of great bitterness and violence, the author having ventured without warrant to claim for it an historical character, appealing to an imaginary “manuscript in Florence.” Other works of Guevara are the *Decada de los Césares* (Valladolid, 1539), or “Lives of the Ten Roman Emperors,” in imitation of the manner of Plutarch and Suetonius; and the *Epistolas familiares* (Valladolid, 1539-1545), sometimes called “The Golden Letters,” often printed in Spain, and translated into all the principal languages of Europe. They are in reality a collection of stiff and formal essays which have long ago fallen into merited oblivion. Guevara, whose influence upon the Spanish prose of the 16th century was considerable, also wrote *Libro de los inventores del arte de marear* (Valladolid, 1539, and Madrid, 1895).

GUEVARA, LUIS VELEZ DE (1579-1644), Spanish dramatist and novelist, was born at Écija on the 1st of August 1579. After graduating as a sizar at the university of Osuna in 1596, he joined the household of Rodrigo de Castro, cardinal-archbishop of Seville, and celebrated the marriage of Philip II. in a poem signed "Velez de Santander," a name which he continued to use till some years later. He appears to have served as a soldier in Italy and Algiers, returning to Spain in 1602 when he entered the service of the count de Saldaña, and dedicated himself to writing for the stage. He died at Madrid on the 10th of November 1644. He was the author of over four hundred plays, of which the best are *Reinar despues de morir*, *Más pesa el rey que la sangre*, *La Luna de la Sierra* and *El Diablo está en Cantillana*; but he is most widely known as the author of *El Diablo cojuelo* (1641), a fantastic novel which suggested to Le Sage the idea of his *Diable boiteux*.

GUGLIELMI, PIETRO (1727-1804), Italian composer, was born at Massa Carrara in May 1727, and died in Rome on the 19th of November 1804. He received his first musical education from his father, and afterwards studied under Durante at the Conservatorio di Santa Maria di Loreto at Naples. His first operatic work, produced at Turin in 1755, established his reputation, and soon his fame spread beyond the limits of his own country, so that in 1762 he was called to Dresden to conduct the opera there. He remained for some years in Germany, where his works met with much success, but the greatest triumphs were reserved for him in England. He went to London, according to Burney, in 1768, but according to Florimo in 1772, returning to Naples in 1777. He still continued to produce operas at an astounding rate, but was unable to compete successfully with the younger masters of the day. In 1793 he became *maestro di cappella* at St Peter's, Rome. He was a very prolific composer of Italian comic opera, and there is in most of his scores a vein of humour and natural gaiety not surpassed by Cimarosa himself. In serious opera he was less successful. But here also he shows at least the qualities of a competent musician. Considering the enormous number of his works, his unequal workmanship and the frequent instances of mechanical and slip-shod writing in his music need not surprise us. The following are among the most celebrated of his operas: *I Due Gemelli*, *La Serva inamorata*, *La Pastorella nobile*, *La Bella Peccatrice*, *Rinaldo*, *Artaserse*, *Didone* and *Enea e Lavinia*. He also wrote oratorios and miscellaneous pieces of orchestral and chamber music. Of his eight sons two at least acquired fame as musicians—Pietro Carlo (1763-1827), a successful imitator of his father's operatic style, and Giacomo, an excellent singer.

GUIANA (*Guyana*, *Guayana*[1]), the general name given in its widest acceptation to the part of South America lying to the north-east from 8° 40′ N. to 3° 30′ S. and from 50° W. to 68° 30′ W. Its greatest length, from Cabo do Norte to the confluence of the Rio Xie and Rio Negro, is about 1250 m., its greatest breadth, from Barima Point in the mouth of the Orinoco to the confluence of the Rio Negro and Amazon, 800 m. Its area is roughly 690,000 sq. m. Comprised in this vast territory are Venezuelan (formerly Spanish) Guiana, lying on both sides of the Orinoco and extending S. and S.W. to the Rio Negro and Brazilian settlements; British Guiana, extending from Venezuela to the left bank of the Corentyn river; Dutch Guiana (or Surinam), from the Corentyn to the Maroni river; French Guiana (or Cayenne), from the Maroni to the Oyapock river;[2] Brazilian (formerly Portuguese) Guiana, extending from the southern boundaries of French, Dutch, British and part of Venezuelan Guiana, to the Amazon and the Negro. Of these divisions the first and last are now included in Venezuela and Brazil respectively; British, Dutch and French Guiana are described in order below, and are alone considered here.



In their physical geography the three Guianas present certain common characteristics. In each the principal features are the rivers and their branch streams. In each colony the northern portion consists of a fluviomarine deposit extending inland and gradually rising to a height of 10 to 15 ft. above the sea. This alluvial plain varies in width from 50 m. to 18 m. and is traversed by ridges of sand and shells, roughly parallel to what is now the coast, indicating the trend of former shore lines. By the draining and diking of these lands the plantations have been formed along the coast and up the rivers. These low lands are attached to a somewhat higher plateau, which towards the coast is traversed by numerous huge sand-dunes and inland by ranges of hills rising in places to as much as 2000 ft. The greater part of this belt of country, in which the auriferous districts principally occur, is covered with a dense growth of jungle and high forest, but savannahs, growing only a long wiry grass and poor shrubs, intrude here and there, being in the S.E. much nearer to the coast than in the N.W. The hinterlands consist of undulating open savannahs rising into hills and mountains, some grass-covered, some in dense forest.

Geology[3].—Guiana is formed almost entirely of gneiss and crystalline schists penetrated by numerous dikes of diorite, diabase, &c. The gold of the placer deposits appears to be derived, not from quartz reefs, but from the schists and intrusive rocks, the selvages of the diabase dikes sometimes containing as much as 5 oz. of gold to the ton. In British Guiana a series of conglomerates, red and white sandstone and red shale, rests upon the gneiss and forms the remarkable table-topped mountains Roraima, Kukenaam, &c. The beds are horizontal, and according to Brown and Sawkins, three layers of greenstone, partly intrusive and partly contemporaneous, are interstratified with the sedimentary deposits. The age of these beds is uncertain, but they evidently correspond with the similar series which occurs in Brazil, partly Palaeozoic and partly Cretaceous. In Dutch Guiana there are a few small patches supposed to belong to the Cretaceous period. Along the coast, and in the lower parts of the river valleys, are deposits which are mainly Quaternary but may also include beds of Tertiary age.

History.—The coast of Guiana was sighted by Columbus in 1498 when he discovered the island of Trinidad and the peninsula of Paria, and in the following year by Alonzo de Ojeda and Amerigo Vespucci; and in 1500 Vincente Yañez Pinzon ventured south of the equator, and sailing north-west along the coast discovered the Amazon; he is believed to have also entered some of the other rivers of Guiana, one of which, now called Oyapock, is marked on early maps as Rio Pinzon. Little, however, was known of Guiana until the fame of the fabled golden city

Manoa or El Dorado tempted adventurers to explore its rivers and forests. From letters of these explorers found in captured ships, Sir Walter Raleigh was induced to ascend the Orinoco in search of El Dorado in 1595, to send Lawrence Keymis on the same quest in the following year, and in 1617 to try once again, with the same intrepid lieutenant, an expedition fraught with disaster for both of them. As early as 1580 the Dutch had established a systematic trade with the Spanish main, but so far as is known their first voyage to Guiana was in 1598. By 1613 they had three or four settlements on the coast of Demerara and Essequibo, and in about 1616 some Zeelanders settled on a small island, called by them *Kyk ober al* ("see over all"), in the confluence of the Cuyuni and Mazaruni rivers. While the Dutch traders were struggling for a footing in Essequibo and Demerara, English and French traders were endeavouring to form settlements on the Oyapock river, in Cayenne and in Surinam, and by 1652 the English had large interests in the latter and the French in Cayenne. In 1663 Charles II. issued letters patent to Lord Willoughby of Parham and Lawrence Hyde, second son of the earl of Clarendon, granting them the district between the Copenam and Maroni rivers, a province described as extending from E. to W. some 120 m. This colony was, however, formally ceded to the Netherlands in 1667 by the peace of Breda, Great Britain taking possession of New York. Meanwhile the Dutch West India Company, formed in 1621, had taken possession of Essequibo, over which colony it exercised sovereign rights until 1791. In 1624 a Dutch settlement was effected in the Berbice river, and from this grew Berbice, for a long time a separate and independent colony. In 1657 the Zeelanders firmly established themselves in the Pomeroon, Moruca and Demerara rivers, and by 1674 the Dutch were colonizing all the territory now known as British and Dutch Guiana. The New Dutch West Indian Company, founded in that year to replace the older company which had failed, received Guiana by charter from the states-general in 1682. In the following year the company sold one-third of their territory to the city of Amsterdam, and another third to Cornelis van Aerssens, lord of Sommelsdijk. The new owners and the company incorporated themselves as the Chartered Society of Surinam, and Sommelsdijk agreed to fill the post of governor of the colony at his own expense. The lucrative trade in slaves was retained by the West Indian Company, but the society could import them on its own account by paying a fine to the company. Sommelsdijk's rule was wise and energetic. He repressed and pacified the Indian tribes, erected forts and disciplined the soldiery, constructed the canal which bears his name, established a high court of justice and introduced the valuable cultivation of the cocoa-nut. But on the 17th of June 1688 he was massacred in a mutiny of the soldiers. The "third" which Sommelsdijk possessed was offered by his widow to William III. of England, but it was ultimately purchased by the city of Amsterdam for 700,000 fl. The settlements in Essequibo progressed somewhat slowly, and it was not until immigration was attracted in 1740 by offers to newcomers of free land and immunity for a decade from taxation that anything like a colony could be said to exist there. In 1732 Berbice placed itself under the protection of the states-general of Holland and was granted a constitution, and in 1773 Demerara, till then a dependency of Essequibo, was constituted as a separate colony. In 1781 the three colonies, Demerara, Essequibo and Berbice, were captured by British privateers, and were placed by Rodney under the governor of Barbados, but in 1782 they were taken by France, then an ally of the Netherlands, and retained until the peace of 1783, when they were restored to Holland. In 1784 Essequibo and Demerara were placed under one governor, and Georgetown—then called Stabroek—was fixed on as the seat of government. The next decade saw a series of struggles between the colonies and the Dutch West India company, which ended in the company being wound up and in the three colonies being governed directly by the states-general. In 1796 the British again took possession, and retained the three colonies until the peace of Amiens in 1802, when they were once again restored to Holland, only to be recaptured by Great Britain in 1803, in which year the history proper of British Guiana began.

I. British Guiana, the only British possession in S. America, was formally ceded in 1814-1815. The three colonies were in 1831 consolidated into one colony divided into three counties, Berbice extending from the Corentyn river to the Abary creek, Demerara from the Abary to the Boerasirie creek, Essequibo from the Boerasirie to the Venezuelan frontier. This boundary-line between British Guiana and Venezuela was for many years the subject of dispute. The Dutch, while British Guiana was in their possession, claimed the whole watershed of the Essequibo river, while the Venezuelans asserted that the Spanish province of Guayana had extended up to the left bank of the Essequibo. In 1840 Sir Robert Schomburgk had suggested a demarcation, afterwards known as the "Schomburgk line"; and subsequently, though no agreement was arrived at, certain modifications were made in this British claim. In 1886 the government of Great Britain declared that it would thenceforward exercise jurisdiction up to and within a boundary known as "the modified Schomburgk line." Outposts were located at points on this line, and for some years Guianese police and Venezuelan soldiers faced one another across the Amacura creek in the Orinoco mouth and at Yuruan up the Cuyuni river. In 1897 the dispute formed the subject

British Guiana.

of a message to congress from the president of the United States, and in consequence of this intervention the matter was submitted to an international commission, whose award was issued at Paris in 1899 (see Venezuela). By this decision neither party gained its extreme claim, the line laid down differing but little from the original Schomburgk line. The demarcation was at once undertaken by a joint commission appointed by Venezuela and British Guiana and was completed in 1904. It was not found practicable, owing to the impassable nature of the country, to lay down on earth that part of the boundary fixed by the Paris award between the head of the Wenamu creek and the summit of Mt. Roraima, and the boundary commissioners suggested a deviation to follow the watersheds of the Caroni, Cuyuni and Mazaruni rivers, a suggestion accepted by the two governments. In 1902 the delimitation of the boundary between British Guiana and Brazil was referred to the arbitration of the king of Italy, and by his reward, issued in June 1904, the substantial area in dispute was conceded to British Guiana. The work of demarcation has since been carried out.

Towns, &c.—The capital of British Guiana is Georgetown, at the mouth of the Demerara river, on its right bank, with a population of about 50,000. New Amsterdam, on the right bank of the Berbice river, has a population of about 7500. Each possesses a mayor and town council, with statutory powers to impose rates. There are nineteen incorporated villages, and ten other locally governed areas known as country districts, the affairs of which are controlled by local authorities, known as village councils and country authorities respectively.

Population.—The census of 1891 gave the population of British Guiana as 278,328. There was no census taken in 1901. By official estimates the population at the end of 1904 was 301,923. Of these some 120,000 were negroes and 124,000 East Indians; 4300 were Europeans, other than Portuguese, estimated at about 11,600, and some 30,000 of mixed race. The aborigines—Arawaks, Caribs, Wapisianas, Warraws, &c.—who numbered about 10,000 in 1891, are now estimated at about 6500. In 1904 the birth-rate for the whole colony was 30.3 per 1000 and the death-rate 28.8.

Physical Geography.—The surface features of British Guiana may be divided roughly into four regions: first, the alluvial seaboard, flat and below the level of high-water; secondly, the forest belt, swampy along the rivers but rising into undulating lands and hills between them; thirdly, the savannahs in and inland of the forest belt, elevated table-lands, grass-covered and practically treeless; and fourthly, the mountain ranges. The eastern portion of the colony, from the source of its two largest rivers, the Corentyn and Essequibo, is a rough inclined plain, starting at some 900 ft. above sea-level at the source of the Takutu in the west, but only some 400 at that of the Corentyn in the west, and sloping down gradually to the low alluvial flats about 3 ft. below high-water line. The eastern part is generally forested; the western is an almost level savannah, with woodlands along the rivers. The northern portion of British Guiana, the alluvial flats alluded to already, consists of a fluviomarine deposit extending inland from 25 m. to 30 m., gradually rising to about 12 ft. above high-water mark and ending against beds of sandy clay, the residua of igneous rocks decomposed *in situ*, which form an extensive undulating region rising to 150 ft. above the sea and stretching back to the forest-covered hills. Roughly parallel to the existing coast-line are narrow reefs of sand and sea-shells, which are dunes indicating the trend of former limits of the sea, and still farther back are the higher “sand hills,” hills of granite or diabase with a thick stratum of coarse white sand superimposed. From the coast-line seawards the ocean deepens very gradually, and at low tide extensive flats of sand and of mixed clay and sand (called locally “caddy”) are left bare, these flats being at times covered with a deposit of thin drift mud.

Two great parallel mountain systems cross the colony from W. to E., the greater being that of the Pacaraima and Merumé Mts., and the lesser including the Kanuku Mts. (2000 ft.), while the Acarai Mts., a densely-wooded range rising to 2500 ft., form the southern boundary of British Guiana and the watershed between the Essequibo and the Amazon. These mountains rise generally in a succession of terraces and broad plateaus, with steep or even sheer sandstone escarpments. They are mostly flat-topped, and their average height is about 3500 ft. The Pacaraima Mts., however, reach 8635 ft. at Roraima, and the latter remarkable mountain rises as a perpendicular wall of red rock 1500 ft. in height springing out of the forest-clad slopes below the summit, and was considered inaccessible until in December 1884 Messrs im Thurn and Perkins found a ledge by which the top could be reached. The summit is a table-land some 12 sq. m. in area. Mt. Kukenaam is of similar structure and also rises above 8500 ft. Other conspicuous summits (about 7000 ft.) are Iwalkarima, Eluwarima, Ilutipu and Waiakapiapu. The southern portion of the Pacaraima range comprises rugged hills and rock-strewn valleys, but to the N., where the sandstone assumes the table-shaped form, there are dense forests, and the scenery is of extraordinary grandeur. Waterfalls frequently descend the cliffs from a great height (nearly 2000 ft. sheer at Roraima and Kukenaam). The sandstone formation can be traced from the northern Pacaraima range on the N.W. to the Corentyn in the S.E. It is traversed in places by dikes and sills of diabase or dolerite, while bosses of more or less altered gabbro rise through it. The surface of a large part of the colony is composed of

gneiss, and of gneissose granite, which is seen in large water-worn bosses in the river beds. Intrusive granite is of somewhat rare occurrence; where found, it gives rise to long low rolls of hilly country and to cataracts in the rivers. Extensive areas of the country consist of quartz-porphyry, porphyrites and felstone, and of more or less schistose rocks derived from them. These rocks are closely connected with the gneissose granites and gneiss, and there are reasons for believing that the latter are the deep-seated portions of them and are only visible where they have been exposed by denudation. Long ranges of hills, varying in elevation from a few hundreds to from 2000 ft. to 3000 ft., traverse the plains of the gneissose districts. These are caused either by old intrusions of diabase and gabbro which have undergone modifications, or by later ones of dolerite. These ranges are of high importance, as the rocks comprising them are the main source of gold in British Guiana.

Rivers.—The principal physical features of British Guiana are its rivers and their branches, which form one vast network of waterways all over it, and are the principal, indeed practically the only, highways inland from the coast. Chief among them are the Waini, the Essequibo, and its tributaries the Mazaruni and Cuyuni, the Demerara, the Berbice and the Corentyn. The Essequibo rises in the Acarai Mts., in 0° 41′ N. and about 850 ft. above the sea, and flows northwards for about 600 m. until it discharges itself into the ocean by an estuary nearly 15 m. in width. In this estuary are several large and fertile islands, on four of which sugar used to be grown. Now but one, Wakenaam, can boast of a factory. The Essequibo can be entered only by craft drawing less than 20 ft. and is navigable for these vessels for not more than 50 m., its subsequent course upwards being frequently broken by cataracts and rapids. Some 7 m. below the first series of rapids it is joined by the Mazaruni, itself joined by the Cuyuni some 4 m. farther up. It has a remarkable course from its source in the Merume Mountains, about 2400 ft. above the sea. It flows first south, then west, north-west, north, and finally south-east to within 20 m. of its own source, forming many fine falls, and its course thereafter is still very tortuous. In 4° N. and 58° W., the Essequibo is joined by the Rupununi, which, rising in a savannah at the foot of the Karawaimento Mts., has a northerly and easterly course of fully 200 m. In 3° 37′ N. the Awaricura joins the Rupununi, and by this tributary the Pirara, a tributary of the Amazon, may be reached,—an example of the interesting series of *itabos* connecting nearly all S. American rivers with one another. Another large tributary of the Essequibo is the Potaro, on which, at 1130 ft. above sea-level and in 5° 8′ N. and 59° 19′ W., is the celebrated Kaieteur fall, discovered in 1870 by Mr C. Barrington Brown while engaged on a geological survey. This fall is produced by the river flowing from a tableland of sandstone and conglomerate into a deep valley 822 ft. below. For the first 741 ft. the water falls as a perpendicular column, thence as a sloping cataract to the still reach below. The river 200 yds. above the fall is about 400 ft. wide, while the actual waterway of the fall itself varies from 120 ft. in dry weather to nearly 400 ft. in rainy seasons. The Kaieteur, which it took Mr Brown a fortnight to reach from the coast, can now be reached on the fifth day from Georgetown. Among other considerable tributaries of the Essequibo are the Siparuni, Burro-Burro, Rewa, Kuyuwini and Kassi-Kudji. The Demerara river, the head-waters of which are known only to Indians, rises probably near 5° N., and after a winding northerly course of some 200 m. enters the ocean in 6° 50′ N. and 58° 20′ W. A bar of mud and sand prevents the entrance of vessels drawing more than 19 ft. The river is from its mouth, which is nearly 2 m. wide, navigable for 70 m. to all vessels which can enter. The Berbice river rises in about 3° 40′ N., and in 3° 53′ N. is within 9 m. of the Essequibo. At its mouth it is about 2½ m. wide, and is navigable for vessels drawing not more than 12 ft. for about 105 m. and for vessels drawing not more than 7 ft. for fully 175 m. Thence upwards it is broken by great cataracts. The Canje creek joins the Berbice river close to the sea. The Corentyn river rises in 1° 48′ 30″ N., about 140 m. E. of the Essequibo, and flowing northwards enters the Atlantic by an estuary some 14 m. wide. The divide between its head-waters and those of streams belonging to the Amazon system is only some 400 ft. in elevation. It is navigable for about 150 m., some of the reaches being of great width and beauty. The upper reaches are broken by a series of great cataracts, some of which, until the discovery of Kaieteur, were believed to be the grandest in British Guiana. Among other rivers are the Pomeroon, Moruca and Barima, while several large streams or creeks fall directly into the Atlantic, the largest being the Abary, Mahaicony and Mahaica, between Berbice and Demerara, and the Boerasirie between Demerara and Essequibo. The colour of the water of the rivers and creeks is in general a dark brown, caused by the infusion of vegetable matter, but where the streams run for a long distance through savannahs they are of a milky colour.

Climate.—The climate is, as tropical countries go, not unhealthy. Malarial fevers are common but preventible; and phthisis is prevalent, not because the climate is unsuitable to sufferers from pulmonary complaints, but because of the ignorance of the common people of the elementary principles of hygiene, an ignorance which the state is endeavouring to lessen by including the teaching of hygiene in the syllabus of the primary schools. The temperature is uniform on the coast for the ten months from October to July, the regular N.E. trade winds keeping it down to an average of 80° F. In August and September the trades die away and the heat becomes oppressive. In the interior the nights are cold and damp. Hurricanes, indeed even strong gales, are unknown; a tidal wave is an impossibility; and the nature of the soil of

the coast lands renders earthquakes practically harmless. Occasionally there are severe droughts, and the rains are sometimes unduly prolonged, but usually the year is clearly divided into two wet and two dry seasons. The long wet season begins in mid-April and lasts until mid-August. The long dry season is from September to the last week in November. December and January constitute the short rainy season, and February and March the short dry season. The rainfall varies greatly in different parts of the colony; on the coast it averages about 80 in. annually.

Flora.—The vegetation is most luxuriant and its growth perpetual. Indigenous trees and plants abound in the utmost variety, while many exotics have readily adapted themselves to local conditions. Along the coast is a belt of courida and mangrove—the bark of the latter being used for tanning—forming a natural barrier to the inroads of the sea, but one which—very unwisely—has been in parts almost ruined to allow of direct drainage. The vast forests afford an almost inexhaustible supply of valuable timbers; greenheart and mora, largely used in shipbuilding and for wharves and dock and lock gates; silverbally, yielding magnificent planks for all kinds of boats; and cabinet woods, such as cedar and crabwood. There may be seen great trees, struggling for life one with the other, covered with orchids—some of great beauty and value—and draped with falling *lianas* and vines. Giant palms fringe the river-banks and break the monotony of the mass of smaller foliage. Many of the trees yield gums, oils and febrifuges, the bullet tree being bled extensively for *balata*, a gum used largely in the manufacture of belting. Valuable varieties of rubber have also been found in several districts, and since early in 1905 have attracted the attention of experts from abroad. On the coast plantains, bananas and mangoes grow readily and are largely used for food, while several districts are admirably adapted to the growth of limes. Oranges, pineapples, star-apples, granadillas, guavas are among the fruits; Indian corn, cassava, yams, eddoes, tannias, sweet potatoes and ochroes are among the vegetables, while innumerable varieties of peppers are grown and used in large quantities by all classes. The dainty avocado pear, purple and green, grows readily. In the lagoons and trenches many varieties of water-lilies grow wild, the largest being the famous *Victoria regia*.

Fauna.—Guiana is full of wild animals, birds, insects and reptiles. Among the wild animals, one and all nocturnal, are the mipourrie or tapir, manatee, acouri and labba (both excellent eating), sloth, ant-eater, armadillo, several kinds of deer, baboons, monkeys and the puma and jaguar. The last is seen frequently down on the coast, attracted from the forest by the cattle grazing on the front and back pasture lands of the estates. Among the birds may be mentioned the carrion crow (an invaluable scavenger), vicissi and muscovy ducks, snipe, teal, plover, pigeon, the ubiquitous kiskadee or *qu'est que dit*, a species of shrike—his name derived from his shrill call—the canary and the twa-twa, both charming whistlers. These are all found on the coast. In the forest are maam (partridge), maroudi (wild turkey), the beautiful bell-bird with note like a silver gong, the quadrille bird with its tuneful oft-repeated bar, great flocks of macaws and parrots, and other birds of plumage of almost indescribable richness and variety. On the coast the trenches and canals are full of alligators, but the great cayman is found only in the rivers of the interior. Among the many varieties of snakes are huge constricting camoudies, deadly bushmasters, labarrias and rattlesnakes. Among other reptiles are the two large lizards, the salumpenta (an active enemy of the barn-door fowl), and the iguana, whose flesh when cooked resembles tender chicken. The rivers, streams and trenches abound with fishes, crabs and shrimps, the amount of the latter consumed being enormous, running into tons weekly as the coolies use them in their curries and the blacks in their foo-foo.

Government and Administration.—Executive power is vested in a governor, who is advised in all administrative matters by an executive council, consisting of five official and three unofficial members nominated by the crown. Legislative authority is vested in the Court of Policy, consisting of the governor, who presides and without whose permission no legislation can be initiated, seven other official members and eight elected members. This body has, however, no financial authority, all taxation and expenditure being dealt with by the Combined Court, consisting of the Court of Policy combined with six financial representatives. The elected members of the Court of Policy and the financial representatives are elected by their several constituencies for five years. Qualification for the Court of Policy is the ownership, or possession under lease for a term of twenty-one years, of eighty acres of land, of which at least forty acres are under cultivation, or of house property to the value of $7500. A financial representative must be similarly qualified or be in receipt of a clear income of not less than £300 per annum. Every male is entitled to be registered as a voter who (in addition to the usual formal qualifications) owns (during six months prior to registration) three acres of land in cultivation or a house of the annual rental or value of £20; or is a secured tenant for not less than three years of six acres of land in cultivation or for one year of a house of £40 rental; or has an income of not less than £100 per annum; or has during the previous twelve months paid £4, 3s. 4d. in direct taxation. Residence in the electoral district for six months prior to registration is coupled with the last two alternative qualifications. Plural voting is legal but no plumping is allowed. The combined court is by this constitution, which was granted in 1891,

allowed the use of all revenues due to the crown in return for a civil list voted for a term now fixed at three years. English is the official and common language. The Roman-Dutch law, modified by orders-in-council and local statutes, governs actions in the civil courts, but the criminal law is founded on that of England. Magistrates have in civil cases jurisdiction up to £20, while an appeal lies from their decisions in any criminal or civil case. The supreme court consists of a chief justice and two puisne judges, and has various jurisdictions. The full court, consisting of the three judges or any two of them, has jurisdiction over all civil matters, but an appeal lies to His Majesty in privy council in cases involving £500 and upwards. A single judge sits in insolvency, in actions involving not over £520, and in appeals from magistrates' decisions. The appeal full court, consisting of three judges, sits to hear appeals from decisions of a single judge in the limited civil, appellate and insolvency courts. Criminal courts are held four times a year in each county, a single judge presiding in each court. A court of crown cases reserved is formed by the three judges, of whom two form a quorum provided the chief-justice is one of the two. There are no imperial troops now stationed in British Guiana, but there is a semi-military police force, a small militia and two companies of volunteers. The Church of England and the Church of Scotland are both established, and grants-in-aid are also given to the Roman Catholic and Wesleyan churches and to several other denominations.

The revenue and expenditure now each amount annually to an average of a little over £500,000. About one-half of the revenue is produced by import duties, and about £90,000 by excise. The public debt on the 31st of March 1905 stood at £989,620.

The system of primary education is denominational and is mainly supported from the general revenue. During 1904-1905, 213 schools received grants-in-aid amounting to £23,500, the average cost per scholar being a little over £1. These grants are calculated on the results of examinations held annually, an allowance varying from 4s. 4½d. to 1s. 0½d. being made for each pass in reading, writing, arithmetic, school-garden work, nature study, singing and drill, English, geography, elementary hygiene and sewing. Secondary education is provided in Georgetown at some private establishments, and for boys at Queen's College, an undenominational government institution where the course of instruction is the same as at a public school in England, and the boys are prepared for the Cambridge local examinations, on the result of which annually depend the Guiana scholarship—open to boys and girls, and carrying a university or professional training in England—and two scholarships at Queen's College.

Industries and Trade.—At the end of the third decade of the 19th century the principal exports were sugar, rum, molasses, cotton and coffee. In 1830, 9,500,000 lb of coffee were sent abroad, but after the emancipation of the slaves it almost ceased as an export, and the little that is now grown is practically entirely consumed in the colony. The cultivation of cotton ceased in 1844, and, but for a short revival during the American civil war, has never prospered since. Efforts have been made to resuscitate its growth, but the experiments of the Board of Agriculture have only shown that Sea Island cotton is not adaptable to local conditions, and that no other known variety can as yet be recommended. To-day the principal exports are sugar, rum, molasses, molascuit—a cattle food made from molasses—gold, timber, balata, shingles and cattle. The annual value of the total exports is just under £2,000,000, of which about two-thirds go to Great Britain and British possessions. The cultivation of rice has made great strides in recent years, and, where difficulties of drainage and irrigation can be economically overcome, promises to increase rapidly. In 1873, 32,000,000 lb of rice were imported, whereas in 1904-1905, the quantity imported having fallen to 20,500,000 lb, there were over 18,000 acres under rice cultivation, and exportation, principally to the British West Indies, had commenced. The cultivation of the sugar-cane, and its manufacture into sugar and its by-products, still remains, in spite of numerous fluctuations, the staple industry. The provision of a trustworthy labour supply for the estates is of great importance, and local scarcity has made it necessary since 1840 to import it under a system of indenture. In that year and until 1867, liberated Africans were brought from Rio de Janeiro, Havana, Sierra Leone and St Helena, and in 1845 systematic immigration from India commenced and has since been carried on annually—save in 1849-1850. In 1853 immigration from China was tried, and was carried on by the government from 1859 to 1866, when it ceased owing to a convention arranged at Peking, stipulating that all immigrants should on the expiry of their term of indenture be entitled to be sent back at the expense of the colony, a liability it could not afford to incur. To reduce the cost of supervision and kindred expenses, and consequently of the cane and its manufacture into sugar, the policy of centralization has been universally adopted, and forty-six estates now produce as much sugar as three times that number did in 1875. During recent years Canada has come forward as a large buyer of Guiana's sugar, and in 1904-1905 the same amount went there as to the United States, in each case over 44,000 tons, whereas in 1901-1902 the United States took 85,000 tons and Canada under 8000 tons. Practically all the rum and molascuit go to England, and the molasses to Holland and Portuguese possessions. The lands on the coast and on the river banks up to the sand hills are of marked fertility, and can produce almost any tropical vegetable or fruit. Cultivation, however, save on the sugar, coffee and cocoa estates, and by a few exceptional small farmers,

is carried on in a haphazard and half-hearted manner, and the problem of agricultural development is one of great difficulty for the government. Much of the privately-owned land is not beneficially occupied, and in many cases it is not possible even to learn to whom it belongs, and though there are vast tracts of uncultivated crown land where a large farm or a small homestead can be easily and cheaply acquired, the difficulties involved in clearing, draining, and in some cases of protecting it by dams, are prohibitive to all but the exceptionally determined.

Prospecting for gold began in 1880, and from 1884 to 1893-1894 the output, chiefly from alluvial workings, increased from 250 oz. to nearly 140,000 oz. annually. The industry then received a serious check by the failure of several mines, and for nearly a decade was almost entirely in the hands of the small tributor, known locally as a pork-knocker. There has been some revival, chiefly due to foreign enterprise. At Omai on the Essequibo river a German syndicate worked a large concession on the hydraulic process of placer mining with considerable success, and more recently took to dredging on its flats. In the Puruni (a tributary of the Mazaruni) American capitalists, working the Peters' mine, have established their workings to a considerable depth, besides constructing a road, 60 m. in length, from Kartabo point, at the confluence of the Guyuni and Mazaruni, to the Puruni river opposite the mine. An English syndicate started dredging in the Conawarook, a tributary of the Essequibo. The principal gold districts are on the Essequibo and its tributaries—the chief being the Cuyuni, Mazaruni, Potaro and Conawarook—and on the Barima, Barama and Waini rivers in the north-west district. There have been smaller workings, mostly unsuccessful, in the Demerara and Berbice rivers.

Diamonds and other precious stones have been found in small quantities, and since 1900 efforts have been made to extend the output, nearly 11,000 carats weight of diamonds being exported in 1904. But though the small stones found were of good water, the cost of transport to the diamond fields, on the Mazaruni river, was heavy, and after 1904 the industry declined. Laws dealing with gold and precious stones passed in 1880, 1886 and 1887, and regulations in 1899, were codified in 1902 and amended in 1905.

Timber is cut, and balata and rubber collected, from crown lands by licences issued from the department of Lands and Mines. Wood-cutting, save on concessions held by a local company owning an up-country line of railway connecting the Demerara and Essequibo rivers, is limited to those parts of the forest which are close to the lower stretches of the rivers and creeks, the overland haulage of the heavy logs being both difficult and costly, while transport through the upper reaches of the rivers is impossible on account of the many cataracts and rapids. The average annual value of imports is £1,500,000, of which about two-thirds are from Great Britain and British possessions. Of the vessels trading with the colony, most are under the British flag, the remainder being principally American and Norwegian.

The money of account is dollars and cents, but, with the exception of the notes of the two local banks, the currency is British sterling. The unit of land measure is the Rhynland rood, roughly equal to 12 ft. 4 in. A Rhynland acre contains 300 square roods.

Inland Communication, &c.—The public roads extend along the coast from the Corentyn river to some 20 m. N. of the Essequibo mouth on the Aroabisci coast, and for a short distance up each of the principal rivers and creeks entering the sea between these points. A line of railway 60½ m. in length runs from Georgetown to Rosignol on the left bank of the Berbice river opposite New Amsterdam; and another line 15 m. long starts from Vreed-en-hoop, on the left bank of the Demerara river opposite Georgetown, and runs to Greenwich Park on the right bank of the Essequibo river some 3 m. from its mouth. A light railway, metre gauge, 18½ m. in length, connects Wismar (on the left bank of the Demerara river some 70 m. from its mouth) with Rockstone (on the right bank of the Essequibo, and above the first series of cataracts in that river). Steamers run daily to and from Georgetown and Wismar, and launches to and from Rockstone and Tumatumari Fall on the Potaro, and all expeditions for the goldfields of the Essequibo and its tributaries above Rockstone travel by this route. Another steamer goes twice a week to Bartica at the confluence of the Essequibo and Mazaruni, and another weekly to Mt. Everard on the Barima, from which termini expeditions start to the other gold and diamond fields. Steamers also run from Georgetown to New Amsterdam and up the Berbice river for about 100 m. Above the termini of these steamer routes all travelling is done in keelless *bateaux*, propelled by paddlers and steered when coming through the rapids at both bow and stern by certificated bowmen and steersmen. Owing to the extreme dangers of this inland travelling, stringent regulations have been framed as to the loading of boats, supply of ropes and qualifications of men in charge, and the shooting of certain falls is prohibited. Voyages up-country are of necessity slow, but the return journey is made with comparatively great rapidity, distances laboriously covered on the up-trip in three days being done easily in seven hours when coming back.

From England British Guiana is reached in sixteen days by the steamers of the Royal Mail Steam Packet Company, and in nineteen days by those of the direct line from London and Glasgow. There are also regular services from Canada, the United States, France and Holland.

History.—When taken over in 1803 the prospects of three British colonies were by no means promising, and during the next decade the situation became very critical. Owing to the increased output of sugar by conquered Dutch and French colonies the English market was glutted and the markets of the continent of Europe were not available, Bonaparte having closed the ports. The years 1811 and 1812 were peculiarly disastrous, especially to those engaged in the manufacture of sugar, and at a public meeting held in Georgetown early in the latter year it was stated that the produce of the colony ordinarily worth £1,860,000 had on account of deteriorated value decreased by fully one-third. At this meeting it was resolved to petition the imperial parliament to allow the interchange of produce with the United States; a resolution which was unfortunately rendered abortive by the outbreak of war between England and the States in 1812, the trade of British Guiana being instead actually harried by American privateers. In his address to the Combined Court on the 20th of October 1812 the governor (General Carmichael) stated that a vessel with government stores had been captured by an American privateer, and in February 1813 the imperial government sent H.M.S. "Peacock" to protect the coast. On the 23rd of that month in cruising along the east coast of Demerara the "Peacock" met the American privateer "Hornet," and though, after a gallant struggle, in which Captain Peake, R.N., was killed, the English ship was sunk with nearly all her crew, the colony did not suffer from any further depredations. In the following years news of the agitation in England in favour of emancipation gradually became known to the slaves and caused considerable unrest among them, culminating in 1823 in a serious outbreak on the estates on the east coast of Demerara. Negroes, demanding their freedom, attacked the houses of several managers, and although at most points these attacks were repulsed with but little loss on either side, the situation was so serious as to necessitate the calling out of the military. The ringleaders were arrested and promptly and vigorously dealt with, while a special court-martial was appointed to try the Rev. John Smith, of the London Missionary Society, who it was alleged had fostered the rising by his teachings to the slave congregation at his chapel in Le Ressouvenir. This trial was stigmatized as unfair by the missionary party in England, but on the whole appears to have been conducted decently by an undoubtedly unbiassed court. It is difficult now to form any very definite conclusion. Mr Smith certainly had great influence over the slaves, and while his teaching prior to the outbreak was at least ill-advised, he made no efforts while the disturbances were going on to use his influence on the side of law and order; indeed all he could say in his own defence was that he was ignorant of what was going on, a statement it is impossible to believe to have been strictly veracious. He was found guilty and sentenced to be hanged. It is obvious that it was never intended to carry out this sentence, and on the 29th of November the governor announced that he felt it imperative on him to transmit the findings of the court for His Majesty's consideration. The question of Smith's guilt or innocence created a great deal of feeling in England, the anti-slavery and missionary societies making it a basis for increased agitation in favour of the slaves; but the imperial government evidently agreed with the colonial executive in holding that he could not be exonerated of grave responsibility, as the order of the king was that while the sentence of death was remitted Mr Smith was to be dismissed from the colony and to enter into a recognizance in £2000 not to return to British Guiana or to reside in any other West Indian colony. This order reached Georgetown in April 1824, but Mr Smith had died in the city jail on the 6th of February of a pulmonary complaint from which he had been suffering for some time.

Sir Benjamin d'Urban was governor from April 1824 to May 1833, the principal event of his administration being the consolidation in 1831 of the three colonies into one colony divided into three counties, Berbice, Demerara and Essequibo.

Governor d'Urban was succeeded in June 1833 by Sir James Carmichael Smyth, who began his administration by a proclamation to the slaves stating that while the king intended to improve their condition, the details of his plans were not as yet completed, and warning them against impatience or insubordination. When the resolutions foreshadowing emancipation, passed by the House of Commons on the 12th of June 1833, reached the colony, the planters, to whom the governor's proclamation had been most distasteful, were thunderstruck and even the government was surprised. Naturally the slaves were wildly jubilant. Emancipation brought troublous times through which the governor steered the colony with great tact and firmness, serious troubles being nipped in the bud solely by his great personality, and the subsequent conflicts with the apprentices might have been obviated had he lived longer. He died at Camp House on the 4th of March 1838.

In the years following emancipation the colony was in a serious condition. The report of a commission in 1850 proved that it was virtually ruined, and only by the introduction of immigrants to provide a reliable labour supply were the sugar estates saved from total extinction. By 1853 the colony had begun to make headway, and Sir Henry Barkly, the then governor, was able to state in his speech to the Combined Court in January that its progress was in every way satisfactory. During Governor Barkly's administration the long series of

struggles between the legislature and the executive terminated, and when he left in May 1853 he did so with the respect and good-will of all classes. The strengthening of the labour supply was not effected without troubles. In 1847 the negroes in Berbice attacked the persons and property of the Portuguese immigrants, the riots spreading to Demerara and Essequibo, and not until the military were called out were the disturbances quelled. Similar riots in 1862 were only stopped by the prompt and firm action of the new governor, Mr (afterwards Sir) Francis Hincks, while rows between negroes and Chinese and negroes and East Indians were frequent. Gradually, however, things quieted down, and until 1883 the estates as a whole did well. In 1884 the price of sugar fell so seriously as to make the prospects of the colony very gloomy, and for nearly two decades proprietors had to be content with a price kept artificially low by bounty-fed beet-sugar, many estates being ruined, while those that survived only did so by the application of every economy, and by their owners availing themselves of every new discovery in the sciences of cultivation and manufacture.

The year 1889 was marked by an outbreak on the part of a section of the negro population in Georgetown directed against the Portuguese residents there. A Portuguese had murdered his black paramour and had been convicted and sentenced to death. The governor commuted the sentence to penal servitude for life. Shortly after this a Portuguese stall-holder in the market assaulted a small black boy whom he suspected of pilfering, the latter having to be taken to a hospital, while the former, after being taken to a police station was, through some misunderstanding or informality, at once released. Almost immediately excitable and unreasoning negroes were rushing about loudly proclaiming that the boy was dead, that the Portuguese were allowed to kill black people and to go free, and calling on one another to take their own revenge. Mobs gathered quickly, attacked individual Portuguese and wrecked their shops and houses, and not until the city had been given up for two days to scenes of disgraceful disorder were the efforts of the police and special constables successful in quelling the disturbances. The damage done amounted to several thousands of dollars, the Portuguese owners being eventually compensated from general revenue.

In 1884 the dispute as to the boundary with Venezuela became acute. It was reported to the colonial government that the government of Venezuela had granted to an American syndicate a concession which covered much of the territory claimed by Great Britain, and although prompt investigation by an agent despatched by the governor did not then disclose any trace of interference with British claims, a further visit in January 1885, made in consequence of reports that servants of the Manoa Company had torn down notices posted by Mr McTurk on his former visit, discovered that the British notices had been covered over by Venezuelan ones and resulted in the government of Great Britain declaring that it would thenceforward exercise jurisdiction up to and within a boundary known as “the modified Schomburgk line.” Outposts were located at points on this line, and for some years Guianese police and Venezuelan soldiers faced one another across the Amacura creek in the Orinoco mouth and at Yuruan up the Cuyuni river. Guianese officers were, however, presumably instructed not actively to oppose acts of aggression by the Venezuelan government, for in January 1895 Venezuelan soldiers arrested Messrs D. D. Barnes and A. H. Baker, inspectors of police in charge at Yuruan station, conveyed them through Venezuela to Caracas, eventually allowing them to take steamer to Trinidad. For this act compensation was demanded and was eventually paid by Venezuela. The diplomatic question as to the boundary—the results of which are stated above—was passed out of the hands of the colony; see the account of the arbitration under Venezuela.

The last two months of 1905 were marked by serious disturbances in Georgetown, and in a lesser degree on the east and west banks of the Demerara river. On the 29th of November the dock labourers employed on the wharves in Georgetown struck for higher wages, and large crowds invaded the principal stores in the city, compelling men willing to work to desist and in some cases assaulting those who opposed them. By the evening of the 30th of November they had got so far out of hand as to necessitate the reading of the Riot Act and a proclamation by the governor (Sir F. M. Hodgson) forbidding all assemblies. On the morning of the 1st of December serious disturbances broke out at Ruimvelt, a sugar estate directly south of Georgetown, where the cane-cutters had suddenly struck for higher pay, and the police were compelled to fire on the mob, killing some and wounding others. All through that day mobs in all parts of the city assaulted any white man they met, houses were invaded and windows smashed, and on two further occasions the police had to fire. At night torrential rains forced the rioters to shelter, and enabled the police to get rest, their places being taken by pickets of militiamen and special constables. On Saturday, the 2nd of December, the police had got the upper hand, and the arrival that night of H.M.S. “Sappho” and on Sunday of H.M.S. “Diamond” gave the government complete control of the situation. Threatened troubles on the sugar estates on the west bank were suppressed by the prompt action of the governor, and the arrest of large numbers of the rioters and their immediate trial by special courts restored

thorough order.

AUTHORITIES.—See Raleigh's *Voyages for the Discovery of Guiana 1595-1596*, ("Hakluyt" series); Laurence Keymis' *Relation of the second Voyage to Guiana* (*1596*), ("Hakluyt" series); Sir R. H. Schomburgk, *Description of British Guiana* (London, 1840); C. Waterton, *Wanderings in South America, 1812-1825* (London, 1828); J. Rodway, *History of British Guiana* (Georgetown, 1891-1894); H. G. Dalton, History of British Guiana (London, 1855); J. W. Boddam Whetham, *Roraima and British Guiana* (London, 1879); C. P. Lucas, *Historical Geography of British Colonies*; E. F. im Thurn, *Among the Indians of Guiana* (London, 1883); *British Guiana Directory* (Georgetown, 1906); G. D. Bayley, *Handbook of British Guiana* (Georgetown, 1909).

(A. G. B.*)

II. DUTCH GUIANA, or *Surinam*, has an area of about 57,900 sq. m. British Guiana bounds it on the west and French on the east (the long unsettled question of the French boundary is dealt with in section III., FRENCH GUIANA). The various peoples inhabiting Surinam are distributed according to the soil and the products. The Indians (Caribs, Arawaks, Warrous) live on the savannahs, or on the upper Nickerie, Coppename and Maroni, far from the plantations, cultivating their fields of manioc or cassava, and for the rest living by fishing and hunting. They number about 2000. The bush negroes (Marrons) dwell between 3° and 4° N., near the isles and cataracts. They are estimated at 10,000, and are employed in the transport of men and goods to the goldfields, the navigation of the rivers in trade with the Indians, and in the transport of wood to Paramaribo and the plantations. They are the descendants of runaway slaves, and before missionaries had worked among them their paganism retained curious traces of their former connexion with Christianity. Their chief god was Gran Gado (grand-god), his wife Maria, and his son Jesi Kist. Various minor deities were also worshipped, Ampuka the bush-god, Toni the water-god, &c. Their language was based on a bastard English, mingled with many Dutch, Portuguese and native elements. Their chiefs are called *gramman* or grand man; but the authority of these men, and the peculiarities of language and religion, have in great measure died out owing to modern intercourse with the Dutch and others. The inhabitants of Paramaribo and the plantations comprise a variety of races, represented by Chinese, Javanese, coolies from India and the West Indies, negroes and about 2000 whites. Of non-Christian immigrants there are about 6000 Mahommedans and 12,000 Hindus; and Jews number about 1200. The total population was given in 1907 as 84,103, exclusive of Indians, &c., in the forests. Nearly one-half of this total are in Paramaribo and one-half in the districts. The population has shown a tendency to move from the districts to the town; thus in 1852 there were 6000 persons in the town and 32,000 in the districts.

Dutch Guiana.

The principal settlements have been made in the lower valley of the Surinam, or between that river and the Saramacca on the W. and the Commewyne on the E. The Surinam is the chief of a number of large rivers which rise in the Tumuc Humac range or the low hills between it and the sea, which they enter on the Dutch seaboard, between the Corentyn and the Maroni (Dutch *Corantijn* and *Marowijne*), which form the boundaries with British and French territories respectively. Between the rivers of Dutch Guiana there are remarkable cross channels available during the floods at least. As the Maroni communicates with the Cottica, which is in turn a tributary of the Commewyne, a boat can pass from the Maroni to Paramaribo; thence by the Sommelsdijk canal it can reach the Saramacca; and from the Saramacca it can proceed up the Coppename, and by means of the Nickerie find its way to the Corentyn. The rivers are not navigable inland to any considerable extent, as their courses are interrupted by rapids. The interior of the country consists for the most part of low hills, though an extreme height of 3800 ft. is known in the Wilhelmina Kette, in the west of the colony, about 3° 50′ to 4° N. The hinterland south of this latitude, and that part of the Tumuc Humac range along which the Dutch frontier runs, are, however, practically unexplored. Like the other territories of Guiana the Dutch colony is divided physically into a low coast-land, savannahs and almost impenetrable forest.

Meteorological observations have been carried on at five stations (Paramaribo, Coronie, Sommelsdijk, Nieuw-Nickerie and Groningen). The mean range of temperature for the day, month and year shows little variation, being respectively 77.54°-88.38° F., 76.1°-78.62° F. and 70.52°-90.14° F. The north-east trade winds prevail throughout the year, but the rainfall varies considerably; for December and January the mean is respectively 8.58 and 9.57 in., for May and June 11.26 and 10.31 in., but for February and March 7.2 and 6.81 in., and for September 2.48 and 2.0 in. The seasons comprise a long and a short dry season, and a period of heavy and of slight rainfall.

Products and Trade.—It has been found exceedingly difficult to exploit the produce of the forests. The most important crops and those supplying the chief exports are cocoa, coffee and sugar, all cultivated on the larger plantations, with rice, maize and bananas on the smaller or

coast lands. Most of the larger plantations are situated on the lower courses of the Surinam, Commewyne, Nickerie and Cottica, and on the coast lands, rarely in the upper parts. Goldfields lie in the older rocks (especially the slate) of the upper Surinam, Saramacca and Maroni. The first section of a railway designed to connect the goldfields with Paramaribo was opened in 1906. The annual production of gold amounts in value to about £100,000, but has shown considerable fluctuation. Agriculture is the chief means of subsistence. About 42,000 acres are under cultivation. Of 30,000, persons whose occupation is given in official statistics, close upon 21,000 are engaged in agriculture or on the plantations, 2400 in gold-mining and only 1000 in trade. The exports increased in value from £200,800 in 1875 to £459,800 in 1899, and imports from £260,450 in 1875 to £510,180 in 1899; but the average value of exports over five years subsequently was only £414,000, while that of imports was £531,000.

Administration.—The colony is under a governor, who is president of an executive council, which also includes a vice-president and three members nominated by the crown. The legislative body is the states, the members of which are elected for six years by electors, of whom there is one for every 200 holders of the franchise. The colony is divided into sixteen districts. For the administration of justice there are three cantonal courts, two district courts, and the supreme court at Paramaribo, whose president and permanent members are nominated by the crown. The average local revenue (1901-1906) was about £276,000 and the expenditure about £317,000; both fluctuated considerably, and a varying subvention is necessary from the home government (£16,000 in 1902, £60,400 in 1906; the annual average is about £37,000). There are a civic guard of about 1800 men and a militia of 500, with a small garrison.

History.—The history of the Dutch in Guiana, and the compression of their influence within its present limits, belongs to the general history of Guiana (above). Surinam and the Dutch islands of the West Indies were placed under a common government in 1828, the governor residing at Paramaribo, but in 1845 they were separated. Slavery was abolished in 1863. Labour then became difficult to obtain, and in 1870 a convention was signed between Holland and England for the regulation of the coolie traffic, and a Dutch government agent for Surinam was appointed at Calcutta. The problem was never satisfactorily solved, but the interest of the mother-country in the colony greatly increased during the last twenty years of the 19th century, as shown by the establishment of the Surinam Association, of the Steam Navigation Company's service to Paramaribo, and by the formation of a botanical garden for experimental culture at that town, as also by geological and other scientific expeditions, and the exhibition at Haarlem in 1898.

AUTHORITIES.—Among the older works on Surinam the first rank is held by Jan Jacob Hartsinck's masterly *Beschryving van Guiana, of de Wilde Kust, in Zuid Amerika* (2 vols., Amsterdam, 1770). Extracts from this work, selected for their bearing upon British boundary questions, were translated and annotated by J. A. J. de Villiers (London, 1897). A valuable *Geschiedenis der Kolonie van Suriname*, by a number of "learned Jews," was published at Amsterdam in 1791 and it was supplemented and so far superseded by Wolbers, *Geschiedenis van Suriname* (Amsterdam, 1861). See further W. G. Palgrave, *Dutch Guiana* (London, 1876); A. Kappler, *Surinam, sein Land, &c.* (Stuttgart, 1887); Prince Roland Bonaparte, *Les Habitants de Surinam* (Paris, 1884); K. Martin, "Bericht über eine Reise ins Gebiet des Oberen-Surinam," *Bijdragen v. h. Inst. voor Taal Land en Volkenkunde*, i. 1. (The Hague); Westerouen van Meeteren, *La Guyane néerlandaise* (Leiden, 1884); H. Ten Kate, "Een en ander over Suriname," *Gids* (1888); G. Verschuur, "Voyages aux trois Guyanes," *Tour du monde* (1893). pp. 1, 49, 65; W. L. Loth, *Beknopte Aardrijkskundige beschrijving van Suriname* (Amsterdam, 1898), and *Tijdschrift van het Aardrijkskundig Genootschap* (1878), 79, 93; Asch van Wyck, "La Colonie de Surinam," *Les Pays-Bas* (1898); L. Thompson, *Overzicht der Geschiedenis van Suriname* (The Hague, 1901); *Catalogus der Nederl. W. I. ten Toonstelling te Haarlem* (1899); *Guide à travers la section des Indes néerlandaises*, p. 323 (Amsterdam, 1899); *Surinaamsche Almanak* (Paramaribo, annually). For the language of the bush-negroes see Wullschlaegel, *Kurzgefasste neger-englische Grammatik* (Bautzen, 1854), and *Deutsch neger-englisches Wörterbuch* (Lobau, 1865).

III. FRENCH GUIANA (*Guyane*).—This colony is situated between Dutch Guiana and Brazil. A delimitation of the territory belonging to France and the Netherlands was arrived at in 1891, by decision of the emperor of Russia. This question originated in the arrangement of 1836, that the river Maroni should form the frontier. It turned on the claim of the Awa or the Tapanahoni to be recognized as the main head-stream of the Maroni, and the final decision, in indicating the Awa, favoured the Dutch. In 1905 certain territory lying between the upper Maroni and the Itany, the possession of which had not then been settled, was acquired by France by agreement between the French and Dutch governments. The question of the exploitation of gold in the Maroni was settled by attributing alternate reaches of the river to France and Holland; while France obtained the principal islands in the lower Maroni. The additional territory thus attached to the French colony amounted to 965 sq. m. In December 1900 the Swiss government as

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arbitrators fixed the boundary between French Guiana and Brazil as the river Oyapock and the watershed on the Tumuc Humac mountains, thus awarding to France about 3000 of the 100,000 sq. m. which she claimed. This dispute was of earlier origin than that with the Dutch; dissensions between the French and the Portuguese relative to territory north of the Amazon occurred in the 17th century. In 1700 the Treaty of Lisbon made the contested area (known as the Terres du Cap du Nord) neutral ground. The treaty of Utrecht in 1713 indicated as the French boundary a river which the French afterwards claimed to be the Araguary, but the Portuguese asserted that the Oyapock was intended. After Brazil had become independent the question dragged on until in 1890-1895 there were collisions in the contested territory between French and Brazilian adventurers. This compelled serious action, and a treaty of arbitration, preliminary to the settlement, was signed at Rio de Janeiro in 1897. French Guiana, according to official estimate, has an area of about 51,000 sq. m. The population is estimated at about 30,000; its movement is not rapid. Of this total 12,350 live at Cayenne, 10,100 were in the communes, 5700 formed the penal population, 1500 were native Indians (Galibi, Emerillon, Oyampi) and 500 near Maroni were negroes. Apart from Cayenne, which was rebuilt after the great fire of 1888, the centres of population are unimportant: Sinnamarie with 1500 inhabitants, Mana with 1750, Roura with 1200 and Approuague with 1150. In 1892 French Guiana was divided into fourteen communes, exclusive of the Maroni district. Belonging to the colony are also the three Safety Islands (Royale, Joseph and Du Diable—the last notable as the island where Captain Dreyfus was imprisoned), the Enfant Perdu Island and the five Remire Islands.

A considerable portion of the low coast land is occupied by marshes, with a dense growth of mangroves or, in the drier parts, with the pinot or wassay palm (*Euterpe oleracea*). Settlements are confined almost entirely to the littoral and alluvial districts. The forest-clad hills of the hinterland do not generally exceed 1500 ft. in elevation; that part of the Tumuc Humac range which forms the southern frontier may reach an extreme elevation of 2600 ft. But the dense tropical forests attract so much moisture from the ocean winds that the highlands are the birthplace of a large number of rivers which in the rainy season especially pour down vast volumes of water. Not less than 15 are counted between the Maroni and the Oyapock. South-eastward from the Maroni the first of importance is the Mana, which is navigable for large vessels 10 m. from its mouth, and for smaller vessels 27 m. farther. Passing the Sinnamary and the Kourou, the Oyock is next reached, near the mouth of which is Cayenne, the capital of the colony, and thereafter the Approuage. All these rivers take their rise in a somewhat elevated area about the middle of the colony; those streams which rise farther south, in the Tumuc Humac hills, are tributaries of the two frontier rivers, the Maroni on the one hand or the Oyapock on the other.

Climate and Products.—The rainy season begins in November or December, and lasts till the latter part of June; but there are usually three or four weeks of good weather in March. During the rest of the year there is often hardly a drop of rain for months, but the air is always very moist. At Cayenne the average annual rainfall amounts to fully 130 in., and it is naturally heavier in the interior. During the hotter part of the year—August, September, October—the temperature usually rises to about 86° F., but it hardly ever exceeds 88°; in the colder season the mean is 79° and it seldom sinks so low as 70°. Between day and night there is very little thermometric difference. The prevailing winds are the N.N.E. and the S.E.; and the most violent are those of the N.E. During the rainy season the winds keep between N. and E., and during the dry season between S. and E. Hurricanes are unknown. In flora and fauna French Guiana resembles the rest of the Guianese region. Vegetation is excessively rich. Among leguminous trees, which are abundantly represented, the wacapou is the finest of many hardwood trees. Caoutchouc and various palms are also common. The manioc is a principal source of food; rice is an important object of cultivation; and maize, yams, arrowroot, bananas and the bread-fruit are also to be mentioned. Vanilla is one of the common wild plants of the country. The clove tree has been acclimatized, and in the latter years of the empire it formed a good source of wealth; the cinnamon tree was also successfully introduced in 1772, but like that of the pepper-tree and the nutmeg its cultivation is neglected. A very small portion of the territory indeed is devoted to agriculture, although France has paid some attention to the development of this branch of activity. In 1880 a colonial garden was created near Cayenne; since 1894 an experimental garden has been laid out at Baduel. About 8200 acres are cultivated, of which 5400 acres are under cereals and rice, the remaining being under coffee (introduced in 1716), cacao, cane and other cultures. The low lands between Cayenne and Oyapock are capable of bearing colonial produce, and the savannahs might support large herds; cereals, root-crops and vegetables might easily be grown on the high grounds, and timber working in the interior should be profitable.

Gold-mining is the most important industry in the colony. Placers of great wealth have been discovered on the Awa, on the Dutch frontier and at Carsevenne in the territory which formed the subject of the Franco-Brazilian dispute. But wages are high and transport is costly, and the amount of gold declared at Cayenne did not average more than 130,550 oz. annually in 1900-

1905. Silver and iron have been found in various districts; kaolin is extracted in the plains of Montsinéry; and phosphates have been discovered at several places. Besides gold-workings, the industrial establishments comprise saw-mills, distilleries, brick-works and sugar-works.

Trade and Communications.—The commerce in 1885 amounted to £336,000 for imports and to £144,000 for exports; in 1897 the values were respectively £373,350 and £286,400, but in 1903, while imports had increased in value only to £418,720, exports had risen to £493,213. The imports consist of wines, flour, clothes, &c.; the chief are gold, phosphates, timber, cocoa and rosewood essence. Cayenne is the only considerable port. One of the drawbacks to the development of the colony is the lack of labour. Native labour is most difficult to obtain, and attempts to utilize convict labour have not proved very successful. Efforts to supply the need by immigration have not done so completely. The land routes are not numerous. The most important are that from Cayenne to Mana by way of Kourou, Sinnamarie and Iracoubo, and that from Cayenne along the coast to Kaw and the mouth of the Approuague. Towards the interior there are only foot-paths, badly made. By water, Cayenne is in regular communication with the Safety Islands (35 m.), and the mouth of the Maroni (80 m.), with Fort de France in the island of Martinique, where travellers meet the mail packet for France, and with Boston (U.S.A.). There is a French cable between Cayenne and Brest.

Administration.—The colony is administered by a commissioner-general assisted by a privy council, including the secretary general and chief of the judicial service, the military, penitentiary and administrative departments. In 1879 an elective general council of sixteen members was constituted. There are a tribunal of first instance and a higher tribunal at Cayenne, besides four justices of peace, one of whom has extensive jurisdiction in other places. Of the £256,000 demanded for the colony in the colonial budget for 1906, £235,000 represented the estimated expenditure on the penal settlement, so that the cost of the colony was only about £21,000. The local budget for 1901 balanced at £99,000 and in 1905 at £116,450. Instruction is given in the college of Cayenne and in six primary schools. At the head of the clergy is an apostolic prefect. The armed force consists of two companies of marine infantry, half a battery of artillery, and a detachment of gendarmerie, and comprises about 380 men. The penal settlement was established by a decree of 1852. From that year until 1867, 18,000 exiles had been sent to Guiana, but for the next twenty years New Caledonia became the chief penal settlement in the French colonies. But in 1885-1887 French Guiana was appointed as a place of banishment for confirmed criminals and for convicts sentenced to more than eight years' hard labour. A large proportion of these men have been found unfit for employment upon public works.

History.—The Sieur La Revardière, sent out in 1604 by Henry IV. to reconnoitre the country, brought back a favourable report; but the death of the king put a stop to the projects of formal colonization. In 1626 a small body of traders from Rouen settled on the Sinnamary, and in 1635 a similar band founded Cayenne. The Compagnie du Cap Nord, founded by the people of Rouen in 1643 and conducted by Poncet de Brétigny, the Compagnie de la France Équinoxiale, established in 1645, and the second Compagnie de la France Équinoxiale, or Compagnie des Douze Seigneurs, established in 1652, were failures, the result of incompetence, mismanagement and misfortune. From 1654 the Dutch held the colony for a few years. The French Compagnie des Indes Occidentales, chartered in 1664 with a monopoly of Guiana commerce for forty years, proved hardly more successful than its predecessors; but in 1674 the colony passed under the direct control of the crown, and the able administration of Colbert began to tell favourably on its progress, although in 1686 an unsuccessful expedition against the Dutch in Surinam set back the advance of the French colony until the close of the century.

The year 1763 was marked by a terrible disaster. Choiseul, the prime minister, having obtained for himself and his cousin Praslin a concession of the country between the Kourou and the Maroni, sent out about 12,000 volunteer colonists, mainly from Alsace and Lorraine. They were landed at the mouth of the Kourou, where no preparation had been made for their reception, and where even water was not to be obtained. Mismanagement was complete; there was (for example) a shop for skates, whereas the necessary tools for tillage were wanting. By 1765 no more than 918 colonists remained alive, and these were a famished fever-stricken band. A long investigation in Paris resulted in the imprisonment of the incompetent leaders of the expedition. Several minor attempts at colonization in Guiana were made in the latter part of the century; but they all seemed to suffer from the same fatal prestige of failure. During the revolution band after band of political prisoners were transported to Guiana. The fate of the royalists, nearly 600 in number, who were exiled on the 18th Fructidor (1797), was especially sad. Landed on the Sinnamary without shelter or food, two-thirds of them perished miserably. In 1800 Victor Hugues was appointed governor, and he managed to put the colony in a better state; but in 1809 his work was brought to a close by the invasion of the Portuguese and British.

Though French Guiana was nominally restored to the French in 1814, it was not really surrendered by the Portuguese till 1817. Numerous efforts were now made to establish the

colony firmly, although its past misfortunes had prejudiced the public mind in France against it. In 1822 the first steam sugar mills were introduced; in 1824 an agricultural colony (Nouvelle Angoulême) was attempted in the Mana district, which, after failure at first, became comparatively successful. The emancipation of slaves and the consequent dearth of labour almost ruined the development of agricultural resources about the middle of the century, but in 1853 a large body of African immigrants was introduced. The discovery of gold on the Approuague in 1855 caused feverish excitement, and seriously disturbed the economic condition of the country.

AUTHORITIES.—A detailed bibliography of French Guiana will be found in Ternaux-Compans, *Notice historique de la Guyane française* (Paris, 1843). Among more recent works, see E. Bassières, *Notice sur la Guyane*, issued on the occasion of the Paris Exhibition (1900); *Publications de la société d'études pour la colonisation de la Guyane française* (Paris, 1843-1844); H. A. Coudreau, *La France équinoxiale* (1887), *Dialectes indiens de Guyane* (1891), *Dix ans de Guyane* (1892), and *Chez nos Indiens* (1893), all at Paris; G. Brousseau, *Les Richesses de la Guyane française* (Paris, 1901); L. F. Viala, *Les Trois Guyanes* (Montpellier, 1893).

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1 The origin of the name is somewhat obscure, and has been variously interpreted. But the late Col. G. E. Church supplies the following note, which has the weight of his great authority: "I cannot confirm the suggestion of Schomburgk that Guayaná 'received its name from a small river, a tributary of the Orinoco', supposed to be the Waini or Guainia. In South America, east of the Andes, it was the common custom of any tribe occupying a length of river to call it simply 'the river'; but the other tribes designated any section of it by the name of the people living on its banks. Many streams, therefore, had more than a dozen names. It is probable that no important river had one name alone throughout its course, prior to the time of the Conquest. The radical *wini*, *waini*, *wayni*, is found as a prefix, and very frequently as a termination, to the names of numerous rivers, not only throughout Guayaná but all over the Orinoco and Amazon valleys. For instance, Paymary Indians called the portion of the Purús river which they occupied the *Waini*. It simply means water, or a fountain of water, or a river. The alternative suggestion that Guayaná is an Indian word signifying 'wild coast,' I also think untenable. This term, applied to the north-east frontage of South America between the Orinoco and the Amazon, is found on the old Dutch map of Hartsinck, who calls it 'Guiana Caribania of de Wilde Kust,' a name which must have well described it when, in 1580, some Zealanders, of the Netherlands, sent a ship to cruise along it, from the mouth of the Amazon to that of the Orinoco, and formed the first settlement near the river Pomeroon. The map of Firnao Vaz Dourado, 1564, calls the northern part of South America, including the present British Guiana, 'East Peru.' An anonymous Spanish map, about 1566, gives Guayaná as lying on the east side of the Orinoco just above its mouth. About 1660, Sebastien de Ruesta, cosmographer of the *Casa de Contractacion de Seville*, shows Guayaná covering the British, French and Dutch Guayanás. According to the map of Nicolas de Fer, 1719, a tribe of Guayazis (Guyanas) occupied the south side of the Amazon river, front of the island of Tupinambará, east of the mouth of the Madeira. Aristides Rojas, an eminent Venezuelan scholar, says that the Mariches Indians, near Caracas, inhabited a site called Guayaná long before the discovery of South America by the Spaniards. Coudreau in his *Chez nos Indiens* mentions that the *Roucouyennes* of Guayaná take their name from a large tree in their forests, 'which appears to be the origin of the name Guayane.' According to Michelana y Rojas, in their report to the Venezuelan government on their voyages in the basin of the Orinoco, 'Guyana derives its name from the Indians who live between the Caroni river and the Sierra de Imataca, called Guayanos.' My own studies of aboriginal South America lead me to support the statement of Michelana y Rojas, but with the following enlargement of it: The Portuguese, in the early part of the 16th century, found that the coast and mountain district of Rio de Janeiro, between Cape São Thome and Angra dos Reis, belonged to the formidable *Tamoyos*. South of these, for a distance of about 300 m. of the ocean slope of the coast range, were the *Guayaná* tribes, called by the early writers *Guianás*, *Goyaná*, *Guayaná*, *Goaná* and, plural, *Goaynázés*, *Goayanázes* and *Guayanázes*. They were constantly at feud with the *Tamoyos* and with their neighbours on the south, the *Carijos*, as well as with the vast Tapuya hordes of the Sertão of the interior. Long before the discovery, they had been forced to abandon their beautiful lands, but had recuperated their strength, returned and reconquered their ancient habitat. Meanwhile, however, many of them had migrated northward, some had settled in the *Sertão* back of Bahia and Pernambuco, others on the middle Amazon and in the valley of the Orinoco, but a large number had crossed the lower Amazon and occupied an extensive area of country to the north of it, about the size of Belgium, along the Tumuchumac range of highlands, and the upper Paron and Maroni rivers, as well as a large district on the northern slope of the above-named range. In their new home they became known as *Roucouyennes*, because, like the Mundurucus of the middle Amazon, they rubbed and painted themselves with *roucou* or *urucu* (Bixa Orellana); but other surrounding tribes called them Ouayanás, that is Guayanás—the Gua, so common to the Guarani-Tupi tongue, having become corrupted into *Oua*. Porto Seguro says of the so-called Tupis, 'at other times they gave themselves the name of *Guayá* or *Guayaná*, which probably means "brothers," from which comes *Guayazes* and *Guayanazes*.... The latter occupied the country just south of Rio de Janeiro.... The masters of the Capitania of St Vincente called themselves *Guianas*.' Guinila, referring to north-eastern South America (1745), speaks of five missions being formed to civilize the '*Nacion Guayana*.' In view of the above, it may be thought reasonable to assume that the vast territory now known as *Guayaná* (British, Dutch, French, Brazilian and Venezuelan) derives its name from its aborigines who were found there at the time of the discovery,

and whose original home was the region I have indicated."

2 This is the boundary generally accepted; but it is in dispute.

3 See C. B. Brown and J. G. Sawkins, *Reports on the Physical, Descriptive and Economic Geology of British Guiana* (London, 1875); C. Velain, "Esquisse géologique de la Guyane française et des bassins du Parou et du Yari (affluents de l'Amazone) d'après les explorations du Dr Crevaux," *Bull. Soc. Géogr.* ser. 7, vol. vi. (Paris, 1885), pp. 453-492 (with geological map); E. Martin, *Geologische Studien über Niederländisch-West-Indien, auf Grund eigener Untersuchungsreisen* (Leiden, 1888); W. Bergt, "Zur Geologie des Coppename- und Nickerietales in Surinam (Hollandisch-Guyana)," *Samml. d. Geol. Reichsmus.* (Leiden), ser. 2, Bd. ii. Heft 2, pp. 93-163 (with 3 maps); and for British Guiana, the official reports on the geology of various districts, by J. B. Harrison, C. W. Anderson, H. I. Perkins, published at Georgetown.

GUIART (or GUIARD), **GUILLAUME** (d. *c.* 1316), French chronicler and poet, was probably born at Orleans, and served in the French army in Flanders in 1304. Having been disabled by a wound he began to write, lived at Arras and then in Paris, thus being able to consult the large store of manuscripts in the abbey of St Denis, including the *Grandes chroniques de France*. Afterwards he appears as a *ménestrel de bouche*. Guiart's poem *Branche des royaulx lignages*, was written and then rewritten between 1304 and 1307, in honour of the French king Philip IV., and in answer to the aspersions of a Flemish poet. Comprising over 21,000 verses it deals with the history of the French kings from the time of Louis VIII.; but it is only really important for the period after 1296 and for the war in Flanders from 1301 to 1304, of which it gives a graphic account, and for which it is a high authority. It was first published by J. A. Buchon (Paris, 1828), and again in tome xxii. of the *Recueil des historiens des Gaules et de la France* (Paris, 1865).

See A. Molinier, *Les Sources de l'histoire de France*, tome iii. (Paris, 1903).

GUIBERT, or WIBERT (*c.* 1030-1100), of Ravenna, antipope under the title of Clement III. from the 25th of June 1080 until September 1100, was born at Parma between 1020 and 1030 of the noble imperialist family, Corregio. He entered the priesthood and was appointed by the empress Agnes, chancellor and, after the death of Pope Victor II. (1057), imperial vicar in Italy. He strove to uphold the imperial authority during Henry IV.'s minority, and presided over the synod at Basel (1061) which annulled the election of Alexander II. and created in the person of Cadalous, bishop of Parma, the antipope Honorius II. Guibert lost the chancellorship in 1062. In 1073, through the influence of Empress Agnes and the support of Cardinal Hildebrand, he obtained the archbishopric of Ravenna and swore fealty to Alexander II. and his successors. He seems to have been at first on friendly terms with Gregory VII., but soon quarrelled with him over the possession of the city of Imola, and henceforth was recognized as the soul of the imperial faction in the investiture contest. He allied himself with Cencius, Cardinal Candidus and other opponents of Gregory at Rome, and, on his refusal to furnish troops or to attend the Lenten synod of 1075, he was ecclesiastically suspended by the pope. He was probably excommunicated at the synod of Worms (1076) with other Lombard bishops who sided with Henry IV., and at the Lenten synod of 1078 he was banned by name. The emperor, having been excommunicated for the second time in March 1080, convened nineteen bishops of his party at Mainz on the 31st of May, who pronounced the deposition of Gregory; and on the 25th of June he caused Guibert to be elected pope by thirty bishops assembled at Brixen. Guibert, whilst retaining possession of his archbishopric, accompanied his imperial master on most of the latter's military expeditions. Having gained Rome, he was installed in the Lateran and consecrated as Clement III. on the 24th of March 1084. One week later, on Easter Sunday, he crowned Henry IV. and Bertha in St Peter's. Clement survived not only Gregory VII. but also Victor III. and Urban II., maintaining his title to the end and in great measure his power over Rome and the adjoining regions. Excommunication was pronounced against him by all his rivals. He was driven out of Rome finally by crusaders in 1097, and sought refuge in various fortresses on his own estates. St Angelo, the last Guibertist stronghold in Rome, fell to Urban II. on the 24th of August 1098. Clement, on the accession of Paschal II. in 1099, prepared to renew his struggle but was driven from Albano by Norman

troops and died at Civita Castellana in September 1100. His ashes, which were said by his followers to have worked miracles, were thrown into the water by Paschal II.

See J. Langen, *Geschichte der römischen Kirche von Gregor VII. bis Innocenz III.* (Bonn, 1893); Jaffé-Wattenbach, *Regesta pontif. Roman.* (2nd ed., 1885-1888); K. J. von Hefele, *Conciliengeschichte*, vol. v. (2nd ed.); F. Gregorovius, *Rome in the Middle Ages*, vol. iv., trans. by Mrs G. W. Hamilton (London, 1900-1902); and O. Köhncke, *Wibert von Ravenna* (Leipzig, 1888).

(C. H. Ha.)

GUIBERT (1053-1124), of Nogent, historian and theologian, was born of noble parents at Clermont-en-Beauvoisis, and dedicated from infancy to the church. He received his early education at the Benedictine abbey of Flavigny (Flaviacum) or St Germer, where he studied with great zeal, devoting himself at first to the secular poets, an experience which left its imprint on his works; later changing to theology, through the influence of Anselm of Bec, afterwards of Canterbury. In 1104, he was chosen to be head of the abbey of Notre Dame de Nogent and henceforth took a prominent part in ecclesiastical affairs. His autobiography (*De vita sua, sive monodiarum*), written towards the close of his life, gives many picturesque glimpses of his time and the customs of his country. The description of the commune of Laon is an historical document of the first order. The same local colour lends charm to his history of the first crusade (*Gesta Dei per Francos*) written about 1110. But the history is largely a paraphrase, in ornate style, of the *Gesta Francorum* of an anonymous Norman author (see Crusades); and when he comes to the end of his authority, he allows his book to degenerate into an undigested heap of notes and anecdotes. At the same time his high birth and his position in the church give his work an occasional value.

Bibliography.—Guibert's works, edited by d'Achery, were first published in 1651, in 1 vol. folio, at Paris (*Venerabilis Guiberti abbatis B. Mariae de Novigento opera omnia*), and republished in Migne's *Patrologia Latina*, vols. clvi. and clxxxiv. They include, besides minor works, a treatise on homiletics ("Liber quo ordine sermo fieri debeat"); ten books of *Moralia* on Genesis, begun in 1084, but not completed until 1116, composed on the model of Gregory the Great's *Moralia in Jobum*; five books of *Tropologiae* on Hosea, Amos and the Lamentations; a treatise on the *Incarnation*, against the Jews; four books *De pignoribus sanctorum*, a remarkably free criticism on the abuses of saint and relic worship; three books of autobiography, *De vita sua, sive monodiarum*; and eight books of the *Historia quae dicitur Gesta Dei per Francos, sive historia Hierosolymitana* (the ninth book is by another author). Separate editions exist of the last named, in J. Bongars, *Gesta Dei per Francos*, i., and *Recueil des historiens des croisades, hist. Occid.*, iv. 115-263. It has been translated into French in Guizot's *Collection*, ix. 1-338. See H. von Sybel, *Geschichte des ersten Kreuzzuges* (Leipzig, 1881); B. Monod, *Le Moine Guibert et son temps* (Paris, 1905); and *Guibert de Nogent; histoire de sa vie*, edited by G. Bourgin (Paris, 1907).

GUIBERT, JACQUES ANTOINE HIPPOLYTE, Comte de (1743-1790), French general and military writer, was born at Montauban, and at the age of thirteen accompanied his father, Charles Bénoit, comte de Guibert (1715-1786), chief of staff to Marshal de Broglie, throughout the war in Germany, and won the cross of St Louis and the rank of colonel in the expedition to Corsica (1767). In 1770 he published his *Essai général de tactique* in London, and this celebrated work appeared in numerous subsequent editions and in English, German and even Persian translations (extracts also in Liskenne and Sauvan, *Bibl. historique et militaire*, Paris, 1845). Of this work (for a detailed critique of which see Max Jähns, *Gesch. d. Kriegswissenschaften*, vol. iii. pp. 2058-2070 and references therein) it may be said that it was the best essay on war produced by a soldier during a period in which tactics were discussed even in the salon and military literature was more abundant than at any time up to 1871. Apart from technical questions, in which Guibert's enlightened conservatism stands in marked contrast to the doctrinaire progressiveness of Menil Durand, Folard and others, the book is chiefly valued for its broad outlook on the state of Europe, especially of military Europe in the period 1763-1792. One quotation may be given as being a most remarkable prophecy of the impending revolution in the art of war, a revolution which the "advanced" tacticians

themselves scarcely foresaw. “The standing armies, while a burden on the people, are inadequate for the achievement of great and decisive results in war, and meanwhile the mass of the people, untrained in arms, degenerates.... The hegemony over Europe will fall to that nation which ... becomes possessed of manly virtues and *creates a national army*”—a prediction fulfilled almost to the letter within twenty years of Guibert’s death. In 1773 he visited Germany and was present at the Prussian regimental drills and army manœuvres; Frederick the Great, recognizing Guibert’s ability, showed great favour to the young colonel and freely discussed military questions with him. Guibert’s *Journal d’un voyage en Allemagne* was published, with a memoir, by Toulongeon (Paris, 1803). His *Défense du système de guerre moderne*, a reply to his many critics (Neuchâtel, 1779) is a reasoned and scientific defence of the Prussian method of tactics, which formed the basis of his work when in 1775 he began to co-operate with the count de St Germain in a series of much-needed and successful reforms in the French army. In 1777, however, St Germain fell into disgrace, and his fall involved that of Guibert who was promoted to the rank of *maréchal de camp* and relegated to a provincial staff appointment. In his semi-retirement he vigorously defended his old chief St Germain against his detractors. On the eve of the Revolution he was recalled to the War Office, but in his turn he became the object of attack and he died, practically of disappointment, on the 6th of May 1790. Other works of Guibert, besides those mentioned, are: *Observations sur la constitution politique et militaire des armées de S. M. Prussienne* (Amsterdam, 1778), *Éloges* of Marshal Catinat (1775), of Michel de l’Hôpital (1778), and of Frederick the Great (1787). Guibert was a member of the Academy from 1786, and he also wrote a tragedy, *Le Connétable de Bourbon* (1775) and a journal of travels in France and Switzerland.

See Toulongeon, *Éloge véridique de Guibert* (Paris, 1790); Madame de Stäel, *Éloge de Guibert*; Bardin, *Notice historique du général Guibert* (Paris, 1836); Flavian d’Aldeguier, *Discours sur la vie et les écrits du comte de Guibert* (Toulouse, 1855); Count Forestie, *Biographie du comte de Guibert* (Montauban, 1855); Count zur Lippe, “Friedr. der Grosse und Oberst Guibert” (*Militär-Wochenblatt*, 1873, 9 and 10).

GUICCIARDINI, FRANCESCO (1483-1540), the celebrated Italian historian and statesman, was born at Florence in the year 1483, when Marsilio Ficino held him at the font of baptism. His family was illustrious and noble; and his ancestors for many generations had held the highest posts of honour in the state, as may be seen in his own genealogical *Ricordi autobiografici e di famiglia* (*Op. ined.* vol. x.). After the usual education of a boy in grammar and elementary classical studies, his father, Piero, sent him to the universities of Ferrara and Padua, where he stayed until the year 1505. The death of an uncle, who had occupied the see of Cortona with great pomp, induced the young Guicciardini to hanker after an ecclesiastical career. He already saw the scarlet of a cardinal awaiting him, and to this eminence he would assuredly have risen. His father, however, checked this ambition, declaring that, though he had five sons, he would not suffer one of them to enter the church in its then state of corruption and debasement. Guicciardini, whose motives were confessedly ambitious (see *Ricordi, Op. ined.* x. 68), turned his attention to law, and at the age of twenty-three was appointed by the Signoria of Florence to read the *Institutes* in public. Shortly afterwards he engaged himself in marriage to Maria, daughter of Alamanno Salviati, prompted, as he frankly tells us, by the political support which an alliance with that great family would bring him (*ib.* x. 71). He was then practising at the bar, where he won so much distinction that the Signoria, in 1512, entrusted him with an embassy to the court of Ferdinand the Catholic. Thus he entered on the real work of his life as a diplomatist and statesman. His conduct upon that legation was afterwards severely criticized; for his political antagonists accused him of betraying the true interests of the commonwealth, and using his influence for the restoration of the exiled house of Medici to power. His Spanish correspondence with the Signoria (*Op. ined.* vol. vi.) reveals the extraordinary power of observation and analysis which was a chief quality of his mind; and in Ferdinand, hypocritical and profoundly dissimulative, he found a proper object for his scientific study. To suppose that the young statesman learned his frigid statecraft in Spain would be perhaps too simple a solution of the problem offered by his character, and scarcely fair to the Italian proficients in perfidy. It is clear from Guicciardini’s autobiographical memoirs that he was ambitious, calculating, avaricious and power-loving from his earliest years; and in Spain he had no more than an opportunity of studying on a large scale those political vices which already ruled the minor potentates of Italy. Still the school was pregnant with instructions for so apt a pupil. Guicciardini issued from this first trial of his skill with an assured reputation for diplomatic ability, as that was understood in Italy. To unravel plots and

weave counterplots; to meet treachery with fraud; to parry force with sleights of hand; to credit human nature with the basest motives, while the blackest crimes were contemplated with cold enthusiasm for their cleverness, was reckoned then the height of political sagacity. Guicciardini could play the game to perfection. In 1515 Leo X. took him into service, and made him governor of Reggio and Modena. In 1521 Parma was added to his rule, and in 1523 he was appointed viceregent of Romagna by Clement VII. These high offices rendered Guicciardini the virtual master of the papal states beyond the Apennines, during a period of great bewilderment and difficulty. The copious correspondence relating to his administration has recently been published (*Op. ined.* vols. vii., viii.). In 1526 Clement gave him still higher rank as lieutenant-general of the papal army. While holding this commission, he had the humiliation of witnessing from a distance the sack of Rome and the imprisonment of Clement, without being able to rouse the perfidious duke of Urbino into activity. The blame of Clement's downfall did not rest with him; for it was merely his duty to attend the camp, and keep his master informed of the proceedings of the generals (see the Correspondence, *Op. ined.* vols. iv., v.). Yet Guicciardini's conscience accused him, for he had previously counselled the pope to declare war, as he notes in a curious letter to himself written in 1527 (*Op. ined.*, x. 104). Clement did not, however, withdraw his confidence, and in 1531 Guicciardini was advanced to the governorship of Bologna, the most important of all the papallord-lieutenancies (Correspondence, *Op. ined.* vol. ix.). This post he resigned in 1534 on the election of Paul III., preferring to follow the fortunes of the Medicean princes. It may here be noticed that though Guicciardini served three popes through a period of twenty years, or perhaps because of this, he hated the papacy with a deep and frozen bitterness, attributing the woes of Italy to the ambition of the church, and declaring he had seen enough of sacerdotal abominations to make him a Lutheran (see *Op. ined.* i. 27, 104, 96, and *Ist. d' It.*, ed. Ros., ii. 218). The same discord between his private opinions and his public actions may be traced in his conduct subsequent to 1534. As a political theorist, Guicciardini believed that the best form of government was a commonwealth administered upon the type of the Venetian constitution (*Op. ined.* i. 6; ii. 130 sq.); and we have ample evidence to prove that he had judged the tyranny of the Medici at its true worth (*Op. ined.* i. 171, on the tyrant; the whole *Storia Fiorentina* and *Reggimento di Firenze*, *ib.* i. and iii., on the Medici). Yet he did not hesitate to place his powers at the disposal of the most vicious members of that house for the enslavement of Florence. In 1527 he had been declared a rebel by the Signoria on account of his well-known Medicean prejudices; and in 1530, deputed by Clement to punish the citizens after their revolt, he revenged himself with a cruelty and an avarice that were long and bitterly remembered. When, therefore, he returned to inhabit Florence in 1534, he did so as the creature of the dissolute Alessandro de' Medici. Guicciardini pushed his servility so far as to defend this infamous despot at Naples in 1535, before the bar of Charles V., from the accusations brought against him by the Florentine exiles (*Op. ined.* vol. ix.). He won his cause; but in the eyes of all posterity he justified the reproaches of his contemporaries, who describe him as a cruel, venal, grasping seeker after power, eager to support a despotism for the sake of honours, offices and emoluments secured for himself by a bargain with the oppressors of his country. Varchi, Nardi, Jacopo Pitti and Bernardo Segni are unanimous upon this point; but it is only the recent publication of Guicciardini's private MSS. that has made us understand the force of their invectives. To plead loyalty or honest political conviction in defence of his Medicean partianship is now impossible, face to face with the opinions expressed in the *Ricordi politici* and the *Storia Fiorentina*. Like Machiavelli, but on a lower level, Guicciardini was willing to "roll stones," or to do any dirty work for masters whom, in the depth of his soul, he detested and despised. After the murder of Duke Alessandro in 1537, Guicciardini espoused the cause of Cosimo de' Medici, a boy addicted to field sports, and unused to the game of statecraft. The wily old diplomatist hoped to rule Florence as grand vizier under this inexperienced princeling. He was mistaken, however, in his schemes, for Cosimo displayed the genius of his family for politics, and coldly dismissed his would-be lord-protector. Guicciardini retired in disgrace to his villa, where he spent his last years in the composition of the *Storia d' Italia*. He died in 1540 without male heirs.

Guicciardini was the product of a cynical and selfish age, and his life illustrated its sordid influences. Of a cold and worldly temperament, devoid of passion, blameless in his conduct as the father of a family, faithful as the servant of his papal patrons, severe in the administration of the provinces committed to his charge, and indisputably able in his conduct of affairs, he was at the same time, and in spite of these qualities, a man whose moral nature inspires a sentiment of liveliest repugnance. It is not merely that he was ambitious, cruel, revengeful and avaricious, for these vices have existed in men far less antipathetic than Guicciardini. Over and above those faults, which made him odious to his fellow-citizens, we trace in him a meanness that our century is less willing to condone. His phlegmatic and persistent egotism, his sacrifice of truth and honour to self-interest, his acquiescence in the worst conditions of the world, if only he could use them for his own advantage, combined with the glaring discord

between his opinions and his practice, form a character which would be contemptible in our eyes were it not so sinister. The social and political decrepitude of Italy, where patriotism was unknown, and only selfishness survived of all the motives that rouse men to action, found its representative and exponent in Guicciardini. When we turn from the man to the author, the decadence of the age and race that could develop a political philosophy so arid in its cynical despair of any good in human nature forces itself vividly upon our notice. Guicciardini seems to glory in his disillusionment, and uses his vast intellectual ability for the analysis of the corruption he had helped to make incurable. If one single treatise of that century should be chosen to represent the spirit of the Italian people in the last phase of the Renaissance, the historian might hesitate between the *Principe* of Machiavelli and the *Ricordi politici* of Guicciardini. The latter is perhaps preferable to the former on the score of comprehensiveness. It is, moreover, more exactly adequate to the actual situation, for the *Principe* has a divine spark of patriotism yet lingering in the cinders of its frigid science, an idealistic enthusiasm surviving in its moral aberrations; whereas a great Italian critic of this decade has justly described the *Ricordi* as “Italian corruption codified and elevated to a rule of life.” Guicciardini is, however, better known as the author of the *Storia d’ Italia*, that vast and detailed picture of his country’s sufferings between the years 1494 and 1532. Judging him by this masterpiece of scientific history, he deserves less commendation as a writer than as a thinker and an analyst. The style is wearisome and prolix, attaining to precision at the expense of circumlocution, and setting forth the smallest particulars with the same distinctness as the main features of the narrative. The whole tangled skein of Italian politics, in that involved and stormy period, is unravelled with a patience and an insight that are above praise. It is the crowning merit of the author that he never ceases to be an impartial spectator—a cold and curious critic. We might compare him to an anatomist, with knife and scalpel dissecting the dead body of Italy, and pointing out the symptoms of her manifold diseases with the indifferent analysis of one who has no moral sensibility. This want of feeling, while it renders Guicciardini a model for the scientific student, has impaired the interest of his history. Though he lived through that agony of the Italian people, he does not seem to be aware that he is writing a great historical tragedy. He takes as much pains in laying bare the trifling causes of a petty war with Pisa as in probing the deep-seated ulcer of the papacy. Nor is he capable of painting the events in which he took a part, in their totality as a drama. Whatever he touches, lies already dead on the dissecting table, and his skill is that of the analytical pathologist. Consequently, he fails to understand the essential magnitude of the task, or to appreciate the vital vigour of the forces contending in Europe for mastery. This is very noticeable in what he writes about the Reformation. Notwithstanding these defects, inevitable in a writer of Guicciardini’s temperament, the *Storia d’ Italia* was undoubtedly the greatest historical work that had appeared since the beginning of the modern era. It remains the most solid monument of the Italian reason in the 16th century, the final triumph of that Florentine school of philosophical historians which included Machiavelli, Segni, Pitti, Nardi, Varchi, Francesco Vettori and Donato Giannotti. Up to the year 1857 the fame of Guicciardini as a writer, and the estimation of him as a man, depended almost entirely upon the *History of Italy*, and on a few ill-edited extracts from his aphorisms. At that date his representatives, the counts Piero and Luigi Guicciardini, opened their family archives, and committed to Signor Giuseppe Canestrini the publication of his hitherto inedited MSS. in ten important volumes. The vast mass of documents and finished literary work thus given to the world has thrown a flood of light upon Guicciardini, whether we consider him as author or as citizen. It has raised his reputation as a political philosopher into the first rank, where he now disputes the place of intellectual supremacy with his friend Machiavelli; but it has coloured our moral judgment of his character and conduct with darker dyes. From the stores of valuable materials contained in those ten volumes, it will be enough here to cite (1) the *Ricordi politici*, already noticed, consisting of about 400 aphorisms on political and social topics; (2) the observations on Machiavelli’s *Discorsi*, which bring into remarkable relief the views of Italy’s two great theorists on statecraft in the 16th century, and show that Guicciardini regarded Machiavelli somewhat as an amiable visionary or political enthusiast; (3) the *Storia Fiorentina*, an early work of the author, distinguished by its animation of style, brilliancy of portraiture, and liberality of judgment; and (4) the *Dialogo del reggimento di Firenze*, also in all probability an early work, in which the various forms of government suited to an Italian commonwealth are discussed with infinite subtlety, contrasted, and illustrated from the vicissitudes of Florence up to the year 1494. To these may be added a series of short essays, entitled *Discorsi politici*, composed during Guicciardini’s Spanish legation. It is only after a careful perusal of these minor works that the student of history may claim to have comprehended Guicciardini, and may feel that he brings with him to the consideration of the *Storia d’ Italia* the requisite knowledge of the author’s private thoughts and jealously guarded opinions. Indeed, it may be confidently affirmed that those who desire to gain an insight into the true principles and feelings of the men who made and wrote history in the 16th century will find it here far more than in the work designed for publication by the writer. Taken in combination with Machiavelli’s treatises,

the *Opere inedite* furnish a comprehensive body of Italian political philosophy anterior to the date of Fra Paolo Sarpi.

(J. A. S.)

See Rosini's edition oí the *Storia d' Italia* (10 vols., Pisa, 1819), and the *Opere inedite*, in 10 vols., published at Florence, 1857. A complete and initial edition of Guicciardini's works is now in preparation in the hands of Alessandro Gherardi of the Florence archives. Among the many studies on Guicciardini we may mention Agostino Rossi's *Francesco Guicciardini e il governo Fiorentino* (2 vols., Bologna, 1896), based on many new documents; F. de Sanctis's essay "L'Uomo del Guicciardini," in his *Nuovi Saggi critici* (Naples, 1879), and many passages in Professor P. Villari's *Machiavelli* (Eng. trans., 1892); E. Benoist's *Guichardin, historien et homme d'état italien an XVI^e^ siècle* (Paris, 1862), and C. Gioda's *Francesco Guicciardini e le sue opere inedite* (Bologna, 1880) are not without value, but the authors had not had access to many important documents since published. See also Geoffrey's article "Une Autobiographie de Guichardin d'après ses œuvres inédites," in the *Revue des deux mondes* (1st of February 1874).

GUICHARD, KARL GOTTLIEB (1724-1775), soldier and military writer, known as Quintus Icilius, was born at Magdeburg in 1724, of a family of French refugees. He was educated for the Church, and at Leiden actually preached a sermon as a candidate for the pastorate. But he abandoned theology for more secular studies, especially that of ancient history, in which his learning attracted the notice of the prince of Orange, who promised him a vacant professorship at Utrecht. On his arrival, however, he found that another scholar had been elected by the local authorities, and he thereupon sought and obtained a commission in the Dutch army. He made the campaigns of 1747-48 in the Low Countries. In the peace which followed, his combined military and classical training turned his thoughts in the direction of ancient military history. His notes on this subject grew into a treatise, and in 1754 he went over to England in order to consult various libraries. In 1757 his *Mémoires militaires sur les Grecs et les Romains* appeared at the Hague, and when Carlyle wrote his *Frederick the Great* it had reached its fifth edition. Coming back, with English introductions, to the Continent, he sought service with Ferdinand of Brunswick, who sent him on to Frederick the Great, whom he joined in January 1758 at Breslau. The king was very favourably impressed with Guichard and his works, and he remained for nearly 18 months in the royal suite. His Prussian official name of Quintus Icilius was the outcome of a friendly dispute with the king (see Nikolai, *Anekdoten*, vi. 129-145; Carlyle, *Frederick the Great*, viii. 113-114). Frederick in discussing the battle of Pharsalia spoke of a centurion Quintus Caecilius as Q. Icilius. Guichard ventured to correct him, whereupon the king said, "*You* shall be Quintus Icilius," and as Major Quintus Icilius he was forthwith gazetted to the command of a free battalion. This corps he commanded throughout the later stages of the Seven Years' War, his battalion, as time went on, becoming a regiment of three battalions, and Quintus himself recruited seven more battalions of the same kind of troops. His command was almost always with the king's own army in these campaigns, but for a short time it fought in the western theatre under Prince Henry. When not on the march he was always at the royal headquarters, and it was he who brought about the famous interview between the king and Gellert (see Carlyle, *Frederick the Great*, ix. 109; Gellert, *Briefwechsel mit Demoiselle Lucius*, ed. Ebert, Leipzig, 1823, pp. 629-631) on the subject of national German literature. On 22nd January 1761 Quintus was ordered to sack the castle of Hubertusburg (a task which Major-General Saldern had point-blank refused to undertake, from motives of conscience), and carried out his task, it is said, to his own very considerable profit. The place cannot have been seriously injured, as it was soon afterwards the meeting-place of the diplomatists whose work ended in the peace of Hubertusburg, but the king never ceased to banter Quintus on his supposed depredations. The very day of Frederick's triumphant return from the war saw the disbanding of most of the free battalions, including that of Quintus, but the major to the end of his life remained with the king. He was made lieutenant-colonel in 1765, and in 1773, in recognition of his work *Mémoires critiques et historiques sur plusieurs points d'antiquités militaires*, dealing mainly with Caesar's campaigns in Spain (Berlin, 1773), was promoted colonel. He died at Potsdam, 1775.

GUICHEN, LUC URBAIN DE BOUËXIC, Comte de (1712-1790), French admiral, entered the navy in 1730 as “garde de la Marine,” the first rank in the corps of royal officers. His promotion was not rapid. It was not till 1748 that he became “lieutenant de vaisseau,” which was, however, a somewhat higher rank than the lieutenant in the British navy, since it carried with it the right to command a frigate. He was “capitaine de vaisseau,” or post captain, in 1756. But his reputation must have been good, for he was made chevalier de Saint Louis in 1748. In 1775 he was appointed to the frigate “Terpsichore,” attached to the training squadron, in which the duc de Chartres, afterwards notorious as the duc d’Orléans and as Philippe Égalité, was entered as volunteer. In the next year he was promoted chef d’escadre, or rear-admiral. When France had become the ally of the Americans in the War of Independence, he hoisted his flag in the Channel fleet, and was present at the battle of Ushant on the 27th of July 1779. In March of the following year he was sent to the West Indies with a strong squadron and was there opposed to Sir George Rodney. In the first meeting between them on the 17th of April to leeward of Martinique, Guichen escaped disaster only through the clumsy manner in which Sir George’s orders were executed by his captains. Seeing that he had to deal with a formidable opponent, Guichen acted with extreme caution, and by keeping the weather gauge afforded the British admiral no chance of bringing him to close action. When the hurricane months approached (July to September) he left the West Indies, and his squadron, being in a bad state from want of repairs, returned home, reaching Brest in September. Throughout all this campaign Guichen had shown himself very skilful in handling a fleet, and if he had not gained any marked success, he had prevented the British admiral from doing any harm to the French islands in the Antilles. In December 1781 the comte de Guichen was chosen to command the force which was entrusted with the duty of carrying stores and reinforcements to the West Indies. On the 12th Admiral Kempenfelt, who had been sent out by the British Government with an unduly weak force to intercept him, sighted the French admiral in the Bay of Biscay through a temporary clearance in a fog, at a moment when Guichen’s warships were to leeward of the convoy, and attacked the transports at once. The French admiral could not prevent his enemy from capturing twenty of the transports, and driving the others into a panic-stricken flight. They returned to port, and the mission entrusted to Guichen was entirely defeated. He therefore returned to port also. He had no opportunity to gain any counterbalancing success during the short remainder of the war, but he was present at the final relief of Gibraltar by Lord Howe. His death occurred on the 13th of January 1790. The comte de Guichen was, by the testimony of his contemporaries, a most accomplished and high-minded gentleman. It is probable that he had more scientific knowledge than any of his English contemporaries and opponents. But as a commander in war he was notable chiefly for his skill in directing the orderly movements of a fleet, and seems to have been satisfied with formal operations, which were possibly elegant but could lead to no substantial result. He had none of the combative instincts of his countryman Suffren, or of the average British admiral.

See vicomte de Noailles, *Marins et soldats français en Amérique* (1903); and E. Chevalier, *Histoire de la marine française pendant la guerre de l’indépendence américaine* (1877).

(D. H.)

GUIDE (in Mid. Eng. *gyde*, from the Fr. *guide*; the earlier French form was *guie*, English “guy,” the *d* was due to the Italian form *guida*; the ultimate origin is probably Teutonic, the word being connected with the base seen in O. Eng. *witan*, to know), an agency for directing or showing the way, specifically a person who leads or directs a stranger over unknown or unmapped country, or conducts travellers and tourists through a town, or over buildings of interest. In European wars up to the time of the French Revolution, the absence of large scale detailed maps made local guides almost essential to the direction of military operations, and in the 18th century the general tendency to the stricter organization of military resources led in various countries to the special training of guide officers (called *Feldjäger*, and considered as general staff officers in the Prussian army), whose chief duty it was to find, and if necessary establish, routes across country for those parts of the army that had to move parallel to the main road and as nearly as possible at deploying interval from each other, for in those days armies were rarely spread out so far as to have the use of two or more made roads. But the necessity for such precautions died away when adequate surveys (in which guide officers were, at any rate in Prussia, freely employed) were carried out, and, as a definite term of military organization to-day, “guide” possesses no more essential peculiarity than fusilier, grenadier or rifleman. The genesis of the modern “Guide” regiments is perhaps to be found in a short-lived Corps of Guides formed by Napoleon in Italy in 1796, which appears to have been a personal escort or body guard composed of men who knew the country. In the Belgian army

of to-day the Guide regiments correspond almost to the Guard cavalry of other nations; in the Swiss army the squadrons of “Guides” act as divisional cavalry, and in this role doubtless are called upon on occasion to lead columns. The “Queen’s own Corps of Guides” of the Indian army consists of infantry companies and cavalry squadrons. In drill, a “guide” is an officer or non-commissioned officer told off to regulate the direction and pace of movements, the remainder of the unit maintaining their alignment and distances by him.

A particular class of guides are those employed in mountaineering; these are not merely to show the way but stand in the position of professional climbers with an expert knowledge of rock and snowcraft, which they impart to the amateur, at the same time assuring the safety of the climbing party in dangerous expeditions. This professional class of guides arose in the middle of the 19th century when Alpine climbing became recognized as a sport (see MOUNTAINEERING). It is thus natural to find that the Alpine guides have been requisitioned for mountaineering expeditions all over the world. In climbing in Switzerland, the central committee of the Swiss Alpine Club issues a guides’ tariff which fixes the charges for guides and porters; there are three sections, for the Valais and Vaudois Alps, for the Bernese Oberland, and for central and eastern Switzerland. The names of many of the great guides have become historical. In Chamonix a statue has been raised to Jacques Balmat, who was the first to climb Mont Blanc in 1786. Of the more famous guides since the beginning of Alpine climbing may be mentioned Auguste Balmat, Michel Cros, Maquignay, J. A. Carrel, who went with E. Whymper to the Andes, the brothers Lauener, Christian Almer and Jakob and Melchior Anderegg.

“Guide” is also applied to a book, in the sense of an elementary primer on some subject, or of one giving full information for travellers of a country, district or town. In mechanical usage, the term “guide” is of wide application, being used of anything which steadies or directs the motion of an object, as of the “leading” screw of a screw-cutting lathe, of a loose pulley used to steady a driving-belt, or of the bars or rods in a steam-engine which keep the sliding blocks moving in a straight line. The doublet “guy” is thus used of a rope which steadies a sail when it is being raised or lowered, or of a rope, chain or stay supporting a funnel, mast, derrick, &c.

GUIDI, CARLO ALESSANDRO (1650-1712), Italian lyric poet, was born at Pavia in 1650. As chief founder of the well-known Roman academy called “L’Arcadia,” he had a considerable share in the reform of Italian poetry, corrupted at that time by the extravagance and bad taste of the poets Marini and Achillini and their school. The poet Guidi and the critic and jurisconsult Gravina checked this evil by their influence and example. The genius of Guidi was lyric in the highest degree; his songs are written with singular force, and charm the reader, in spite of touches of bombast. His most celebrated song is that entitled *Alla Fortuna* (To Fortune), which certainly is one of the most beautiful pieces of poetry of the 17th century. Guidi was squint-eyed, humpbacked, and of a delicate constitution, but possessed undoubted literary ability. His poems were printed at Parma in 1671, and at Rome in 1704. In 1681 he published at Parma his lyric tragedy *Amalasunta in Italy*, and two pastoral dramas *Daphne* and *Endymion*. The last had the honour of being mentioned as a model by the critic Gravina, in his treatise on poetry. Less fortunate was Guidi’s poetical version of the six homilies of Pope Clement XI., first as having been severely criticized by the satirist Settano, and next as having proved to be the indirect cause of the author’s death. A splendid edition of this version had been printed in 1712, and, the pope being then in San Gandolfo, Guidi went there to present him with a copy. On the way he found out a serious typographical error, which he took so much to heart that he was seized with an apoplectic fit at Frascati and died on the spot. Guidi was honoured with the special protection of Ranuccio II., duke of Parma, and of Queen Christina of Sweden.

GUIDICCIONI, GIOVANNI (1480-1541), Italian poet, was born at Lucca in 1480, and died at Macerata in 1541. He occupied a high position, being bishop of Fossombrone and president of Romagna. The latter office nearly cost him his life; a murderer attempted to kill him, and had already touched his breast with his dagger when, conquered by the resolute calmness of the prelate, he threw away the weapon and fell at his feet, asking forgiveness. The *Rime* and

Letters of Guidiccioni are models of elegant and natural Italian style. The best editions are those of Genoa (1749), Bergamo (1753) and Florence (1878).

GUIDO OF AREZZO (possibly to be identified with Guido de St Maur des Fosses), a musician who lived in the 11th century. He has by many been called the father of modern music, and a portrait of him in the refectory of the monastery of Avellana bears the inscription *Beatus Guido, inventor musicae*. Of his life little is known, and that little is chiefly derived from the dedicatory letters prefixed to two of his treatises and addressed respectively to Bishop Theodald (not Theobald, as Burney writes the name) of Arezzo, and Michael, a monk of Pomposa and Guido's pupil and friend. Occasional references to the celebrated musician in the works of his contemporaries are, however, by no means rare, and from these it may be conjectured with all but absolute certainty that Guido was born in the last decade of the 10th century. The place of his birth is uncertain in spite of some evidence pointing to Arezzo; on the title-page of all his works he is styled *Guido Aretinus*, or simply *Aretinus*. At his first appearance in history Guido was a monk in the Benedictine monastery of Pomposa, and it was there that he taught singing and invented his educational method, by means of which, according to his own statement, a pupil might learn within five months what formerly it would have taken him ten years to acquire. Envy and jealousy, however, were his only reward, and by these he was compelled to leave his monastery—"inde est, quod me vides prolixis finibus exulatum," as he says himself in the second of the letters above referred to. According to one account, he travelled as far as Bremen, called there by Archbishop Hermann in order to reform the musical service. But this statement has been doubted. Certain it is that not long after his flight from Pomposa Guido was living at Arezzo, and it was here that, about 1030, he received an invitation to Rome from Pope John XIV. He obeyed the summons, and the pope himself became his first and apparently one of his most proficient pupils. But in spite of his success Guido could not be induced to remain in Rome, the insalubrious air of which seems to have affected his health. In Rome he met again his former superior, the abbot of Pomposa, who seems to have repented of his conduct, and to have induced Guido to return to Pomposa; and here all authentic records of Guido's life cease. We only know that he died, on the 17th of May 1050, as prior of Avellana, a monastery of the Camaldulians; such at least is the statement of the chroniclers of that order. It ought, however, to be added that the Camaldulians claim the celebrated musician as wholly their own, and altogether deny his connexion with the Benedictines.

The documents discovered by Dom Germain Morin, the Belgian Benedictine, about 1888, point to the conclusion that Guido was a Frenchman and lived from his youth upwards in the Benedictine monastery of St Maur des Fosses where he invented his novel system of notation and taught the brothers to sing by it. In codex 763 of the British Museum the composer of the "Micrologus" and other works by Guido of Arezzo is always described as Guido de Sancto Mauro.

There is no doubt that Guido's method shows considerable progress in the evolution of modern notation. It was he who for the first time systematically used the lines of the staff, and the intervals or *spatia* between them. There is also little doubt that the names of the first six notes of the scale, *ut*, *re*, *mi*, *fa*, *sol*, *la*, still in use among Romance nations, were introduced by Guido, although he seems to have used them in a relative rather than in an absolute sense. It is well known that these words are the first syllables of six lines of a hymn addressed to St John the Baptist, which may be given here:—

Ut queant laxis *re*sonare fibris
*Mi*ra gestorum *fa*muli tuorum,
*Sol*ve polluti *la*bii reatum,
Sancte Joannes.

In addition to this Guido is generally credited with the introduction of the F clef. But more important than all this, perhaps, is the thoroughly practical tone which Guido assumes in his theoretical writings, and which differs greatly from the clumsy scholasticism of his contemporaries and predecessors.

The most important of Guido's treatises, and those which are generally acknowledged to be authentic, are *Micrologus Guidonis de disciplina artis musicae*, dedicated to Bishop Theodald of Arezzo, and comprising a complete theory of music, in 20 chapters; *Musicae Guidonis*

regulae rhythmicae in antiphonarii sui prologum prolatae, written in trochaic decasyllabics of anything but classical structure; *Aliae Guidonis regulae de ignoto cantu, identidem in antiphonarii sui prologum prolatae*; and the *Epistola Guidonis Michaeli monacho de ignoto cantu*, already referred to. These are published in the second volume of Gerbert's *Scriptores ecclesiastici de musica sacra*. A very important manuscript unknown to Gerbert (the *Codex bibliothecae Uticensis*, in the Paris library) contains, besides minor treatises, an antiphonarium and gradual undoubtedly belonging to Guido.

See also L. Angeloni, *G. d'Arezzo* (1811); Kiesewetter, *Guido von Arezzo* (1840); Kornmüller, "Leben und Werken Guidos von Arezzo," in Habert's *Jahrb.* (1876); Antonio Brandi, *G. Aretino* (1882); G. B. Ristori, *Biografia di Guido monaco d'Arezzo* (1868).

GUIDO OF SIENA. The name of this Italian painter is of considerable interest in the history of art, on the ground that, if certain assumptions regarding him could be accepted as true, he would be entitled to share with Cimabue, or rather indeed to supersede him in, the honour of having given the first onward impulse to the art of painting. The case stands thus. In the church of S. Domenico in Siena is a large painting of the "Virgin and Child Enthroned," with six angels above, and in the Benedictine convent of the same city is a triangular pinnacle, once a portion of the same composition, representing the Saviour in benediction, with two angels; the entire work was originally a triptych, but is not so now. The principal section of this picture has a rhymed Latin inscription, giving the painter's name as Gu ... o de Senis, with the date 1221: the genuineness of the inscription is not, however, free from doubt, and especially it is maintained that the date really reads as 1281. In the general treatment of the picture there is nothing to distinguish it particularly from other work of the same early period; but the heads of the Virgin and Child are indisputably very superior, in natural character and graceful dignity, to anything to be found anterior to Cimabue. The question therefore arises, Are these heads really the work of a man who painted in 1221? Crowe and Cavalcaselle pronounce in the negative, concluding that the heads are repainted, and are, as they now stand, due to some artist of the 14th century, perhaps Ugolino da Siena; thus the claims of Cimabue would remain undisturbed and in their pristine vigour. Beyond this, little is known of Guido da Siena. There is in the Academy of Siena a picture assigned to him, a half-figure of the "Virgin and Child," with two angels, dating probably between 1250 and 1300; also in the church of S. Bernardino in the same city a Madonna dated 1262. Milanesi thinks that the work in S. Domenico is due to Guido Graziani, of whom no other record remains earlier than 1278, when he is mentioned as the painter of a banner. Guido da Siena appears always to have painted on panel, not in fresco on the wall. He has been termed, very dubiously, a pupil of Pietrolino, and the master of "Diotisalvi," Mino da Turrita and Berlinghieri da Lucca.

GUIDO RENI (1575-1642), a prime master in the Bolognese school of painting, and one of the most admired artists of the period of incipient decadence in Italy, was born at Calvenzano near Bologna on the 4th of November 1575. His father was a musician of repute, a player on the flageolet; he wished to bring the lad up to perform on the harpsichord. At a very childish age, however, Guido displayed a determined bent towards the art of form, scribbling some attempt at a drawing here, there and everywhere. He was only nine years of age when Denis Calvart took notice of him, received him into his academy of design by the father's permission, and rapidly brought him forward, so that by the age of thirteen Guido had already attained marked proficiency. Albani and Domenichino became soon afterwards pupils in the same academy. With Albani Guido was very intimate up to the earlier period of manhood, but they afterwards became rivals, both as painters and as heads of ateliers, with a good deal of asperity on Albani's part; Domenichino was also pitted against Reni by the policy of Annibale Caracci. Guido was still in the academy of Calvart when he began frequenting the opposition school kept by Lodovico Caracci, whose style, far in advance of that of the Flemish painter, he dallied with. This exasperated Calvart. Him Guido, not yet twenty years of age, cheerfully quitted, transferring himself openly to the Caracci academy, in which he soon became prominent, being equally skilful and ambitious. He had not been a year with the Caracci when a work of his excited the wonder of Agostino and the jealousy of Annibale. Lodovico cherished him, and frequently painted him as an angel, for the youthful Reni was extremely handsome.

After a while, however, Lodovico also felt himself nettled, and he patronized the competing talents of Giovanni Barbiere. On one occasion Guido had made a copy of Annibale's "Descent from the Cross"; Annibale was asked to retouch it, and, finding nothing to do, exclaimed pettishly, "He knows more than enough" ("Costui ne sa troppo"). On another occasion Lodovico, consulted as umpire, lowered a price which Reni asked for an early picture. This slight determined the young man to be a pupil no more. He left the Caracci, and started on his own account as a competitor in the race for patronage and fame. A renowned work, the story of "Callisto and Diana," had been completed before he left.

Guido was faithful to the eclectic principle of the Bolognese school of painting. He had appropriated something from Calvart, much more from Lodovico Caracci; he studied with much zest after Albert Dürer; he adopted the massive, sombre and partly uncouth manner of Caravaggio. One day Annibale Caracci made the remark that a style might be formed reversing that of Caravaggio in such matters as the ponderous shadows and the gross common forms; this observation germinated in Guido's mind, and he endeavoured after some such style, aiming constantly at suavity. Towards 1602 he went to Rome with Albani, and Rome remained his headquarters for twenty years. Here, in the pontificate of Paul V. (Borghese), he 689
was greatly noted and distinguished. In the garden-house of the Rospigliosi Palace he painted the vast fresco which is justly regarded as his masterpiece—"Phoebus and the Hours preceded by Aurora." This exhibits his second manner, in which he had deviated far indeed from the promptings of Caravaggio. He founded now chiefly upon the antique, more especially the Niobe group and the "Venus de' Medici," modified by suggestions from Raphael, Correggio, Parmigiano and Paul Veronese. Of this last painter, although on the whole he did not get much from him, Guido was a particular admirer; he used to say that he would rather have been Paul Veronese than any other master—Paul was more nature than art. The "Aurora" is beyond doubt a work of pre-eminent beauty and attainment; it is stamped with pleasurable dignity, and, without being effeminate, has a more uniform aim after graceful selectness than can readily be traced in previous painters, greatly superior though some of them had been in impulse and personal fervour of genius. The pontifical chapel of Montecavallo was assigned to Reni to paint; but, being straitened in payments by the ministers, the artist made off to Bologna. He was fetched back by Paul V. with ceremonious éclat, and lodging, living and equipage were supplied to him. At another time he migrated from Rome to Naples, having received a commission to paint the chapel of S. Gennaro. The notorious cabal of three painters resident in Naples—Corenzio, Caracciolo and Ribera—offered, however, as stiff an opposition to Guido as to some other interlopers who preceded and succeeded him. They gave his servant a beating by the hands of two unknown bullies, and sent by him a message to his master to depart or prepare for death; Guido waited for no second warning, and departed. He now returned to Rome; but he finally left that city abruptly, in the pontificate of Urban VIII., in consequence of an offensive reprimand administered to him by Cardinal Spinola. He had received an advance of 400 scudi on account of an altarpiece for St Peter's, but after some lapse of years had made no beginning with the work. A broad reminder from the cardinal put Reni on his mettle; he returned the 400 scudi, quitted Rome within a few days, and steadily resisted all attempts at recall. He now resettled in Bologna. He had taught as well as painted in Rome, and he left pupils behind him; but on the whole he did not stamp any great mark upon the Roman school of painting, apart from his own numerous works in the papal city.

In Bologna Guido lived in great splendour, and established a celebrated school, numbering more than two hundred scholars. He himself drew in it, even down to his latest years. On first returning to this city, he charged about £21 for a full-length figure (mere portraits are not here in question), half this sum for a half-length, and £5 for a head. These prices must be regarded as handsome, when we consider that Domenichino about the same time received only £10, 10s. for his very large and celebrated picture, the "Last Communion of St Jerome." But Guido's reputation was still on the increase, and in process of time he quintupled his prices. He now left Bologna hardly at all; in one instance, however, he went off to Ravenna, and, along with three pupils, he painted the chapel in the cathedral with his admired picture of the "Israelites gathering Manna." His shining prosperity was not to last till the end. Guido was dissipated, generously but indiscriminately profuse, and an inveterate gambler. The gambling propensity had been his from youth, but until he became elderly it did not noticeably damage his fortunes. It grew upon him, and in a couple of evenings he lost the enormous sum of 14,400 scudi. The vice told still more ruinously on his art than on his character. In his decline he sold his time at so much per hour to certain picture dealers; one of them, the Shylock of his craft, would stand by, watch in hand, and see him work. Half-heartedness, half-performance, blighted his product: self-repetition and mere mannerism, with affectation for sentiment and vapidity for beauty, became the art of Guido. Some of these trade-works, heads or half-figures, were turned out in three hours or even less. It is said that, tardily wise, Reni left off gambling for nearly two years; at last he relapsed, and his relapse was followed not long afterwards by his death, caused by malignant fever. This event took place in Bologna on the 18th of August

1642; he died in debt, but was buried with great pomp in the church of S. Domenico.

Guido was personally modest, although he valued himself on his position in the art, and would tolerate no slight in that relation; he was extremely upright, temperate in diet, nice in his person and his dress. He was fond of stately houses, but could feel also the charm of solitude. In his temper there was a large amount of suspiciousness; and the jealousy which his abilities and his successes excited, now from the Caracci, now from Albani, now from the monopolizing league of Neapolitan painters, may naturally have kept this feeling in active exercise. Of his numerous scholars, Simone Cantarini, named II Pesarese, counts as the most distinguished; he painted an admirable head of Reni, now in the Bolognese Gallery. The portrait in the Uffizi Gallery of Florence is from Reni's own hand. Two other good scholars were Giacomo Semenza and Francesco Gessi.

The character of Guido's art is so well known as hardly to call for detailed analysis, beyond what we have already intimated. His most characteristic style exhibits a prepense ideal, of form rather than character, with a slight mode of handling, and silvery, somewhat cold, colour. In working from the nude he aimed at perfection of form, especially marked in the hands and feet. But he was far from always going to choice nature for his model; he transmuted *ad libitum*, and painted, it is averred, a Magdalene of demonstrative charms from a vulgar-looking colour-grinder. His best works have beauty, great amenity, artistic feeling and high accomplishment of manner, all alloyed by a certain core of commonplace; in the worst pictures the commonplace swamps everything, and Guido has flooded European galleries with trashy and empty pretentiousness, all the more noxious in that its apparent grace of sentiment and form misleads the unwary into approval, and the dilettante dabbler into cheap raptures. Both in Rome and wherever else he worked he introduced increased softness of style, which was then designated as the modern method. His pictures are mostly Scriptural or mythologic in subject, and between two and three hundred of them are to be found in various European collections—more than a hundred of these containing life-sized figures. The portraits which he executed are few—those of Sixtus V., Cardinal Spada and the so-called Beatrice Cenci being among the most noticeable. The identity of the last-named portrait is very dubious; it certainly cannot have been painted direct from Beatrice, who had been executed in Rome before Guido ever resided there. Many etchings are attributed to him—some from his own works, and some after other masters; they are spirited, but rather negligent.

Of other works not already noticed, the following should be named:—in Rome (the Vatican), the "Crucifixion of St Peter," an example of the painter's earlier manner; in S. Lorenzo in Lucina, "Christ Crucified"; in Forlì, the "Conception"; in Bologna, the "Alms of St Roch" (early), the "Massacre of the Innocents," and the "Pietà, or Lament over the Body of Christ" (in the church of the Mendicanti), which is by many regarded as Guido's prime executive work; in the Dresden Gallery, an "Ecce Homo"; in Milan (Brera Gallery), "Saints Peter and Paul"; in Genoa (church of S. Ambrogio), the "Assumption of the Virgin"; in Berlin, "St Paul the Hermit and St Anthony in the Wilderness." The celebrated picture of "Fortune" (in the Capitol) is one of Reni's finest treatments of female form; as a specimen of male form, the "Samson Drinking from the Jawbone of an Ass" might be named beside it. One of his latest works of mark is the "Ariadne," which used to be in the Gallery of the Capitol. The Louvre contains twenty of his pictures, the National Gallery of London seven, and others were once there, now removed to other public collections. The most interesting of the seven is the small "Coronation of the Virgin," painted on copper, an elegantly finished work, more pretty than beautiful. It was probably painted before the master quitted Bologna for Rome.

For the life and works of Guido Reni, see Bolognini, *Vita di Guido Reni* (1839); Passeri, *Vite de' pittori*; and Malvasia, *Felsina Pittrice*; also Lanzi, *Storia pitiorica*.

(W. M. R.)

GUIENNE, an old French province which corresponded roughly to the *Aquitania Secunda* of the Romans and the archbishopric of Bordeaux. In the 12th century it formed with Gascony the duchy of Aquitaine, which passed under the dominion of the kings of England by the marriage of Eleanor of Aquitaine to Henry II.; but in the 13th, through the conquests of Philip Augustus, Louis VIII. and Louis IX., it was confined within the narrower limits fixed by the treaty of Paris (1259). It is at this point that Guienne becomes distinct from Aquitaine. It then comprised the Bordelais (the old countship of Bordeaux), the Bazadais, part of Périgord, Limousin, Quercy and Rouergue, the Agenais ceded by Philip III. (the Bold) to Edward I. (1279), and (still united with Gascony) formed a duchy extending from the Charente to the Pyrenees. This duchy was held on the terms of homage to the French kings, an onerous obligation; and both in 1296 and 1324 it was confiscated by the kings of France on the ground that there had been a failure in

the feudal duties. At the treaty of Brétigny (1360) Edward III. acquired the full sovereignty of the duchy of Guienne, together with Aunis, Saintonge, Angoumois and Poitou. The victories of du Guesclin and Gaston Phœbus, count of Foix, restored the duchy soon after to its 13th-century limits. In 1451 it was conquered and finally united to the French crown by Charles VII. In 1469 Louis XI. gave it in exchange for Champagne and Brie to his brother Charles, duke of Berry, after whose death in 1472 it was again united to the royal dominion. Guienne then formed a government which from the 17th century onwards was united with Gascony. The government of Guienne and Gascony, with its capital at Bordeaux, lasted till the end of the *ancien régime*. Under the Revolution the departments formed from Guienne proper were those of Gironde, Lot-et-Garonne, Dordogne, Lot, Aveyron and the chief part of Tarn-et-Garonne.

GUIGNES, JOSEPH DE (1721-1800), French orientalist, was born at Pontoise on the 19th of October 1721. He succeeded Fourmont at the Royal Library as secretary interpreter of the Eastern languages. A *Mémoire historique sur l'origine des Huns et des Turcs*, published by de Guignes in 1748, obtained his admission to the Royal Society of London in 1752, and he became an associate of the French Academy of Inscriptions in 1754. Two years later he began to publish his learned and laborious *Histoire générale des Huns, des Mongoles, des Turcs et des autres Tartares occidentaux* (1756-1758); and in 1757 he was appointed to the chair of Syriac at the Collège de France. He maintained that the Chinese nation had originated in Egyptian colonization, an opinion to which, in spite of every argument, he obstinately clung. He died in Paris in 1800. The *Histoire* had been translated into German by Dähnert (1768-1771). De Guignes left a son, Christian Louis Joseph (1759-1845), who, after learning Chinese from his father, went as consul to Canton, where he spent seventeen years. On his return to France he was charged by the government with the work of preparing a Chinese-French-Latin dictionary (1813). He was also the author of a work of travels (*Voyages à Pékin, Manille, et l'île de France*, 1808).

See Quérard, *La France littéraire*, where a list of the memoirs contributed by de Guignes to the *Journal des savants* is given.

GUILBERT, YVETTE (1869-), French *diseuse*, was born in Paris. She served for two years until 1885 in the Magasin du Printemps, when, on the advice of the journalist, Edmond Stoullig, she trained for the stage under Landrol. She made her début at the Bouffes du Nord, then played at the Variétés, and in 1890 she received a regular engagement at the Eldorado to sing a couple of songs at the beginning of the performance. She also sang at the Ambassadeurs. She soon won an immense vogue by her rendering of songs drawn from Parisian lower-class life, or from the humours of the Latin Quarter, "*Quatre z'étudiants*" and the "*Hôtel du numéro trois*" being among her early triumphs. Her adoption of an habitual yellow dress and long black gloves, her studied simplicity of diction, and her ingenuous delivery of songs charged with *risqué* meaning, made her famous. She owed something to M. Xanrof, who for a long time composed songs especially for her, and perhaps still more to Aristide Bruant, who wrote many of her *argot* songs. She made successful tours in England, Germany and America, and was in great request as an entertainer in private houses. In 1895 she married Dr M. Schiller. In later years she discarded something of her earlier manner, and sang songs of the "pompadour" and the "crinoline" period in costume. She published the novels *La Vedette* and *Les Demi-vieilles*, both in 1902.

GUILDFORD, a market town and municipal borough, and the county town of Surrey, England, in the Guildford parliamentary division, 29 m. S.W. of London by the London and South Western railway; served also by the London, Brighton, and South Coast and the South Eastern and Chatham railways. Pop. (1901) 15,938. It is beautifully situated on an acclivity of

the northern chalk Downs and on the river Wey. Its older streets contain a number of picturesque gabled houses, with quaint lattices and curious doorways. The ruins of a Norman castle stand finely above the town and are well preserved; while the ground about them is laid out as a public garden. Beneath the Angel Inn and a house in the vicinity are extensive vaults, apparently of Early English date, and traditionally connected with the castle. The church of St Mary is Norman and Early English, with later additions and considerably restored; its aisles retain their eastward apses and it contains many interesting details. The church of St Nicholas is a modern building on an ancient site, and that of Holy Trinity is a brick structure of 1763, with later additions, also on the site of an earlier church, from which some of the monuments are preserved, including that of Archbishop Abbot (1640). The town hall dates from 1683 and contains a number of interesting pictures. Other public buildings are the county hall, corn-market and institute with museum and library. Abbot's Hospital, founded by Archbishop Abbot in 1619, is a beautiful Tudor brick building. The county hospital (1866) was erected as a memorial to Albert, Prince Consort. The Royal Free Grammar School, founded in 1509, and incorporated by Edward VI., is an important school for boys. At Cranleigh, 6 m. S.E., is a large middle-class county school. The town has flour mills, iron foundries and breweries, and a large trade in grain; while fairs are held for live stock. There is a manufacture of gunpowder in the neighbouring village of Chilworth. Guildford is a suffragan bishopric in the diocese of Winchester. The borough is under a mayor, 4 aldermen and 12 councillors. Area, 2601 acres.

Guildford (Gyldeford, Geldeford), occurs among the possessions of King Alfred, and was a royal borough throughout the middle ages. It probably owed its rise to its position at the junction of trade routes. It is first mentioned as a borough in 1131. Henry III. granted a charter to the men of Guildford in 1256, by which they obtained freedom from toll throughout the kingdom, and the privilege of having the county court held always in their town. Edward III. granted charters to Guildford in 1340, 1346 and 1367; Henry VI. in 1423; Henry VII. in 1488. Elizabeth in 1580 confirmed earlier charters, and other charters were granted in 1603, 1626 and 1686. The borough was incorporated in 1486 under the title of the mayor and good men of Guildford. During the middle ages the government of the town rested with a powerful merchant gild. Two members for Guildford sat in the parliament of 1295, and the borough continued to return two representatives until 1867 when the number was reduced to one. By the Redistribution Act of 1885 Guildford became merged in the county for electoral purposes. Edward II. granted to the town the right of having two fairs, at the feast of St Matthew (21st of September) and at Trinity respectively. Henry VII. granted fairs on the feast of St Martin (11th of November) and St George (23rd of April). Fairs in May for the sale of sheep and in November for the sale of cattle are still held. The market rights date at least from 1276, and three weekly markets are still held for the sale of corn, cattle and vegetables respectively. The cloth trade which formed the staple industry at Guildford in the middle ages is now extinct.

GUILDHALL, the hall of the corporation of the city of London, England. It faces a courtyard opening out of Gresham Street. The date of its original foundation is not known. An ancient crypt remains, but the hall has otherwise undergone much alteration. It was rebuilt in 1411, beautified by the munificence of successive officials, damaged in the Great Fire of 1666, and restored in 1789 by George Dance; while the hall was again restored, with a new roof, in 1870. This fine chamber, 152 ft. in length, is the scene of the state banquets and entertainments of the corporation, and of the municipal meetings "in common hall." The building also contains a council chamber and various court rooms, with a splendid library, open to the public, a museum and art gallery adjoining. The hall contains several monuments and two giant figures of wood, known as Gog and Magog. These were set up in 1708, but the appearance of giants in city pageants is of much earlier date.

GUILFORD, BARONS AND EARLS OF. Francis North, 1st Baron Guilford (1637-1685), was the third son of the 4th Baron North (see North, Barons), and was created Baron Guilford in 1683, after becoming lord keeper in succession to Lord Nottingham. He had been an eminent lawyer, solicitor-general (1671), attorney-general (1673), and chief-justice of the common pleas (1675), and in 1679 was made a member of the council of thirty and on its

dissolution of the cabinet. He was a man of wide culture and a stanch royalist. In 1672 he married Lady Frances Pope, daughter and co-heiress of the earl of Downe, who inherited the Wroxton estate; and he was succeeded as 2nd baron by his son Francis (1673-1729), whose eldest son Francis (1704-1790), after inheriting first his father's title as 3rd baron, and then (in 1734) the barony of North from his kinsman the 6th Baron North, was in 1752 created 1st earl of Guilford. His first wife was a daughter of the earl of Halifax, and his son and successor Frederick was the English prime minister, commonly known as Lord North, his courtesy title while the 1st earl was alive.

Frederick North, 2nd earl of Guilford, but better known by his courtesy title of Lord North (1732-1792), prime minister of England during the important years of the American War, was born on the 13th of April 1732, and after being educated at Eton and Christ Church, Oxford, was sent to make the grand tour of the continent. On his return he was, though only twenty-two years of age, at once elected M.P. for Banbury, of which town his father was high steward; and he sat for the same town in parliament for nearly forty years. In 1759 he was chosen by the duke of Newcastle to be a lord of the treasury, and continued in the same office under Lord Bute and George Grenville till 1765. He had shown himself such a ready debater that on the fall of the first Rockingham ministry in 1766 he was sworn of the privy council, and made paymaster-general by the duke of Grafton. His reputation for ability grew so high that in December 1767, on the death of the brilliant Charles Townshend, he was made chancellor of the exchequer. His popularity with both the House of Commons and the people continued to increase, for his temper was never ruffled, and his quiet humour perpetually displayed; and, when the retirement of the duke of Grafton was necessitated by the hatred he inspired and the attacks of Junius, no better successor could be found for the premiership than the chancellor of the exchequer. Lord North succeeded the duke in March 1770, and continued in office for twelve of the most eventful years in English history. George III. had at last overthrown the ascendancy of the great Whig families, under which he had so long groaned, and determined to govern as well as rule. He knew that he could only govern by obtaining a majority in parliament to carry out his wishes, and this he had at last obtained by a great expenditure of money in buying seats and by a careful exercise of his patronage. But in addition to a majority he must have a minister who would consent to act as his lieutenant, and such a minister he found in Lord North. How a man of undoubted ability such as Lord North was could allow himself to be thus used as a mere instrument cannot be explained; but the confidential tone of the king's letters seems to show that there was an unusual intimacy between them, which may account for North's compliance. The path of the minister in parliament was a hard one; he had to defend measures which he had not designed, and of which he had not approved, and this too in a House of Commons in which all the oratorical ability of Burke and Fox was against him, and when he had only the purchased help of Thurlow and Wedderburne to aid him. The most important events of his ministry were those of the American War of Independence. He cannot be accused of causing it, but one of his first acts was the retention of the tea-duty, and he it was also who introduced the Boston Port Bill in 1774. When the war had broken out he earnestly counselled peace, and it was only the earnest solicitations of the king not to leave his sovereign again at the mercy of the Whigs that induced him to defend a war which from 1779 he knew to be both hopeless and impolitic. At last, in March 1782, he insisted on resigning after the news of Cornwallis's surrender at Yorktown, and no man left office more blithely. He had been well rewarded for his assistance to the king: his children had good sinecures; his half-brother, Brownlow North (1741-1820), was bishop of Winchester; he himself was chancellor of the university of Oxford, lord-lieutenant of the county of Somerset, and had finally been made a knight of the Garter, an honour which has only been conferred on three other members of the House of Commons, Sir R. Walpole, Lord Castlereagh and Lord Palmerston. Lord North did not remain long out of office, but in April 1783 formed his famous coalition with his old subordinate, C. J. Fox (*q.v.*), and became secretary of state with him under the nominal premiership of the duke of Portland. He was probably urged to this coalition with his old opponent by a desire to show that he could act independently of the king, and was not a mere royal mouthpiece. The coalition ministry went out of office on Fox's India Bill in December 1783, and Lord North, who was losing his sight, then finally gave up political ambition. He played, when quite blind, a somewhat important part in the debates on the Regency Bill in 1789, and in the next year succeeded his father as earl of Guilford. He did not long survive his elevation, and died peacefully on the 5th of August 1792. It is impossible to consider Lord North a great statesman, but he was a most good-tempered and humorous member of the House of Commons. In a time of unexampled party feeling he won the esteem and almost the love of his most bitter opponents. Burke finely sums up his character in his *Letter to a Noble Lord*: "He was a man of admirable parts, of general knowledge, of a versatile understanding, fitted for every sort of business; of infinite wit and pleasantry, of a delightful temper, and with a mind most disinterested. But it would be only to degrade myself," he continues, "by a weak adulation, and not to honour the memory of a great man, to deny that he

wanted something of the vigilance and spirit of command which the times required."

By his wife Anne (d. 1797), daughter of George Speke of White Lackington, Somerset, Guilford had four sons, the eldest of whom, George Augustus (1757-1802), became 3rd earl on his father's death. This earl was a member of parliament from 1778 to 1792 and was a member of his father's ministry and also of the royal household; he left no sons when he died on the 20th of April 1802 and was succeeded in the earldom by his brother Francis (1761-1817), who also left no sons. The youngest brother, Frederick (1766-1827), who now became 5th earl of Guilford, was remarkable for his great knowledge and love of Greece and of the Greek language. He had a good deal to do with the foundation of the Ionian university at Corfu, of which he was the first chancellor and to which he was very liberal. Guilford, who was governor of Ceylon from 1798 to 1805, died unmarried on the 14th of October 1827. His cousin, Francis (1772-1861), a son of Brownlow North, bishop of Winchester from 1781 to 1820, was the 6th earl, and the latter's descendant, Frederick George (b. 1876), became 8th earl in 1886.

On the death of the 3rd earl of Guilford in 1802 the barony of North fell into abeyance between his three daughters, the survivor of whom, Susan (1797-1884). wife of John Sidney Doyle, who took the name of North, was declared by the House of Lords in 1841 to be Baroness North, and the title passed to her son, William Henry John North, the 11th baron (b. 1836) (see North, Barons).

For the Lord Keeper Guilford see the *Lives* by the Hon. R. North, edited by A. Jessopp (1890); and E. Foss, *The Judges of England*, vol. vii. (1848-1864). For the prime minister, Lord North, see *Correspondence of George III.* with Lord North, edited by W. B. Donne (1867); Horace Walpole, *Journal of the Reign of George III.* (1859), and *Memoirs of the Reign of George III.*, edited by G. F. R. Barker (1894); Lord Brougham, *Historical Sketches of Statesmen*, vol. i. (1839); Earl Stanhope, *History of England* (1858); Sir T. E. May, *Constitutional History of England* (1863-1865); and W. E. H. Lecky, *History of England in the 18th century* (1878-1890).

GUILFORD, a township, including a borough of the same name, in New Haven county, Connecticut, U.S.A., on Long Island Sound and at the mouth of the Menunkatuck or West river, about 16 m. E. by S. of New Haven. Pop. of the township, including the borough (1900), 2785, of whom 387 were foreign-born; (1910) 3001; pop. of the borough (1910), 1608. The borough is served by the New York, New Haven & Hartford railroad. On a plain is the borough green of nearly 12 acres, which is shaded by some fine old elms and other trees, and in which there is a soldiers' monument. About the green are several churches and some of the better residences. On an eminence commanding a fine view of the Sound is an old stone house, erected in 1639 for a parsonage, meeting-house and fortification; it was made a state museum in 1898, when extensive alterations were made to restore the interior to its original appearance. The Point of Rocks, in the harbour, is an attractive resort during the summer season. There are about 12 ft. of water on the harbour bar at high tide. The principal industries of Guilford are coastwise trade, the manufacture of iron castings, brass castings, wagon wheels and school furniture, and the canning of vegetables. Near the coast are quarries of fine granite; the stone for the pedestal of the Statue of Liberty on Bedloe's Island, in New York Harbour, was taken from them.

Guilford was founded In 1639 as an independent colony by a company of twenty-five or more families from Kent, Surrey and Sussex, England, under the leadership of Rev. Henry Whitfield (1597-1657). While still on shipboard twenty-five members of the company signed a plantation covenant whereby they agreed not to desert the plantation which they were about to establish. Arriving at New Haven early in July 1639, they soon began negotiations with the Indians for the purchase of land, and on the 29th of September a deed was signed by which the Indians conveyed to them the territory between East River and Stony Creek for "12 coates, 12 Fathoms of Wampam, 12 glasses (mirrors), 12 payer of shooes, 12 Hatchetts, 12 paire of Stockings, 12 Hooes, 4 kettles, 12 knives, 12 Hatts, 12 Porringers, 12 spoones, and 2 English coates." Other purchases of land from the Indians were made later. Before the close of the year the company removed from New Haven and established the new colony; it was known by the Indian name Menuncatuck for about four years and the name Guilford (from Guildford, England) was then substituted. As a provisional arrangement, civil power for the administration of justice and the preservation of the peace was vested in four persons until such time as a church should be organized. This was postponed until 1643 when

considerations of safety demanded that the colony should become a member of the New Haven Jurisdiction, and then only to meet the requirements for admission to this union were the church and church state modelled after those of New Haven. Even then, though suffrage was restricted to church members, Guilford planters who were not church members were required to attend town meetings and were allowed to offer objections to any proposed order or law. From 1661 until the absorption of the members of the New Haven Jurisdiction by Connecticut, in 1664, William Leete (1611-1683), one of the founders of Guilford, was governor of the Jurisdiction, and under his leadership Guilford took a prominent part in furthering the submission to Connecticut, which did away with the church state and the restriction of suffrage to freemen. Guilford was the birthplace of Fitz-Greene Halleck (1790-1867), the poet; of Samuel Johnson (1696-1771), the first president of King's College (now Columbia University); of Abraham Baldwin (1754-1807), prominent as a statesman and the founder of the University of Georgia; and of Thomas Chittenden, the first governor of Vermont. The borough was incorporated in 1815.

See B. C. Steiner, *A History of the Plantation of Menunca-Tuck and of the Original Town of Guilford, Connecticut* (Baltimore, 1897), and *Proceedings at the Celebration of the 250th Anniversary of the Settlement of Guilford, Connecticut* (New Haven, 1889).

GUILLAUME, JEAN BAPTISTE CLAUDE EUGÈNE (1822-1905), French sculptor, was born at Montbard on the 4th of July 1822, and studied under Cavelier, Millet, and Barrias, at the École des Beaux-Arts, which he entered in 1841, and where he gained the *prix de Rome* in 1845 with "Theseus finding on a rock his Father's Sword." He became director of the École des Beaux-Arts in 1864, and director-general of Fine Arts from 1878 to 1879, when the office was suppressed. Many of his works have been bought for public galleries, and his monuments are to be found in the public squares of the chief cities of France. At Rheims there is his bronze statue of "Colbert," at Dijon his "Rameau" monument. The Luxembourg Museum has his "Anacreon" (1852), "Les Gracques" (1853), "Faucheur" (1855), and the marble bust of "Mgr Darboy"; the Versailles Museum the portrait of "Thiers"; the Sorbonne Library the marble bust of "Victor le Clerc, doyen de la faculté des lettres." Other works of his are at Trinity Church, St Germain l'Auxerrois, and the church of St Clotilde, Paris. Guillaume was a prolific writer, principally on sculpture and architecture of the Classic period and of the Italian Renaissance. He was elected member of the Académie Française in 1862, and in 1891 was sent to Rome as director of the Académie de France in that city. He was also elected an honorary member of the Royal Academy, London, 1869, on the institution of that class.

GUILLAUME DE LORRIS (fl. 1230), the author of the earlier section of the *Roman de la rose*, derives his surname from a small town about equidistant from Montargis and Gien, in the present department of Loiret. This and the fact of his authorship may be said to be the only things positively known about him. The rubric of the poem, where his own part finishes, attributes Jean de Meun's continuation to a period forty years later than William's death and the consequent interruption of the romance. Arguing backwards, this death used to be put at about 1260; but Jean de Meun's own work has recently been dated earlier, and so the composition of the first part has been thrown back to a period before 1240. The author represents himself as having dreamed the dream which furnished the substance of the poem in his twentieth year, and as having set to work to "rhyme it" five years later. The later and longer part of the *Roman* shows signs of greater intellectual vigour and wider knowledge than the earlier and shorter, but Guillaume de Lorris is to all appearance more original. The great features of his four or five thousand lines are, in the first place, the extraordinary vividness and beauty of his word-pictures, in which for colour, freshness and individuality he has not many rivals except in the greatest masters, and, secondly, the fashion of allegorical presentation, which, hackneyed and wearisome as it afterwards became, was evidently in his time new and striking. There are of course traces of it before, as in some romances, such as those of Raoul de Houdenc, in the troubadours, and in other writers; but it was unquestionably Guillaume de Lorris who fixed the style.

For an attempt to identify Guillaume de Lorris see L. Jarry, *Guillaume de Lorris et le*

testament d'Alphonse de Poitiers (1881). Also Paulin Paris in the *Hist. litt. de la France*, vol. xxiii.

GUILLAUME DE PALERME (William of Palerne), hero of romance. The French verse romance was written at the desire of a Countess Yolande, generally identified with Yolande, daughter of Baldwin IV., count of Flanders. The English poem in alliterative verse was written about 1350 by a poet called William, at the desire of Humphrey Bohun, earl of Hereford, (d. 1361). Guillaume, a foundling supposed to be of low degree, is brought up at the court of the emperor of Rome, and loves his daughter Melior who is destined for a Greek prince. The lovers flee into the woods disguised in bear-skins. Alfonso, who is Guillaume's cousin and a Spanish prince, has been changed into a wolf by his step-mother's enchantments. He provides food and protection for the fugitives, and Guillaume eventually triumphs over Alfonso's father, and wins back from him his kingdom. The benevolent werwolf is disenchanted, and marries Guillaume's sister.

See *Guillaume de Palerne*, ed. H. Michelant (Soc. d. anc. textes fr., 1876); *Hist. litt. de la France*, xxii. 829; *William of Palerme*, ed. Sir F. Madden (Roxburghe Club, 1832), and W. W. Skeat (E. E. Text Soc., extra series No. 1, 1867); M. Kaluza, in *Eng. Studien* (Heilbronn, iv. 196). The prose version of the French romance, printed by N. Bonfons, passed through several editions.

GUILLAUME D'ORANGE (d. 812), also known as Guillaume Fierabrace, St Guillaume de Gellone, and the Marquis au court nez, was the central figure of the southern cycle of French romance, called by the *trouvères* the *geste* of Garin de Monglane. The cycle of Guillaume has more unity than the other great cycles of Charlemagne or of Doon de Mayence, the various poems which compose it forming branches of the main story rather than independent epic poems. There exist numerous cyclic MSS. in which there is an attempt at presenting a continuous *histoire poétique* of Guillaume and his family. MS. Royal 20 D xi. in the British Museum contains eighteen *chansons* of the cycle. Guillaume, son of Thierry or Theodoric and of Alde, daughter of Charles Martel, was born in the north of France about the middle of the 8th century. He became one of the best soldiers and trusted counsellors of Charlemagne, and In 790 was made count of Toulouse, when Charles's son Louis the Pious was put under his charge. He subdued the Gascons, and defended Narbonne against the infidels. In 793 Hescham, the successor of Abd-al-Rahman II., proclaimed a holy war against the Christians, and collected an army of 100,000 men, half of which was directed against the kingdom of the Asturias, while the second invaded France, penetrating as far as Narbonne. Guillaume met the invaders near the river Orbieux, at Villedaigne, where he was defeated, but only after an obstinate resistance which so far exhausted the Saracens that they were compelled to retreat to Spain. He took Barcelona from the Saracens in 803, and in the next year founded the monastery of Gellone (now Saint Guilhem-le Désert), of which he became a member in 806. He died there in the odour of sanctity on the 28th of May 812.

No less than thirteen historical personages bearing the name of William (Guillaume) have been thought by various critics to have their share in the formation of the legend. William, count of Provence, son of Boso II., again delivered southern France from a Saracen invasion by his victory at Fraxinet in 973, and ended his life in a cloister. William Tow-head (*Tête d'étoupe*), duke of Aquitaine (d. 983), showed a fidelity to Louis IV. paralleled by Guillaume d'Orange's service to Louis the Pious. The cycle of twenty or more *chansons* which form the *geste* of Guillaume reposes on the traditions of the Arab invasions of the south of France, from the battle of Poitiers (732) under Charles Martel onwards, and on the French conquest of Catalonia from the Saracens. In the Norse version of the Carolingian epic Guillaume appears in his proper historical environment, as a chief under Charlemagne; but he plays a leading part in the *Couronnement Looys*, describing the formal associations of Louis the Pious in the empire at Aix (813, the year after Guillaume's death), and after the battle of Aliscans it is from the emperor Louis that he seeks reinforcements. This anachronism arises from the fusion of the epic Guillaume with the champion of Louis IV., and from the fact that he was the military and civil chief of Louis the Pious, who was titular king of Aquitaine under his father from the

time when he was three years old. The inconsistencies between the real and the epic Guillaume are often left standing in the poems. The personages associated with Guillaume in his Spanish wars belong to Provence, and have names common in the south. The most famous of these are Beuves de Comarchis, Ernaud de Girone, Garin d'Anséun, Aïmer le chétif, so called from his long captivity with the Saracens. The separate existence of Aïmer, who refused to sleep under a roof, and spent his whole life in warring against the infidel, is proved. He was Hadhemar, count of Narbonne, who in 809 and 810 was one of the leaders sent by Louis against Tortosa. No doubt the others had historical prototypes. In the hands of the *trouvères* they became all brothers of Guillaume, and sons of Aymeri de Narbonne,[1] the grandson of Garin de Monglane, and his wife Ermenjart. Nevertheless when Guillaume seeks help from Louis the emperor he finds all his relations in Laon, in accordance with his historic Frankish origin.

The central fact of the *geste* of Guillaume is the battle of the Archamp or Aliscans, in which perished Guillaume's heroic nephew, Vezian or Vivien, a second Roland. At the eleventh hour he summoned Guillaume to his help against the overwhelming forces of the Saracens. Guillaume arrived too late to help Vivien, was himself defeated, and returned alone to his wife Guibourc, leaving his knights all dead or prisoners. This event is related in a Norman-French transcript of an old French *chanson de geste*, the *Chançun de Willame*—which only was brought to light in 1901 at the sale of the books of Sir Henry Hope Edwardes—in the *Covenant Vivien*, a recension of an older French chanson and in *Aliscans*. *Aliscans* continues the story, telling how Guillaume obtained reinforcements from Laon, and how, with the help of the comic hero, the scullion Rainouart or Rennewart, he avenged the defeat of Aliscans and his nephew's death. Rainouart turns out to be the brother of Guillaume's wife Guibourc, who was before her marriage the Saracen princess and enchantress Orable. Two other poems are consecrated to his later exploits, *La Bataille Loquifer*, the work of a French Sicilian poet, Jendeu de Brie (fl. 1170), and *Le Moniage Rainouart*. The staring-point of Herbert le duc of Dammartin (fl. 1170) in *Foucon de Candie* (Candie = Gandia in Spain?) is the return of Guillaume from the battle; and the Italian compilation *I Nerbonesi*, based on these and other *chansons*, seems in some cases to represent an earlier tradition than the later of the French *chansons*, although its author Andrea di Barberino wrote towards the end of the 14th century. The minnesinger Wolfram von Eschenbach based his *Willehalm* on a French original which must have differed from the versions we have. The variations in the story of the defeat of Aliscans or the Archant, and the numerous inconsistencies of the narratives even when considered separately have occupied many critics. Aliscans (Aleschans, Alyscamps, Elysii Campi) was, however, generally taken to represent the battle of Villedaigne, and to take its name from the famous cemetery outside Arles. Wolfram von Eschenbach even mentions the tombs which studded the field of battle. Indications that this tradition was not unassailable were not lacking before the discovery of the *Chançun de Willame*, which, although preserved in a very corrupt form, represents the earliest recension we have of the story, dating at least from the beginning of the 12th century. It seems probable that the Archant was situated in Spain near Vivien's headquarters at Tortosa, and that Guillaume started from Barcelona, not from Orange, to his nephew's help. The account of the disaster was modified by successive *trouvères*, and the uncertainty of their methods may be judged by the fact that in the *Chançun de Willame* two consecutive accounts (11. 450-1326 and 11. 1326-2420) of the fight appear to be set side by side as if they were separate episodes. *Le Couronnement Looys*, already mentioned, *Le Charroi de Nîmes* (12th century) in which Guillaume, who had been forgotten in the distribution of fiefs, enumerates his services to the terrified Louis, and *Aliscans* (12th century), with the earlier *Chançun*, are among the finest of the French epic poems. The figure of Vivien is among the most heroic elaborated by the *trouvères*, and the giant Rainouart has more than a touch of Rabelaisian humour.

The *chansons de geste* of the cycle of Guillaume are: *Enfances Garin de Monglane* (15th century) and *Garin de Monglane* (13th century), on which is founded the prose romance of *Guérin de Monglane*, printed in the 15th century by Jehan Trepperel and often later; *Girars de Viane* (13th century, by Bertrand de Bar-sur-Aube), ed. P. Tarbé (Reims, 1850); *Hernaut de Beaulande* (fragment 14th century); *Renier de Gennes*, which only survives in its prose form; *Aymeri de Narbonne* (*c.* 1210) by Bertrand de Bar-sur-Aube, ed. L. Demaison (Soc. des anc. textes fr., Paris, 2 vols., 1887); *Les Enfances Guillaume* (13th century); *Les Narbonnais*, ed. H. Suchier (Soc. des anc. textes fr., 2 vols., 1898), with a Latin fragment dating from the 11th century, preserved at the Hague; *Le Couronnement Looys* (ed. E. Langlois, 1888), *Le Charroi de Nîmes*, *La Prise d'Orange*, *Le Covenant Vivien*, *Aliscans*, which were edited by W. J. A. Jonckbloet in vol. i. of his *Guillaume d'Orange* (The Hague, 1854); a critical text of *Aliscans* (Halle, 1903, vol. i.) is edited by E. Wienbeck, W. Hartnacke and P. Rasch; *Loquifer* and *Le Moniage Rainouart* (12th century); *Bovon de Commarchis* (13th century), recension of the earlier Siège de Barbastre, by Adenès li Rois, ed. A. Scheler (Brussels, 1874); *Guibert d'Andrenas* (13th century); *La Prise de Cordres* (13th century); *La Mort Aimeri de Narbonne*,

ed. J. Couraye de Parc (Soc. des Anciens Textes français, Paris, 1884); *Foulque de Candie* (ed. P. Tarbé, Reims, 1860); *Le Moniage Guillaume* (12th century); *Les Enfances Vivien* (ed. C. Wahlund and H. v. Feilitzen, Upsala and Paris, 1895); *Chançun de Willame* (Chiswick Press, 1903), described by P. Meyer in *Romania* (xxxiii. 597-618). The ninth branch of the *Karlamagnus Saga* (ed. C. R. Unger, Christiania, 1860) deals with the *geste* of Guillaume. *I Nerbonesi* is edited by J. G. Isola (Bologna, 1877, &c.).

See C. Révillout, *Étude hist. et litt. sur la vita sancti Willelmi* (Montpellier, 1876); W. J. A. Jonckbloet, *Guillaume d'Orange* (2 vols., 1854, The Hague); L. Clarus (ps. for W. Volk), *Herzog Wilhelm von Aquitanien* (Münster, 1865); P. Paris, *in Hist. litt. de la France* (vol. xxii., 1852); L. Gautier, *Épopées françaises* (vol. iv., 2nd ed., 1882); R. Weeks, *The newly discovered Chançun de Willame* (Chicago, 1904); A. Thomas, *Études romanes* (Paris, 1891), on Vivien; L. Saltet, "S. Vidian de Martres-Tolosanes" in *Bull. de litt. ecclés.* (Toulouse, 1902); P. Becker, *Die altfrz. Wilhelmsage u. ihre Beziehung zu Wilhelm dem Heiligen* (Halle, 1896), and *Der südfranzösische Sagenkreis und seine Probleme* (Halle, 1898); A. Jeanroy, "Études sur le cycle de Guillaume au court nez" (in *Romania*, vols. 25 and 26, 1896-1897); H. Suchier, "Recherches sur ... Guillaume d'Orange" (in *Romania*, vol. 32, 1903). The conclusions arrived at by earlier writers are combated by Joseph Bédier in the first volume, "Le Cycle de Guillaume d'Orange" (1908), of his *Légendes épiques*, in which he constructs a theory that the cycle of Guillaume d'Orange grew up round the various shrines on the pilgrim route to Saint Gilles of Provence and Saint James of Compostella—that the *chansons de geste* were, in fact, the product of 11th and 12th century trouvères, exploiting local ecclesiastical traditions, and were not developed from earlier poems dating back perhaps to the lifetime of Guillaume of Toulouse, the saint of Gellone.

1 The poem of *Aymeri de Narbonne* contains the account of the young Aymeri's brilliant capture of Narbonne, which he then receives as a fief from Charlemagne, of his marriage with Ermenjart, sister of Boniface, king of the Lombards, and of their children. The fifth daughter, Blanchefleur, is represented as the wife of Louis the Pious. The opening of this poem furnished, though indirectly, the matter of the *Aymerillot* of Victor Hugo's *Légende des siècles*.

GUILLEMOT (Fr. *guillemot*[1]), the name accepted by nearly all modern authors for a sea-bird, the *Colymbus troile* of Linnaeus and the *Uria troile* of Latham, which nowadays it seems seldom if ever to bear among those who, from their vocation, are most conversant with it, though, according to Willughby and Ray his translator, it was in their time so called "by those of Northumberland and Durham." Around the coasts of Britain it is variously known as the frowl, kiddaw or skiddaw, langy (cf. Ice. *Langvia*), lavy, marrock, murre, scout (cf. Coot), scuttock, strany, tinker or tinkershire and willock. In former days the guillemot yearly frequented the cliffs on many parts of the British coasts in countless multitudes, and this is still the case in the northern parts of the United Kingdom; but more to the southward nearly all its smaller settlements have been rendered utterly desolate by the wanton and cruel destruction of their tenants during the breeding season, and even the inhabitants of those which were more crowded had become so thinned that, but for the intervention of the Sea Birds Preservation Act (32 & 33 Vict. cap. 17), which provided under penalty for the safety of this and certain other species at the time of year when they were most exposed to danger, they would unquestionably by this time have been exterminated so far as England is concerned.

Part of the guillemot's history is still little understood. We know that it arrives at its wonted breeding stations on its accustomed day in spring, that it remains there till, towards the end of the summer, its young are hatched and able, as they soon are, to encounter the perils of a seafaring life, when away go all, parents and progeny. After that time it commonly happens that a few examples are occasionally met with in bays and shallow waters. Tempestuous weather will drive ashore a large number in a state of utter destitution—many of them indeed are not unfrequently washed up dead—but what becomes of the bulk of the birds, not merely the comparatively few thousands that are natives of Britain, but the tens and hundreds of thousands, not to say millions, that are in summer denizens of more northern latitudes, no one can say. This mystery is not peculiar to the guillemot, but is shared by all the *Alcidae* that inhabit the Atlantic Ocean. Examples stray every season across the Bay of Biscay, are found off the coasts of Spain and Portugal, enter the Mediterranean and reach Italian waters, or, keeping farther south, may even touch the Madeiras, Canaries or Azores; but these bear no proportion whatever to the mighty hosts of whom they are literally the "scouts," and whose position and movements they no more reveal than do the vedettes of a well-appointed army. The common guillemot of both sides of the Atlantic is replaced farther northward by a species

with a stouter bill, the *U. arra* or *U. bruennichi* of ornithologists, and on the west coast of North America by the *U. californica*. The habits of all these are essentially the same, and the structural resemblance between all of them and the Auks is so great that several systematists have relegated them to the genus *Alca*, confining the genus *Uria* to the guillemots of another group, of which the type is the *U. grylla*, the black guillemot of British authors, the dovekey or Greenland dove of sailors, the tysty of Shetlanders. This bird assumes in summer an entirely black plumage with the exception of a white patch on each wing, while in winter it is beautifully marbled with white and black. Allied to it as species or geographical races are the *U. mandti*, *U. columba* and *U. carbo*. All these differ from the larger guillemots by laying two or three eggs, which are generally placed in some secure niche, while the members of the other group lay but a single egg, which is invariably exposed on a bare ledge.

(A. N.)

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1 The word, however, seems to be cognate with or derived from the Welsh and Manx *Guillem*, or *Gwilym* as Pennant spells it. The association may have no real meaning, but one cannot help comparing the resemblance between the French *guillemot* and *Guillaume* with that between the English willock (another name for the bird) and William.

GUILLOCHE, a French word for an ornament, either painted or carved, which was one of the principal decorative bands employed by the Greeks in their temples or on their vases. Guilloches are single, double or triple; they consist of a series of circles equidistant one from the other and enclosed in a band which winds round them and interlaces. This guilloche is of Asiatic origin and was largely employed in the decoration of the Assyrian palaces, where it was probably copied from Chaldaean work, as there is an early example at Erech which dates from the time of Gudea (2294 B.C.). The ornament as painted by the Greeks has almost entirely disappeared, but traces are found in the temple of Nemesis at Rhamnus; and on the terra-cotta slabs by which the timber roofs of Greek temples were protected, it is painted in colours which are almost as brilliant as when first produced, those of the Treasury of Gela at Olympia being of great beauty. These examples are double guilloches, with two rows of circles, each with an independent interlacing band and united by a small arc with palmette inside; in both the single and double guilloches of Greek work there is a flower in the centre of the circles. In the triple guilloche, the centre row of circles comes half-way between the others, and the enclosing band crosses diagonally both ways, interlacing alternately. The best example of the triple guilloche is that which is carved on the torus moulding of the base and on the small convex moulding above the echinus of the capitals of the columns of the Erechtheum at Athens. It was largely employed in Roman work, and the single guilloche is found almost universally as a border in mosaic pavements, not only in Italy but throughout Europe. In the Renaissance in Italy it was also a favourite enrichment for borders and occasionally in France and England.

GUILLON, MARIE NICOLAS SYLVESTRE (1760-1847), French ecclesiastic, was born in Paris on the 1st of January 1760. He was librarian and almoner in the household of the princess de Lamballe, and when in 1792 she was executed, he fled to the provinces, where under the name of Pastel he practised medicine. A man of facile conscience, he afterwards served in turn under Napoleon, the Bourbons and the Orleanists, and became canon of St Denis, bishop of Morocco and dean of the Sorbonne.

Among his many literary works are a *Collection des brefs du pape Pie VI* (1798), *Bibliothèque choisie des pères grecs et latins* (1822, 26 vols.) and a French translation of Cyprian with notes (1837, 2 vols.).

GUILLOTINE, the instrument for inflicting capital punishment by decapitation, introduced into France at the period of the Revolution. It consists of two upright posts surmounted by a

cross beam, and grooved so as to guide an oblique-edged knife, the back of which is heavily weighted to make it fall swiftly and with force when the cord by which it is held aloft is let go. Some ascribe the invention of the machine to the Persians; and previous to the period when it obtained notoriety under its present name it had been in use in Scotland, England and various parts of the continent. There is still preserved In the antiquarian museum of Edinburgh the rude guillotine called the “maiden” by which the regent Morton was decapitated in 1581. The last persons decapitated by the Scottish “maiden” were the marquis of Argyll in 1661 and his son the earl of Argyll in 1685. It would appear that no similar machine was ever in general use in England; but until 1650 there existed in the forest of Hardwick, which was coextensive with the parish of Halifax, West Riding, Yorkshire, a mode of trial and execution called the gibbet law, by which a felon convicted of theft within the liberty was sentenced to be decapitated by a machine called the Halifax gibbet. A print of it is contained in a small book called *Halifax and its Gibbet Law* (1708), and in Gibson’s edition of Camden’s *Britannia* (1722). In Germany the machine was in general use during the middle ages, under the name of the *Diele*, the *Hobel* or the *Dolabra*. Two old German engravings, the one by George Penez, who died in 1550, and the other by Heinrich Aldegrever, with the date 1553, represent the death of a son of Titus Manlius by a similar instrument, and its employment for the execution of a Spartan is the subject of the engraving of the eighteenth symbol in the volume entitled *Symbolicae quaestiones de universo genere*, by Achilles Bocchi (1555). From the 13th century it was used in Italy under the name of *Mannaia* for the execution of criminals of noble birth. The *Chronique de Jean d’Anton*, first published in 1835, gives minute details of an execution in which it was employed at Genoa in 1507; and it is elaborately described by Père Jean Baptiste Labat in his *Voyage en Espagne et en Italie en 1730*. It is mentioned by Jacques, viscomte de Puységur, in his *Mémoires* as in use in the south of France, and he describes the execution by it of Marshal Montmorency at Toulouse in 1632. For about a century it had, however, fallen into general disuse on the continent; and Dr Guillotine, who first suggested its use in modern times, is said to have obtained his information regarding it from the description of an execution that took place at Milan in 1702, contained in an anonymous work entitled *Voyage historique et politique de Suisse, d’Italie, et d’Allemagne*.

Guillotine, who was born at Saintes, May 28, 1738, and elected to the Constituent Assembly in 1789, brought forward on the 1st December of that year two propositions regarding capital punishment, the second of which was that, “in all cases of capital punishment it shall be of the same kind—that is, decapitation—and it shall be executed by means of a machine.” The reasons urged in support of this proposition were that in cases of capital punishment the privilege of execution by decapitation should no longer be confined to the nobles, and that it was desirable to render the process of execution as swift and painless as possible. The debate was brought to a sudden termination in peals of laughter caused by an indiscreet reference of Dr Guillotine to his machine, but his ideas seem gradually to have leavened the minds of the Assembly, and after various debates decapitation was adopted as the method of execution in the penal code which became law on the 6th October 1791. At first it was intended that decapitation should be by the sword, but on account of a memorandum by M. Sanson, the executioner, pointing out the expense and certain other inconveniences attending that method, the Assembly referred the question to a committee, at whose request Dr Antoine Louis, secretary to the Academy of Surgeons, prepared a memorandum on the subject. Without mentioning the name of Guillotine, it recommended the adoption of an instrument similar to that which was formerly suggested by him. The Assembly decided in favour of the report, and the contract was offered to the person who usually provided the instruments of justice; but, as his terms were considered exorbitant, an agreement was ultimately come to with a German of the name of Schmidt, who, under the direction of M. Louis, furnished a machine for each of the French departments. After satisfactory experiments had been made with the machine on several dead bodies in the hospital of Bicêtre, it was erected on the Place de Grève for the execution of the highwayman Pelletier on the 25th April 1792. While the experiments regarding the machine were being carried on, it received the name *Louisette* or *La Petite Louison*, but the mind of the nation seems soon to have reverted to Guillotine, who first suggested its use; and in the *Journal des révolutions de Paris* for 28th April 1792 it is mentioned as *la guillotine*, a name which it thenceforth bore both popularly and officially. In 1795 the question was much debated as to whether or not death by the guillotine was instantaneous, and in support of the negative side the case of Charlotte Corday was adduced whose countenance, it is said, blushed as if with indignation when the executioner, holding up the head to the public gaze, struck it with his fist. The connexion of the instrument with the horrors of the Revolution has hindered its introduction into other countries, but in 1853 it was adopted under the name of *Fallschwert* or *Fallbeil* by the kingdom of Saxony; and it is used for the execution of sentences of death in France, Belgium and some parts of Germany. It has often been stated that Dr Guillotine perished by the instrument which bears his name, but it is beyond question that he survived the Revolution and died a natural death in 1814.

See Sédillot, *Réflexions historiques et physiologiques sur le supplice de la guillotine* (1795); Sue, *Opinion sur le supplice de la guillotine*, (1796); Réveillé-Parise, *Étude biographique sur Guillotine* (Paris, 1851); *Notice historique et physiologique sur le supplice de la guillotine* (Paris, 1830); Louis Dubois, *Recherches historiques et physiologiques sur la guillotine et détails sur Sanson* (Paris, 1843); and a paper by J. W. Croker in the *Quarterly Review* for December 1843, reprinted separately in 1850 under the title *The Guillotine, a historical Essay*.

GUILT, a lapse from duty, a crime, now usually the fact of wilful wrong-doing, the condition of being guilty of a crime, hence conduct deserving of punishment. The O. Eng. form of the word is *gylt*. The *New English Dictionary* rejects for phonetic reasons the usually accepted connexion with the Teutonic root *gald-*, to pay, seen in Ger. *gelten*, to be of value, *Geld*, money, payment, English “yield.”

GUIMARÃES (sometimes written *Guimaraens*), a town of northern Portugal, in the district of Braga, formerly included in the province of Entre-Minho-e-Douro; 36 m. N.E. of Oporto by the Trofa-Guimarães branch of the Oporto-Corunna railway. Pop. (1900) 9104. Guimarães is a very ancient town with Moorish fortifications; and even the quarters which are locally described as “new” date partly from the 15th century. It occupies a low hill, skirted on the north-west by a small tributary of the river Ave. The citadel, founded in the 11th century by Count Henry of Burgundy, was in 1094 the birthplace of his son Alphonso, the first king of Portugal. The font in which Alphonso was baptized is preserved, among other interesting relics, in the collegiate church of Santa Maria da Oliveira, “St Mary of the Olive,” a Romanesque building of the 14th century, which occupies the site of an older foundation. This church owes its name to the legend that the Visigothic king Wamba (672-680) here declined the crown of Spain, until his olive wood spear-shaft blossomed as a sign that he should consent. The convent of São Domingos, now a museum of antiquities, has a fine 12th-13th century cloister; the town hall is built in the blend of Moorish and Gothic architecture known as Manoelline. Guimarães has a flourishing trade in wine and farm produce; it also manufactures cutlery, linen, leather and preserved fruits. Near the town are Citania, the ruins of a prehistoric Iberian city, and the hot sulphurous springs of Taipas, frequented since the 4th century, when Guimarães itself was founded.

GUIMARD, MARIE MADELEINE (1743-1816), French dancer, was born in Paris on the 10th of October 1743. For twenty-five years she was the star of the Paris Opéra. She made herself even more famous by her love affairs, especially by her long liaison with the prince de Soubise. She bought a magnificent house at Pantin, and built a private theatre connected with it, where Collé’s *Partie de chasse de Henri IV* which was prohibited in public, and most of the *Proverbes* of Carmontelle (Louis Carrogis, 1717-1806), and similar licentious performances were given to the delight of high society. In 1772, in defiance of the archbishop of Paris, she opened a gorgeous house with a theatre seating five hundred spectators in the Chaussée d’Antin. In this Temple of Terpsichore, as she named it, the wildest orgies took place. In 1786 she was compelled to get rid of the property, and it was disposed of by lottery for her benefit for the sum of 300,000 francs. Soon after her retirement in 1789 she married Jean Etienne Despréaux (1748-1820), dancer, song-writer and playwright.

GUIMET, JEAN BAPTISTE (1795-1871), French industrial chemist, was born at Voiron on

the 20th of July 1795. He studied at the École Polytechnique in Paris, and in 1817 entered the Administration des Poudres et Salpêtres. In 1828 he was awarded the prize offered by the Société d'Encouragement pour l'Industrie Nationale for a process of making artificial ultramarine with all the properties of the substance prepared from lapis lazuli; and six years later he resigned his official position in order to devote himself to the commercial production of that material, a factory for which he established at Fleurieux sur Saône. He died on the 8th of April 1871.

His son Émile Étienne Guimet, born at Lyons on the 26th of June 1836, succeeded him in the direction of the factory, and founded the Musée Guimet, which was first located at Lyons in 1879 and was handed over to the state and transferred to Paris in 1885. Devoted to travel, he was in 1876 commissioned by the minister of public instruction to study the religions of the Far East, and the museum contains many of the fruits of this expedition, including a fine collection of Japanese and Chinese porcelain and many objects relating not merely to the religions of the East but also to those of Ancient Egypt, Greece and Rome. He wrote *Lettres sur l'Algérie* (1877) and *Promenades japonaises* (1880), and also some musical compositions, including a grand opera, *Taï-Tsoung* (1894).

GUINEA, the general name applied by Europeans to part of the western coast region of equatorial Africa, and also to the gulf formed by the great bend of the coast line eastward and then southward. Like many other geographical designations the use of which is controlled neither by natural nor political boundaries, the name has been very differently employed by different writers and at different periods. In the widest acceptation of the term, the Guinea coast may be said to extend from 13° N. to 16° S., from the neighbourhood of the Gambia to Cape Negro. Southern or Lower Guinea comprises the coasts of Gabun and Loango (known also as French Congo) and the Portuguese possessions on the south-west coast, and Northern or Upper Guinea stretches from the river Casamance to and inclusive of the Niger delta, Cameroon occupying a middle position. In a narrower use of the name, Guinea is the coast only from Cape Palmas to the Gabun estuary. Originally, on the other hand, Guinea was supposed to begin as far north as Cape Nun, opposite the Canary Islands, and Gomes Azurara, a Portuguese historian of the 15th century, is said to be the first authority who brings the boundary south to the Senegal. The derivation of the name is uncertain, but is probably taken from Ghinea, Ginnie, Genni or Jenné, a town and kingdom in the basin of the Niger, famed for the enterprise of its merchants and dating from the 8th century A.D. The name Guinea is found on maps of the middle of the 14th century, but it did not come into general use in Europe till towards the close of the 15th century.[1]

Although the term Gulf of Guinea is applied generally to that part of the coast south of Cape Palmas and north of the mouth of the Congo, particular indentations have their peculiar designations. The bay formed by the configuration of the land between Cape St Paul and the Nun mouth of the Niger is known as the Bight of Benin, the name being that of the once powerful native state whose territory formerly extended over the whole district. The Bight of Biafra, or Mafra (named after the town of Mafra in southern Portugal), between Capes Formosa and Lopez, is the most eastern part of the Gulf of Guinea; it contains the islands Fernando Po, Prince's and St Thomas's. The name Biafra—as indicating the country—fell into disuse in the later part of the 19th century.

The coast is generally so low as to be visible to navigators only within a very short distance, the mangrove trees being their only sailing marks. In the Bight of Biafra the coast forms an exception, being high and bold, with the Cameroon Mountains for background. At Sierra Leone also there is high land. The coast in many places maintains a dead level for 30 to 50 m. inland. Vegetation is exceedingly luxuriant and varied. The palm-oil tree is indigenous and abundant from the river Gambia to the Congo. The fauna comprises nearly all the more remarkable of African animals. The inhabitants are the true Negro stock.

By the early traders the coast of Upper Guinea was given names founded on the productions characteristic of the different parts. The Grain coast, that part of the Guinea coast extending for 500 m. from Sierra Leone eastward to Cape Palmas received its name from the export of the seeds of several plants of a peppery character, called variously grains of paradise, Guinea pepper and melegueta. The name Grain coast was first applied to this region in 1455. It was occasionally styled the Windy or Windward coast, from the frequency of short but furious tornadoes throughout the year. Towards the end of the 18th century, Guinea pepper was supplanted in Europe by peppers from the East Indies. The name now is seldom used, the

Grain coast being divided between the British colony of Sierra Leone and the republic of Liberia. The Ivory coast extends from Cape Palmas to 3° W., and obtained its name from the quantity of ivory exported therefrom. It is now a French possession. Eastwards of the Ivory coast are the Gold and Slave coasts. The Niger delta was for long known as the Oil rivers. To two regions only of the coast is the name Guinea officially applied, the French and Portuguese colonies north of Sierra Leone being so styled.

Of the various names by which the divisions of Lower Guinea were known, Loango was applied to the country south of the Gabun and north of the Congo river. It is now chiefly included in French Congo. Congo was used to designate the country immediately south of the river of the same name, usually spoken of until the last half of the 19th century as the Zaire. Congo is now one of the subdivisions of Portuguese West Africa (see Angola). It must not be confounded with the Belgian Congo.

Few questions in historical geography have been more keenly discussed than that of the first discovery of Guinea by the navigators of modern Europe. Lancelot Malocello, a Genoese, in 1270 reached at least as far as the Canaries. The first direct attempt to find a sea route to India was, it is said, also made by Genoese, Ugolino and Guido de Vivaldo, Tedisio Doria and others who equipped two galleys and sailed south along the African coast in 1291. Beyond the fact that they passed Cape Nun there is no trustworthy record of their voyage. In 1346 a Catalan expedition started for “the river of gold” on the Guinea coast; its fate is unknown. The French claim that between 1364 and 1410 the people of Dieppe sent out several expeditions to Guinea; and Jean de Béthencourt, who settled in the Canaries about 1402, made explorations towards the south. At length the consecutive efforts of the navigators employed by Prince Henry of Portugal—Gil Eannes, Diniz Diaz, Nuno Tristam, Alvaro Fernandez, Cadamosto, Usodimare and Diego Gomez—made known the coast as far as the Gambia, and by the end of the 15th century the whole region was familiar to Europeans. 697

For further information see Senegal, Gold Coast, Ivory Coast, French Guinea, Portuguese Guinea, Liberia, &c. For the history of European discoveries, consult G. E. de Azurara, *Chronica de descobrimento e conquista de Guiné*, published, with an introduction, by Barros de Santarem (Paris, 1841), English translation, *The Discovery and Conquest of Guinea*, by C. R. Beazley and E. Prestage (Hakluyt Society publications, 2 vols., London, 1896-1899, vol. ii. has an introduction on the early history of African exploration, &c. with full bibliographical notes). L. Estancelin, *Recherches sur les voyages et découvertes des navigateurs normands en Afrique* (Paris, 1832); Villault de Bellefond, *Relation des costes d’Afrique appellées Guinée* (Paris, 1669); Père Labat, *Nouvelle Relation de l’Afrique occidentale* (Paris, 1728); Desmarquets, *Mém. chron. pour servir à l’hist. de Dieppe* (1875); Santarem, *Priorité de la découverte des pays situés sur la côte occidentale d’Afrique* (Paris, 1842); R. H. Major, *Life of Prince Henry the Navigator* (London, 1868); and the elaborate review of Major’s work by M. Codine in the *Bulletin de la Soc. de Géog.* (1873); A. E. Nordenskiöld, *Periplus* (Stockholm, 1897); *The Story of Africa*, vol. i. (London, 1892), edited by Dr Robert Brown.

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1 Guinea may, however, be derived from Ghana (or Ghanata) the name of the oldest known state in the western Sudan. Ghana dates, according to some authorities, from the 3rd century A.D. From the 7th to the 12th century it was a powerful empire, its dominions extending, apparently, from the Atlantic to the Niger bend. At one time Jenné was included within its borders. Ghana was finally conquered by the Mandingo kings of Melle in the 13th century. Its capital, also called Ghana, was west of the Niger, and is generally placed some 200 m. west of Jenné. In this district L. Desplagnes discovered in 1907 numerous remains of a once extensive city, which he identified as those of Ghana. The ruins lie 25 m. W. of the Niger, on both banks of a marigot, and are about 40 m. N. by E. of Kulikoro (see *La Géographie*, xvi. 329). By some writers Ghana city is, however, identified with Walata, which town is mentioned by Arab historians as the capital of Ghanata. The identification of Ghana city with Jenné is not justified, though Idrisi seems to be describing Jenné when writing of “Ghana the Great.”

GUINEA, a gold coin at one time current in the United Kingdom. It was first coined in 1663, in the reign of Charles II., from gold imported from the Guinea coast of West Africa by a company of merchants trading under charter from the British crown—hence the name. Many of the first guineas bore an elephant on one side, this being the stamp of the company; in 1675 a castle was added. Issued at the same time as the guinea were five-guinea, two-guinea and half-guinea pieces. The current value of the guinea on its first issue was twenty shillings. It was subsidiary to the silver coinage, but this latter was in such an unsatisfactory state that the guinea in course of time became over-valued in relation to silver, so much so that in 1694 it

had risen in value to thirty shillings. The rehabilitation of the silver coinage in William III.'s reign brought down the value of the guinea to 21s. 6d. in 1698, at which it stood until 1717, when its value was fixed at twenty-one shillings. This value the guinea retained until its disappearance from the coinage. It was last coined in 1813, and was superseded in 1817 by the present principal gold coin, the sovereign. In 1718 the quarter-guinea was first coined. The third-guinea was first struck in George III.'s reign (1787). To George III.'s reign also belongs the "spade-guinea," a guinea having the shield on the reverse pointed at the base or spade-shaped. It is still customary to pay subscriptions, professional fees and honoraria of all kinds, in terms of "guineas," a guinea being twenty-one shillings.

GUINEA FOWL, a well-known domestic gallinaceous bird, so called from the country whence in modern times it was brought to Europe, the *Meleagris* and *Avis* or *Gallina Numidica* of ancient authors.[1] Little is positively known of the wild stock to which we owe our tame birds, nor can the period of its reintroduction (for there is apparently no evidence of its domestication being continuous from the time of the Romans) be assigned more than roughly to that of the African discoveries of the Portuguese. It does not seem to have been commonly known till the middle of the 16th century, when John Caius sent a description and figure, with the name *Gallus Mauritanus*, to Gesner, who published both in his *Paralipomena* in 1555, and in the same year Belon also gave a notice and woodcut under the name of *Poulle de la Guinée*; but while the former authors properly referred their bird to the ancient *Meleagris*, the latter confounded the *Meleagris* and the turkey.

The ordinary guinea fowl of the poultry-yard (see also Poultry and Poultry-Farming) is the *Numida meleagris* of ornithologists. The chief or only changes which domestication seems to have induced in its appearance are a tendency to albinism generally shown in the plumage of its lower parts, and frequently, though not always, the conversion of the colour of its legs and feet from dark greyish-brown to bright orange. That the home of this species is West Africa from the Gambia[2] to the Gaboon is certain, but its range in the interior is quite unknown. It appears to have been imported early into the Cape Verd Islands, where, as also in some of the Greater Antilles and in Ascension, it has run wild. Representing the species in South Africa we have the *N. coronata*, which is very numerous from the Cape Colony to Ovampoland, and the *N. cornuta* of Drs Finsch and Hartlaub, which replaces it in the west as far as the Zambesi. Madagascar also has its peculiar species, distinguishable by its red crown, the *N. mitrata* of Pallas, a name which has often been misapplied to the last. This bird has been introduced to Rodriguez, where it is now found wild. Abyssinia is inhabited by another species, the *N. ptilorhyncha*,[3] which differs from all the foregoing by the absence of any red colouring about the head. Very different from all of them, and the finest species known, is the *N. vulturina* of Zanzibar, conspicuous by the bright blue in its plumage, the hackles that adorn the lower part of its neck, and its long tail. By some writers it is thought to form a separate genus, *Acryllium*. All these guinea fowls except the last are characterized by having the crown bare of feathers and elevated into a bony "helmet," but there is another group (to which the name *Guttera* has been given) in which a thick tuft of feathers ornaments the top of the head. This contains four or five species, all inhabiting some part or other of Africa, the best known being the *N. cristata* from Sierra Leone and other places on the western coast. This bird, apparently mentioned by Marcgrave more than 200 years ago, but first described by Pallas, is remarkable for the structure—unique, if not possessed by its representative forms—of its *furcula*, where the head, instead of being the thin plate found in all other *Gallinae*, is a hollow cup opening upwards, into which the trachea dips, and then emerges on its way to the lungs. Allied to the genus *Numida*, but readily distinguished form among other characters by the possession of spurs and the absence of a helmet, are two very rare forms, *Agelastes* and *Phasidus*, both from western Africa. Of their habits nothing is known. All these birds are beautifully figured in Elliot's *Monograph of the Phasianidae*, from drawings by Wolf.

(A. N.)

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1 Columella (*De re rustica*, viii. cap. 2) distinguishes the *Meleagris* from the *Gallina Africana* or *Numidica*, the latter having, he says, a red wattle (*palea*, a reading obviously preferable to *galea*), while it was blue in the former. This would look as if the *Meleagris* had sprung from what is now called *Numida ptilorhyncha*, while the *Gallina Africana* originated in the *N. meleagris*, species which have a different range, and if so the fact would point to two distinct introductions—one by Greeks, the other by Latins.

2 Specimens from the Gambia are said to be smaller, and have been described as distinct under the

name of *N. rendalli*.

3 Darwin (*Anim. and Pl. under Domestication*, i. 294), gives this as the original stock of the modern domestic birds, but obviously by an accidental error. As before observed, it may possibly have been the true μελεαγρίς of the Greeks.

GUINEA-WORM (*Dracontiasis*), a disease due to the *Filaria medinensis*, or *Dracunculus*, or Guinea-worm, a filarious nematode like a horse-hair, whose most frequent habitat is the subcutaneous and intramuscular tissues of the legs and feet. It is common on the Guinea coast, and in many other tropical and subtropical regions and has been familiarly known since ancient times. The condition of dracontiasis due to it is a very common one, and sometimes amounts to an epidemic. The black races are most liable, but Europeans of almost any social rank and of either sex are not altogether exempt. The worm lives in water, and, like the *Filaria sanguinis hominis*, appears to have an intermediate host for its larval stage. It is doubtful whether the worm penetrates the skin of the legs directly; it is not impossible that the intermediate host (a cyclops) which contains the larvae may be swallowed with the water, and that the larvae of the *Dracunculus* may be set free in the course of digestion.

GÜINES, a town in the interior of Havana province, Cuba, about 30 m. S.E. of Havana. Pop. (1907) 8053. It is situated on a plain, in the midst of a rich plantation district, chiefly devoted to the cultivation of tobacco. The first railway in Cuba was built from Havana to Güines between 1835 and 1838. One of the very few good highways of the island also connects Güines with the capital. The pueblo of Güines, which was built on a great private estate of the same name, dates back to about 1735. The church dates from 1850. Güines became a “villa” in 1814, and was destroyed by fire in 1817.

GUINGAMP, a town of north-western France, capital of an arrondissement in the department of Côtes-du-Nord, on the right bank of the Trieux, 20 m. W.N.W. of St Brieuc on 698
the railway to Brest. Pop. (1906), town 6937, commune 9212. Its chief church, Notre-Dame de Bon-Secours, dates from the 14th to the 16th centuries; two towers rise on each side of the richly sculptured western portal and a third surmounts the crossing. A famous statue of the Virgin, the object of one of the most important “pardons” or religious pilgrimages in Brittany, stands in one of the two northern porches. The central square is decorated by a graceful fountain in the Renaissance style, restored in 1743. Remains of the ramparts and of the château of the dukes of Penthièvre, which belong to the 15th century, still survive. Guingamp is the seat of a sub-prefect and of a tribunal of first instance. It is an important market for dairy-cattle, and its industries include flour-milling, tanning and leather-dressing. Guingamp was the chief town of the countship (subsequently the duchy) of Penthièvre. The Gothic chapel of Grâces, near Guingamp, contains fine sculptures.

GUINNESS, the name of a family of Irish brewers. The firm was founded by Arthur Guinness, who about the middle of the 18th century owned a modest brewing-plant at Leixlip, a village on the upper reaches of the river Liffey. In or about 1759 Arthur Guinness, seeking to extend his trade, purchased a small porter brewery belonging to a Mr Rainsford at St James’s Gate, Dublin. By careful attention to the purity of his product, coupled with a shrewd perception of the public taste, he built up a considerable business. But his third son, Benjamin

Lee Guinness (1798-1868), may be regarded as the real maker of the firm, into which he was taken at an early age, and of which about 1825 he was given sole control. Prior to that date the trade in Guinness's porter and stout had been confined to Ireland, but Benjamin Lee Guinness at once established agencies in the United Kingdom, on the continent, in the British colonies and in America. The export trade soon assumed huge proportions; the brewery was continually enlarged, and when in 1855 his father died, Benjamin Lee Guinness, who in 1851 was elected first lord mayor of Dublin, found himself sole proprietor of the business and the richest man in Ireland. Between 1860 and 1865 he devoted a portion of this wealth to the restoration of St Patrick's cathedral, Dublin. The work, the progress of which he regularly superintended himself, cost £160,000. Benjamin Lee Guinness represented the city of Dublin in parliament as a Conservative from 1865 till his death, and in 1867 was created a baronet. He died in 1868, and was succeeded in the control of the business by Sir Arthur Edward Guinness (b. 1840), his eldest, and Edward Cecil Guinness (b. 1847), his third, son. Sir Arthur Edward Guinness, who for some time represented Dublin in parliament, was in 1880 raised to the peerage as Baron Ardilaun, and about the same time disposed of his share in the brewery to his brother Edward Cecil Guinness. In 1886 Edward Cecil Guinness disposed of the brewery, the products of which were then being sent all over the world, to a limited company, in which he remained the largest shareholder. Edward Cecil Guinness was created a baronet in 1885, and in 1891 was raised to the peerage as Baron Iveagh.

The Guinness family have been distinguished for their philanthropy and public munificence. Lord Ardilaun gave a recreation ground to Dublin, and the famous Muckross estate at Killarney to the nation. Lord Iveagh set aside £250,000 for the creation of the Guinness trust (1889) for the erection and maintenance of buildings for the labouring poor in London and Dublin, and was a liberal benefactor to the funds of Dublin university.

GUINOBATAN, a town of the province of Albay, Luzon, Philippine Islands, on the Inaya river, 9 m. W. by N. of the town of Albay. Pop. (1903), 20,027. Its chief interest is in hemp, which is grown in large quantities in the neighbouring country.

GUIPÚZCOA, a maritime province of northern Spain, included among the Basque provinces, and bounded on the N. by the Bay of Biscay; W. by the province of Biscay (*Vizcaya*); S. and S.E. by. Álava and Navarre: and N.E. by the river Bidassoa,[1] which separates it from France. Pop. (1900), 195,850; area, 728 sq. m. Situated on the northern slope of the great Cantabrian chain at its junction with the Pyrenees, the province has a great variety of surface in mountain, hill and valley; and its scenery is highly picturesque. The coast is much indented, and has numerous harbours, but none of very great importance; the chief are those of San Sebastian, Pasajes, Guetaria, Deva and Fuenterrabia. The rivers (Deva, Urola, Oria, Urumea, Bidassoa) are all short, rapid and unnavigable. The mountains are for the most part covered with forests of oak, chestnut or pine; holly and arbutus are also common, with furze and heath in the poorer parts. The soil in the lower valleys is generally of hard clay and unfertile; it is cultivated with great care, but the grain raised falls considerably short of what is required for home consumption. The climate, though moist, is mild, pleasant and healthy; fruit is produced in considerable quantities, especially apples for manufacture into *zaragua* or cider. The chief mineral products are iron, lignite, lead, copper, zinc and cement. Ferruginous and sulphurous springs are very common, and are much frequented every summer by visitors from all parts of the kingdom. There are excellent fisheries, which supply the neighbouring provinces with cod, tunny, sardines and oysters; and the average yearly value of the coasting trade exceeds £400,000. By Irun, Pasajes and the frontier roads £4,000,000 of imports and £3,000,000 of exports pass to and from France, partly in transit for the rest of Europe. Apart from the four Catalan provinces, no province has witnessed such a development of local industries as Guipúzcoa. The principal industrial centres are Irun, Renteria, Villabona, Vergara and Azpéitia for cotton and linen stuffs; Zumarraga for osiers; Eibar, Plasencia and Elgoibar for arms and cannon and gold incrustations; Irun for soap and carriages; San Sebastian, Irun and Onate for paper, glass, chemicals and saw-mills; Tolosa for paper, timber, cloths and furniture; and the banks of the bay of Pasajes for the manufacture of liqueurs of every kind, and the preparation

of wines for export and for consumption in the interior of Spain. This last industry occupies several thousand French and Spanish workmen. An arsenal was established at Azpéitia during the Carlist rising of 1870-1874; but the manufacture of ordnance and gunpowder was subsequently discontinued. The main line of the northern railway from Madrid to France runs through the province, giving access, by a loop line, to the chief industrial centres. The custom-house through which it passes on the frontier is one of the most important in Spain. Despite the steep gradients, where traffic is hardly possible except by ox-carts, there are over 350 m. of admirably engineered roads, maintained solely by the local tax-payers. After San Sebastian, the capital (pop. 1900, 37,812), the chief towns are Fuenterrabia (4345) and Irun (9912). Other towns with more than 6000 inhabitants are Azpéitia (6066), Eibar (6583), Tolosa (8111) and Vergara (6196). Guipúzcoa is the smallest and one of the most densely peopled provinces of Spain; for its constant losses by emigration are counterbalanced by a high birth-rate and the influx of settlers from other districts who are attracted by its industrial prosperity.

For an account of its inhabitants and their customs, language and history, see Basques and Basque Provinces.

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1 A small island in the Bidassoa, called La Isla de los Faisanes, or l'Isle de la Conférence, is celebrated as the place where the marriage of the duke of Guienne was arranged between Louis XI. and Henry IV. in 1463, where Francis I., the prisoner of Charles V., was exchanged for his two sons in 1526, and where in 1659 "the Peace of the Pyrenees" was concluded between D. Luis de Haro and Cardinal Mazarin.

GUIRAUD, ERNEST (1837-1892), French composer, was born at New Orleans on the 26th of June 1837. He studied at the Paris Conservatoire, where he won the *grand prix de Rome*. His father had gained the same distinction many years previously, this being the only instance of both father and son obtaining this prize. Ernest Guiraud composed the following operas: *Sylvie* (1864); *Le Kobold* (1870), *Madame Turlupin* (1872), *Piccolino* (1876), *Galante Aventure* (1882), and also the ballet *Gretna Green*, given at the Opéra in 1873. His opera *Frédégonde* was left in an unfinished condition and was completed by Camille Saint-Saëns. Guiraud, who was a fellow-student and intimate friend of Georges Bizet, was for some years professor of composition at the Conservatoire. He was the author of an excellent treatise on instrumentation. He died in Paris on the 6th of May 1892.

GUISBOROUGH, or Guisbrough, a market town in the Cleveland parliamentary division of the North Riding of Yorkshire, England, 10 m. E.S.E. of Middlesbrough by a branch of the North-Eastern railway. Pop. of urban district (1901), 5645. It is well situated in a narrow, fertile valley at the N. foot of the Cleveland Hills. The church of St Nicholas is Perpendicular, greatly restored. Other buildings are the town hall, and the modern buildings of the grammar school founded in 1561. Ruins of an Augustinian priory, founded in 1129, are beautifully situated near the eastern extremity of the town. The church contains some fine Decorated work, and the chapter house and parts of the conventual buildings may be traced. Considerable fragments of Norman and transitional work remain. Among the historic personages who were buried within its walls was Robert Bruce, lord of Annandale, the competitor for the throne of Scotland with John Baliol, and the grandfather of King Robert the Bruce. About 1 m. S.E. of the town there is a sulphurous spring discovered in 1822. The district neighbouring to Guisborough is rich in iron-stone. Its working forms the chief industry of the town, and there are also tanneries and breweries.

GUISE, a town of northern France, in the department of Aisne, on the Oise, 31 m. N. of Laon by rail. Pop. (1906), 7562. The town was formerly the capital of the district of Thiérache and

afterwards of a countship (see below). There is a château dating in part from the middle of the 16th century. Camille Desmoulins was in 1762 born in the town, which has erected a statue to him. The chief industry is the manufacture of iron stoves and heating apparatus, carried on on the co-operative system in works founded by J. B. A. Godin, who built for his workpeople the huge buildings known as the *familistère*, in front of which stands his statue. A board of trade-arbitration is among the public institutions.

GUISE, HOUSE OF, a cadet branch of the house of Lorraine (*q.v.*). René II., duke of Lorraine (d. 1508), united the two branches of the house of Lorraine. From his paternal grandmother, Marie d'Harcourt, René inherited the countships of Aumale, Mayenne, Elbeuf, Lillebonne, Brionne and other French fiefs, in addition to the honours of the elder branch, which included the countship of Guise, the dowry of Marie of Blois on her marriage in 1333 with Rudolph or Raoul of Lorraine. René's eldest surviving son by his marriage with Philippa, daughter of Adolphus of Egmont, duke of Gelderland, was Anthony, who succeeded his father as duke of Lorraine (d. 1544), while the second, Claude, count and afterwards duke of Guise, received the French fiefs. The Guises, though naturalized in France, continued to interest themselves in the fortunes of Lorraine, and their enemies were always ready to designate them as foreigners. The partition between the brothers Anthony and Claude was ratified by a further agreement in 1530, reserving the lapsed honours of the kingdoms of Jerusalem, Sicily, Aragon, the duchy of Anjou and the countships of Provence and Maine to the duke of Lorraine. Of the other sons of René II., John (1498-1550) became the first cardinal of Lorraine, while Ferri, Louis and Francis fell fighting in the French armies at Marignano (1515), Naples (1528) and Pavia (1525) respectively.

Claude of Lorraine, count and afterwards 1st duke of Guise (1496-1550), was born on the 20th of October 1496. He was educated at the French court, and at seventeen allied himself to the royal house of France by a marriage with Antoinette de Bourbon (1493-1583) daughter of François, Count of Vendôme. Guise distinguished himself at Marignano (1515), and was long in recovering from the twenty-two wounds he received in the battle; in 1521 he fought at Fuenterrabia, when Louise of Savoy ascribed the capture of the place to his efforts; in 1522 he defended northern France, and forced the English to raise the siege of Hesdin; and in 1523 he obtained the government of Champagne and Burgundy, defeating at Neufchâteau the imperial troops who had invaded his province. In 1525 he destroyed the Anabaptist peasant army, which was overrunning Lorraine, at Lupstein, near Saverne (Zabern). On the return of Francis I. from captivity, Guise was erected into a duchy in the peerage of France, though up to this time only princes of the royal house had held the title of duke and peer of France. The Guises, as cadets of the sovereign house of Lorraine and descendants of the house of Anjou, claimed precedence of the Bourbon princes. Their pretensions and ambitions inspired distrust in Francis I., although he rewarded Guise's services by substantial gifts in land and money. The duke distinguished himself in the Luxemburg campaign in 1542, but for some years before his death he effaced himself before the growing fortunes of his sons. He died on the 12th of April 1550.

He had been supported in all his undertakings and intrigues by his brother John, cardinal of Lorraine (1498-1550), who had been made coadjutor of Metz at the age of three. The cardinal was archbishop of Reims, Lyons and Narbonne, bishop of Metz, Toul, Verdun, Thérouanne, Luçon, Albi, Valence, Nantes and Agen, and before he died had squandered most of the wealth which he had derived from these and other benefices. Part of his ecclesiastical preferments he gave up in favour of his nephews. He became a member of the royal council in 1530, and in 1536 was entrusted with an embassy to Charles V. Although a complaisant helper in Francis I.'s pleasures, he was disgraced in 1542, and retired to Rome. He died at Nogent-sur-Yonne on the 18th of May 1550. He was extremely dissolute, but as an open-handed patron of art and learning, as the protector and friend of Erasmus, Marot and Rabelais he did something to counter-balance the general unpopularity of his calculating and avaricious brother.

Claude of Guise had twelve children, among them Francis, 2nd duke of Guise; Charles, 2nd cardinal of Lorraine (1524-1574), who became archbishop of Reims in 1538 and cardinal in 1547; Claude, marquis of Mayenne, duke of Aumale (1526-1573), governor of Burgundy, who married Louise de Brézé, daughter of Diane de Poitiers, thus securing a powerful ally for the family; Louis (1527-1578), bishop of Troyes, archbishop of Sens and cardinal of Guise; René, marquis of Elbeuf (1536-1566), from whom descended the families of Harcourt, Armagnac, Marsan and Lillebonne; Mary of Lorraine (*q.v.*), generally known as Mary of Guise, who after

the death of her second husband, James V. of Scotland, acted as regent of Scotland for her daughter Mary, queen of Scots; and Francis (1534-1563), grand prior of the order of the Knights of Malta. The solidarity of this family, all the members of which through three generations cheerfully submitted to the authority of the head of the house, made it a formidable factor in French politics.

Francis of Lorraine, 2nd duke of Guise (1519-1563), “le grand Guise,” was born at Bar on the 17th of February 1519. As count of Aumale he served in the French army, and was nearly killed at the siege of Boulogne in 1545 by a wound which brought him the name of “Balafré.” Aumale was made (1547) a peerage-duchy in his favour, and on the accession of Henry II. the young duke, who had paid assiduous court to Diane de Poitiers, shared the chief honours of the kingdom with the constable Anne de Montmorency. Both cherished ambitions for their families, but the Guises were more unscrupulous in subordinating the interests of France to their own. Montmorency’s brutal manners, however, made enemies where Guise’s grace and courtesy won him friends. Guise was a suitor for the hand of Jeanne d’Albret, princess of Navarre, who refused, however, to become a sister-in-law of a daughter of Diane de Poitiers and remained one of the most dangerous and persistent enemies of the Guises. He married in December 1548 Anne of Este, daughter of Ercole II., duke of Ferrara, and through her mother Renée, a granddaughter of Louis XII. of France. In the same year he had put down a peasant rising in Saintonge with a humanity that compared very favourably with the cruelty shown by Montmorency to the town of Bordeaux. He made preparations in Lorraine for the king’s German campaign of 1551-52. He was already governor of Dauphiné, and now became grand chamberlain, prince of Joinville, and hereditary seneschal of Champagne, with large additions to his already considerable revenues. He was charged with the defence of Metz, which Henry II. had entered in 1551. He reached the city in August 1552, and rapidly gave proof of his great powers as a soldier and organizer by the skill with which the place, badly fortified and unprovided with artillery, was put in a state of defence. Metz was invested by the duke of Alva in October with an army of 60,000 men, and the emperor joined his forces in November. An army of brigands commanded by Albert of Brandenburg had also to be reckoned with. Charles was obliged to raise the siege on the 2nd of January 1553, having lost, it is said, 30,000 men before the walls. Guise used his victory with rare moderation and humanity, providing medical care for the sick and wounded left behind in the besiegers’ camp. The subsequent operations were paralysed by the king’s suspicion and carelessness, and the constable’s inactivity, and a year later Guise was removed from the command. He followed the constable’s army as a volunteer, and routed the army of Charles V. at the siege of Renty on the 12th of August 1554. Montmorency’s inaction rendered the victory fruitless, and a bitter controversy followed between Guise and the constable’s nephew Coligny, admiral of France, which widened a breach already existing.

The conclusion of a six years’ truce at Vaucelles (1556) disappointed Guise’s ambitions, and he was the main mover in the breach of the treaty in 1558, when he was sent at the head of a French army to Italy to the assistance of Pope Paul IV. against Spain. Guise, who perhaps had in view the restoration to his family of the Angevin dominion of Naples and Sicily, crossed the Alps early in 1557 and after a month’s delay in Rome, where he failed to receive the promised support, marched on the kingdom of Naples, then occupied by the Spanish troops under Alva. He seized and sacked Campli (April 17th), but was compelled to raise the siege of Civitella. Meanwhile the pope had veered round to a Spanish alliance, and Guise, seeing that no honour was to be gained in the campaign, wisely spared his troops, so that his army was almost intact when, in August, he was hastily summoned home to repel the Spanish army which had invaded France from the north, and had taken St Quentin. On reaching Paris in October Guise was made lieutenant-general of the kingdom, and proceeded to prepare for the siege of Calais. The town was taken, after six days’ fighting, on the 6th of January 1558, and this success was followed up by the capture of Guînes, Thionville and Arlon, when the war was ended by the treaty of Câteau Cambrésis (1559). Although his brother, the cardinal of Lorraine, was one of the negotiators, this peace was concluded against the wishes of Guise, and was regarded as a triumph of the constable’s party. The Guises were provided with a weapon against Montmorency by the bishop of Arras (afterwards Cardinal Granvella), who gave to the cardinal of Lorraine at an interview at Péronne in 1558 an intercepted letter proving the Huguenot leanings of the constable’s nephews.

On the accession in 1559 of Francis II., their nephew by marriage with Mary Stuart, the royal authority was practically delegated to Guise and the cardinal, who found themselves beyond rivalry for the time being. They had, however, to cope with a new and dangerous force in Catherine de’ Medici, who was now for the first time free to use her political ability. The incapacity, suspicion and cruelty of the cardinal, who controlled the internal administration, roused the smaller nobility against the Lorraine princes. A conspiracy to overturn their government was formed at Nantes, with a needy Périgord nobleman named La Renaudie as its

nominal head, though the agitation had in the first instance been fostered by the agents of Louis I., prince of Condé. The Guises were warned of the conspiracy while the court was at Blois, and for greater security removed the king to Amboise. La Renaudie, nothing daunted, merely postponed his plans; and the conspirators assembled in small parties in the woods round Amboise. They had, however, been again betrayed and many of them were surrounded and taken before the *coup* could be delivered; one party, which had seized the château of Noizay, surrendered on a promise of amnesty given "on his faith as a prince" by James of Savoy, duke of Nemours, a promise which, in spite of the duke's protest, was disregarded. On the 19th of March 1560, La Renaudie and the rest of the conspirators openly attacked the château of Amboise. They were repelled; their leader was killed; and a large number were taken prisoners. The merciless vengeance of the Guises was the measure of their previous fears. For a whole week the torturings, quarterings and hangings went on, the bodies being cast into the Loire, the young king and queen witnessing the bloody spectacle day by day from a balcony of the château.

The cruel repression of this "conspiracy of Amboise" inspired bitter hatred of the Guises, since they were avenging a rising rather against their own than the royal authority. They now entrenched themselves with the king at Orleans, and the Bourbon princes, Anthony, king of Navarre, and his brother Condé, were summoned to court. The Guises convened a special commission to try Condé, who was condemned to death; but the affair was postponed by the chancellor, and the death of Francis II. in December saved Condé. Guise then made common cause with his old rival Montmorency and with the Marshal de Saint André against Catherine, the Bourbons and Coligny. This alliance, constituted on the 6th of April 1561, and known as the triumvirate, aimed at the annulment of the concessions made by Catherine to the Huguenots. The cardinal of Lorraine fomented the discord which appeared between the clergy of the two religions when they met at the colloquy of Poissy in 1561, but in spite of the extreme Catholic views he there professed, he was at the time in communication with the Lutheran princes of Germany, and in February 1562 met the duke of Württemberg at Zabern to discuss the possibility of a religious compromise.

The signal for civil war was given by an attack of Guise's escort on a Huguenot congregation at Vassy (1st of March 1562). Although Guise did not initiate the massacre, and although, when he learned what was going on, he even tried to restrain his soldiers, he did not disavow their action. When Catherine de' Medici forbade his entry into Paris, he accepted the challenge, and on the 16th of March he entered the city, where he was a popular hero, at the head of 2000 armed nobles. The provost of the merchants offered to put 20,000 men and two million livres at his disposal. In September he joined Montmorency in besieging Rouen, which was sacked as if it had been a foreign city, in spite of Guise's efforts to save it from the worst horrors. At the battle of Dreux (19th of December 1562) he commanded a reserve army, with which he saved Montmorency's forces from destruction and inflicted a crushing defeat on the Huguenots. The prince of Condé was his prisoner, while the capture of Montmorency by the Huguenots and the assassination of the Marshal de Saint-André after the battle left Guise the undisputed head of the Catholic party. He was appointed lieutenant-general of the kingdom, and on the 5th of February 1563 he appeared with his army before Orleans. On the 19th, however, he was shot by the Huguenot Jean Poltrot de Méré as he was returning to his quarters, and died on the 24th of the effects of the wound. Guise's splendid presence, his generosity and humanity and his almost unvarying success on the battlefield made him the idol of his soldiers. He attended personally to the minutest details, and Monluc complains that he even wrote out his own orders. The mistakes and cruelties associated with his name were partly due to the evil counsels of his brother Charles, the cardinal, whose cowardice and insincerity were the scorn of his contemporaries. The negotiations of the Guises with Spain dated from the interview with Granvella at Péronne, in 1558, and after the death of his brother the cardinal of Lorraine was constantly in communication with the Spanish court, offering, in the event of the failure of direct heirs to the Valois kings, to deliver up the frontier fortresses and to acknowledge Philip II. as king of France. His death in 1574 temporarily weakened the extreme Catholic party.

> Of the children of Francis "le Balafré" five survived him: Henry, 3rd duke of Guise; Charles, duke of Mayenne (1554-1611) (*q.v.*), who consolidated the League; Catherine (1552-1596), who married Louis of Bourbon, duke of Montpensier, and encouraged the fanaticism of the Parisian leaguers; Louis, second cardinal of Guise, afterwards of Lorraine (1555-1588), who was assassinated with his brother Henry; and Francis (1558-1573).

Henry of Lorraine, 3rd duke of Guise (1550-1588), born on the 31st of December 1550, was thirteen years old at the time of his father's death, and grew up under the domination of a passionate desire for revenge. Catherine de' Medici refused to take steps against Coligny, who was formally accused by the duchess of Guise and her brothers-in-law of having incited the murder. In 1566 she insisted on a formal reconciliation at Moulins between the Guises and

Coligny, at which, however, none of the sons of the murdered man was present. Henry and his brothers were, however, compelled in 1572 to sign an ambiguous assent to this agreement. Guise's widow married James of Savoy, duke of Nemours, and the young duke at sixteen went to fight against the Turks in Hungary. On the fresh outbreak of civil war in 1567 he returned to France and served under his uncle Aumale. In the autumn of 1568 he received a considerable command, and speedily came into rivalry with Henry of Valois, duke of Anjou. He had not inherited his father's generalship, and his rashness and headstrong valour more than once brought disaster on his troops, but the showy quality of his fighting brought him great popularity in the army. In the defence of Poitiers in 1569 with his brother, the duke of Mayenne, he showed more solid abilities as a soldier. On the conclusion of peace in 1570 he returned to court, where he made no secret of his attachment to Margaret of Valois. His pretensions were violently resented by her brothers, who threatened his life, and he saved himself by a precipitate marriage with Catherine of Cleves (daughter of Francis of Cleves, duke of Nevers, and Margaret of Bourbon), the widow of a Huguenot nobleman, Antoine de Crog, prince of Porcien. Presently he ended his disgrace by an apparent reconciliation with Henry of Valois and an alliance with Catherine de' Medici. He was an accomplice in the first attack on Coligny's life, and when permission for the massacre of Saint Bartholomew had been extorted from Charles IX. he roused Paris against the Huguenots, and satisfied his personal vengeance by superintending the murder of Coligny. He was now the acknowledged chief of the Catholic party, and the power of his family was further increased by the marriage (1575) of Henry III. with Louise of Vaudémont, who belonged to the elder branch of the house of Lorraine. In a fight at Dormans (10th of October 1575), the only Catholic victory in a disastrous campaign, Guise received a face wound which won for him his father's name of Balafré and helped to secure the passionate attachment of the Parisians. He refused to acquiesce in the treaty of Beaulieu (5th of May 1576), and with the support of the Jesuits proceeded to form a "holy league" for the defence of the Roman Catholic Church. The terms of enrolment enjoined offensive action against all who refused to join. This association had been preceded by various provincial leagues among the Catholics, notably one at Péronne. Condé had been imposed on this town as governor by the terms of the peace, and the local nobility banded together to resist him. This, like the Holy League itself, was political as well as religious in its aims, and was partly inspired by revolt against the royal authority. In the direction of the League Guise was hampered by Philip of Spain, who subsidized the movement, while he also had to submit to the dictation of the Parisian democracy. Ulterior ambitions were freely ascribed to him. It was asserted that papers seized from his envoy to Rome, Jean David, revealed a definite design of substituting the Lorraines, who represented themselves as the successors of Charlemagne, for the Valois; but these papers were probably a Huguenot forgery. Henry III. eventually placed himself at the head of the League, and resumed the war against the Huguenots; but on the conclusion of peace (September 1577) he seized the opportunity of disbanding the Catholic associations. The king's jealousy of Guise increased with the duke's popularity, but he did not venture on an open attack, nor did he dare to avenge the murder by Guise's partisans of one of his personal favourites, Saint-Mégrin, who had been set on by the court to compromise the reputation of the duchess of Guise.[1]

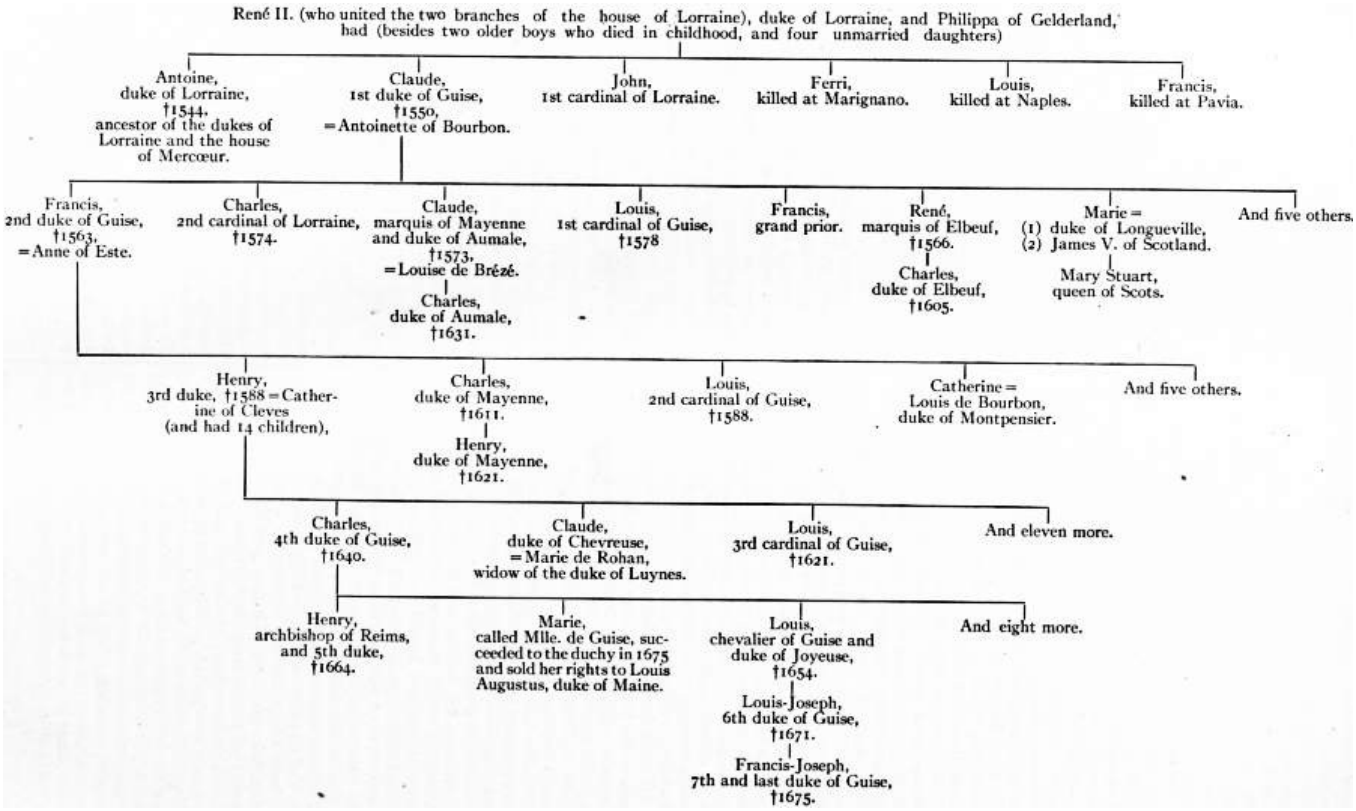
Meanwhile the duke had entered on an equivocal alliance with Don John of Austria. He was also in constant correspondence with Mary of Lorraine, and meditated a descent on Scotland in support of the Catholic cause. But the great riches of the Guises were being rapidly dissipated, and in 1578 the duke became a pensioner of Philip II. When in 1584 the death of the duke of Anjou made Henry of Navarre the next heir to the throne, the prospect of a Huguenot dynasty roused the Catholics to forget their differences, and led to the formation of a new league of the Catholic nobles. At the end of the same year Guise and his brother, the duke of Mayenne, with the assent of other Catholic nobles, signed a treaty at Joinville with Philip II., fixing the succession to the crown on Charles, cardinal of Bourbon, to the exclusion of the Protestant princes of his house. In March 1585 the chiefs of the League issued the Declaration of Péronne, exposing their grievances against the government and announcing their intention to restore the dignity of religion by force of arms. On the refusal of Henry III. to accept Spanish help against his Huguenot subjects, war broke out. The chief cities of France declared for the League, and Guise, who had recruited his forces in Germany and Switzerland, took up his headquarters at Châlons, while Mayenne occupied Dijon, and his relatives, the dukes of Elbeuf, Aumale and Mercœur,[2] roused Normandy and Brittany. Henry III. accepted, or feigned to accept, the terms imposed by the Guises at Nemours (7th of July 1585). The edicts in favour of the Huguenots were immediately revoked. Guise added to his reputation as the Catholic champion by defeating the German auxiliaries of the Huguenots at Vimory (October 1587) and Auneau (November 1587). The protestations of loyalty to Henry III. which had marked the earlier manifestoes of the League were modified. Obedience to the king was now stated to depend on his giving proof of Catholic zeal and showing no favour to heresy. In April 1588 Guise arrived in Paris, where he put himself at the head of the Parisian mob, and on

the 12th of May, known as the Day of the Barricades, he actually had the crown within his grasp. He refused to treat with Catherine de' Medici, who was prepared to make peace at any cost, but restrained the populace from revolution and permitted Henry to escape from Paris. Henry came to terms with the League in May, and made Guise lieutenant-general of the royal armies. The estates-general, which were assembled at Blois, were devoted to the Guise interest, and alarmed the king by giving voice to the political as well as the religious aspirations of the League. Guise remained at the court of Blois after receiving repeated warnings that Henry meditated treason. On the 25th of December he was summoned to the king's chamber during a sitting of the royal council, and was murdered by assassins carefully posted by Henry III. himself. The cardinal of Lorraine was murdered in prison on the next day. The history of the Guises thenceforward centres in the duke of Mayenne (*q.v.*).

By his wife, Catherine of Cleves, the third duke had fourteen children: among them Charles, 4th duke of Guise (1571-1640); Claude, duke of Chevreuse (1578-1657), whose wife, Marie de Rohan, duchess of Chevreuse, became famous for her intrigues; Louis (1585-1621), 3rd cardinal of Guise, archbishop of Reims, remembered for his liaison with Charlotte des Essarts, mistress of Henry IV.

CHARLES, 4th duke of Guise (1571-1640), was imprisoned for three years after his father's death. He married Henriette Catherine de Joyeuse, widow of the duke of Montpensier. His eldest son predeceased him, and he was succeeded by his second son HENRY (1614-1664), who had been archbishop of Reims, but renounced the ecclesiastical estate and became 5th duke. He made an attempt (1647) on the crown of Naples, and was a prisoner in Spain from 1648 to 1652. A second expedition to Naples in 1654 was a fiasco. He was succeeded by his nephew, LOUIS JOSEPH (1650-1671), as 6th duke. With his son, FRANCIS JOSEPH (1670-1675), the line failed; and the title and estates passed to his great-aunt, Marie of Lorraine, duchess of Guise (1615-1688), daughter of the 4th duke, and with her the title became extinct. The title is now vested in the family of the Bourbon-Orleans princes.

GENEALOGICAL TABLE OF THE HOUSE OF GUISE



AUTHORITIES.—A number of contemporary documents relating to the Guises are included by L. Cimber and F. Danjou in their *Archives curieuses de l'histoire de France* (Paris, 1834, &c.). Vol. iii. contains a soldier's diary of the siege of Metz, first published in Italian (Lyons, 1553), accounts of the sieges of Calais (Tours, 1558). of Thionville (Paris, 1558); vol. iv. an account of the tumult of Amboise from the *Mémoires* of Condé, and four accounts of the affair of Vassy; vol. v. four accounts of the battle of Dreux, one dictated by Guise, and accounts of the murder of Guise; vol. xi. accounts of the Parisian revolution of 1558; and vol. xii. numerous pamphlets and pieces dealing with the murder of Henry of Guise and his brother. An account of the murder of Guise and of the subsequent measures taken by Mayenne, which was supplied by the Venetian ambassador, G. Mocenigo, to his government, is printed by H. Brown in the *Eng.*

Hist. Rev. (April 1895). For the foreign policy of the Guises, and especially their relations with Scotland, there is abundant material in the English *Calendar of State Papers* of Queen Elizabeth (Foreign Series) and in the correspondence of Cardinal Granvella. The memoirs of Francis, duke of Guise, covering the years 1547 to 1563, were published by Michel and Poujoulat in series 1, vol. iv. of their *Coll. de mémoires*. Among contemporary memoirs see especially those of the prince of Condé, of Blaise de Monluc and of Gaspard de Saulx-Tavannes. See also *La Vie de F. de Lorraine, duc de Guise* (Paris, 1681), by J. B. H. du Trousset de Valincourt; A. de Ruble, *L'Assassinat de F. de Lorraine, duc de Guise* (1897), where there is a list of the MS. sources available for a history of the house; R. de Bouillé, *Hist. des ducs de Guise* (4 vols., 1849); H. Forneron, *Les Guise et leur époque* (2 vols., 1887).

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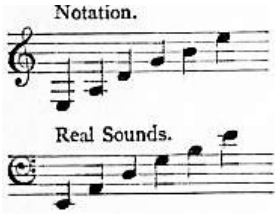
1 This incident supplied Alexandre Dumas *père* with the subject of his *Henri III et sa cour* (1829).

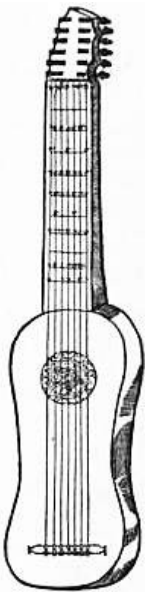
2 Philippe-Emmanuel of Lorraine, duke of Mercœur, a cadet of Lorraine and brother of Louise de Vaudémont, Henry III.'s queen. His wife, Mary of Luxemburg, descended from the dukes of Brittany, and he was made governor of the province in 1582. He aspired to separate sovereignty, and called his son prince and duke of Brittany.

GUITAR (Fr. *guitarre*, Ger. *Guitarre*, Ital. *chitarra*, Span. *guitarra*), a musical instrument strung with gut strings twanged by the fingers, having a body with a flat back and graceful incurvations in complete contrast to the members of the family of lute (*i.e.*), whose back is vaulted. The construction of the instrument is of paramount importance in assigning to the guitar its true position in the history of musical instruments, midway between the cithara (*i.e.*) and the violin. The medieval stringed instruments with neck fall into two classes, characterized mainly by the construction of the body: (1) Those which, like their archetype the cithara, had a body composed of a flat or delicately arched back and soundboard joined by ribs. (2) Those which, like the lyre, had a body consisting of a vaulted back over which was glued a flat soundboard without the intermediary of ribs; this method of construction predominates among Oriental Instruments and is greatly inferior to the first. A striking proof of this inferiority is afforded by the fact that instruments with vaulted backs, such as the rebab or rebec, although extensively represented during the middle ages in all parts of Europe by numerous types, have shown but little or no development during the course of some twelve centuries, and have dropped out one by one from the realm of practical music without leaving a single survivor. The guitar must be referred to the first of these classes.



The back and ribs of the guitar are of maple, ash or cherry-wood, frequently inlaid with rose-wood, mother-of-pearl, tortoise-shell, &c., while the soundboard is of pine and has one large ornamental rose sound hole. The bridge, to which the strings are fastened, is of ebony with an ivory nut which determines the one end of the vibrating strings, while the nut at the end of the fingerboard determines the other. The neck and fingerboard are made of hard wood, such as ebony, beech or pear. The head, bent back from the neck at an obtuse angle contains two parallel barrels or long holes through which the pegs or metal screws pass, three on each side of the head. The correct positions for stopping the intervals are marked on the fingerboard by little metal ridges called frets. The modern guitar has six strings, three of gut and three of silk covered with silver wire, tuned as shown. To the thumb are assigned the three deepest strings, while the first, second and third fingers are used to twang the highest strings. It is generally stated that the sixth or lowest string was added in 1790 by Jacob August Otto of Jena, who was the first in Germany to take up the construction of guitars after their introduction from Italy in 1788 by the duchess Amalie of Weimar. Otto[1] states that it was Capellmeister Naumann of Dresden who requested him to make him a guitar with six strings by adding the low E, a spun wire string. The original guitar brought from Italy by the duchess Amalie had five strings,[2] the lowest A being the only one covered with wire. Otto also covered the D in order to increase the fulness of the tone. In Spain six-stringed guitars and vihuelas were known in the 16th century; they are described by Juan Bermudo[3] and others.[4] The lowest string was tuned to G. Other Spanish guitars of the same period had four, five or seven strings or courses of strings in pairs of unisons. They were always twanged by the fingers.

The guitar is derived from the cithara[5] both structurally and etymologically. It is usually asserted that the guitar was introduced into Spain by the Arabs, but this statement is open to the gravest doubts. There is no trace among the



From Juan Bermudo.

FIG. 1.—Spanish Guitar with seven Strings. 1555. *Vihuela da Mano*.

instruments of the Arabs known to us of any similar to the guitar in construction or shape, although a guitar (fig. 2) with slight incurvations was known to the ancient Egyptians.[6] There is also extant a fine example of the guitar, with ribs and incurvations and a long neck provided with numerous frets, on a Hittite bas-relief on the dromos at Euyuk (*c.* 1000 B.C.) in Cappadocia.[7] Unless other monuments of much later date should come to light showing guitars with ribs, we shall be justified in assuming that the instrument, which required skill in construction, died out in Egypt and in Asia before the days of classic Greece, and had to be evolved anew from the cithara by the Greeks of Asia Minor. That the evolution should take place within the Byzantine Empire or in Syria would be quite consistent with the traditions of the Greeks and their veneration for the cithara, which would lead them to adapt the neck and other improvements to it, rather than adopt the rebab, the tanbur or the barbiton from the Persians or Arabians. This is, in fact, what seems to have taken place. It is true that in the 14th century in an enumeration of musical instruments by the Archipreste de Hita, a *guitarra morisca* is mentioned and unfavourably compared with the *guitarra latina*; moreover, the Arabs of the present day still use an instrument called *kuitra* (which in N. Africa would be guithara), but it has a vaulted back, the body being like half a pear with a long neck; the strings are twanged by means of a quill. The Arab instrument therefore belongs to a different class, and to admit the instrument as the ancestor of the Spanish guitar would be tantamount to deriving the guitar from the lute.[8]

By piecing together various indications given by Spanish writers, we obtain a clue to the identity of the medieval instruments, which, in the absence of absolute proof, is entitled to serious consideration. From Bermudo's work, quoted above, we learn that the guitar and the *vihuela da mano* were practically identical, differing only in accordance and occasionally in the number of strings.[9] Three kinds of vihuelas were known in Spain during the middle ages, distinguished by the qualifying phrases *da arco* (with bow), *da mano* (by hand), *da penola* (with quill). Spanish scholars[10] who have inquired into this question of identity state that the *guitarra latina* was afterwards known as the *vihuela da mano*, a statement fully supported by other evidence. As the Arab *kuitra* was known to be played by means of a quill, we shall not be far wrong in identifying it with the *vihuela da penola*. The word *vihuela* or *vigola* is connected with the Latin *fidicula* or *fides*, a stringed instrument mentioned by Cicero[11] as being made from the wood of the plane-tree and having many strings. The remaining link in the chain of identification is afforded by St Isidore, bishop of Seville in the 7th century, who states that fidicula was another name for cithara, "Veteres aut citharas fidicula vel fidice nominaverunt."[12] The fidicula therefore was the cithara, either in its original classical form or in one of the transitions which transformed it into the guitar. The existence of a superior *guitarra latina* side by side with the *guitarra morisca* is thus explained. It was derived directly from the classical cithara introduced by the Romans into Spain, the archetype of the structural beauty which formed the basis of the perfect proportions and delicate structure of the violin. In an inventory[13] made by Philip van Wilder of the musical instruments which had belonged to Henry VIII. is the following item bearing on the question: "foure gitterons with iiii. cases *they are called Spanishe Vialles*." *Vial* or *viol* was the English equivalent of *vihuela*. The transitions whereby the cithara acquired a neck and became a guitar are shown in the miniatures (fig. 3) of a single MS., the celebrated Utrecht Psalter, which gave rise to so many discussions. The Utrecht Psalter was executed in the diocese of Reims in the 9th century, and the miniatures, drawn by an Anglo-Saxon artist attached to the Reims school, are unique, and illustrate the Psalter, psalm by psalm. It is evident that the Anglo-Saxon artist, while endowed with extraordinary talent and vivid imagination, drew his inspiration from an older Greek illustrated Psalter from the Christian East,[14] where the evolution of the guitar took place.

From Denon's *Voyage in Egypt*.

FIG. 2.—Ancient Egyptian Guitar. 1700 to 1200 B.C.

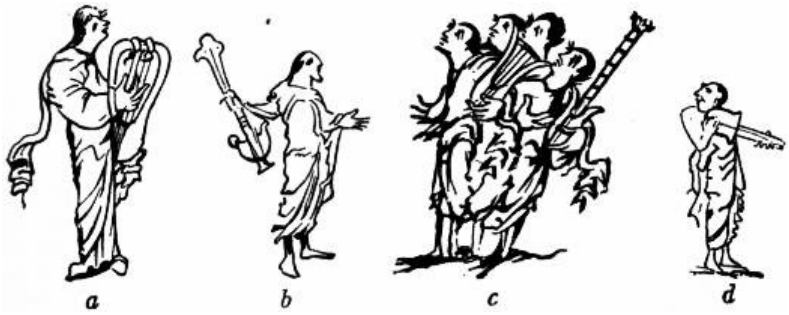


Fig. 3.—Instrumentalists from the Utrecht Psalter, 9th century: (*a*) The bass rotta, first transition of cithara in (C); (*b, c, d*), Transitions showing the addition of neck to the body of the cithara.

From Dr H. Janitschek's *Geschichte der deutschen Malerei.*

Fig. 4.—Representation of a European Guitar. A.D. 1180.

One of the earliest representations (fig. 4) of a guitar in Western Europe occurs in a Passionale from Zwifalten A.D. 1180, now in the Royal Library at Stuttgart.[15] St Pelagia seated on an ass holds a rotta, or cithara in transition, while one of the men-servants leading her ass holds her guitar. Both instruments have three strings and the characteristic guitar outline with incurvations, the rotta differing in having no neck. Mersenne[16] writing early in the 17th century describes and figures two Spanish guitars, one with four, the other with five strings; the former had a cittern head, the latter the straight head bent back at an obtuse angle from the neck, as in the modern instrument; he gives the Italian, French and Spanish tablatures which would seem to show that the guitar already enjoyed a certain vogue in France and Italy as well as in Spain. Mersenne states that the proportions of the guitar demand that the length of the neck from shoulder to nut shall be equal to the length of the body from the centre of the rose to the tail end. From this time until the middle of the 19th century the guitar enjoyed great popularity on the continent, and became the fashionable instrument in England after the Peninsular War, mainly through the virtuosity of Ferdinand Sor, who also wrote compositions for it. This popularity of the guitar was due less to its merits as a solo instrument than to the ease with which it could be mastered sufficiently to accompany the voice. The advent of the Spanish guitar in England led to the wane in the popularity of the cittern, also known at that time in contradistinction as the English or wire-strung guitar, although the two instruments differed in many particulars. As further evidence of the great popularity of the guitar all over Europe may be instanced the extraordinary number of books extant on the instrument, giving instructions how to play the guitar and read the tablature.[17]

(K. S.)

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1 *Über den Bau der Bogeninstrumente* (Jena, 1828), pp. 94 and 95.

2 See Pietro Millioni, *Vero e facil modo d' imparare a sonare et accordare da se medesimo la chitarra spagnola*, with illustration (Rome, 1637).

3 *Declaracion de instrumentos musicales* (Ossuna, 1555), fol. xciii. *b* and fol. xci. *a*. See also illustration of *vihuela da mano*.

4 See also G. G. Kapsperger, *Libro primo di Villanelle con l' infavolutura del chitarone et alfabeto per la chitarra spagnola* (three books, Rome, 1610-1623).

5 See Kathleen Schlesinger, *The Instruments of the Orchestra*, part ii. "Precursors of the Violin Family," pp. 230-248.

6 See Denon's *Voyage in Egypt* (London, 1807, pl. 55).

7 Illustrated from a drawing in Perrot and Chipiez, "Judée Sardaigne, Syrie, Cappadoce." Vol. iv. of *Hist. de l'art dans l'antiquité*, Paris, 1887, p. 670. Also see plate from a photograph by Prof. John Garstang, in Kathleen Schlesinger, *op. cit.*

8 See Biernath, *Die Guitarre* (1908).

9 See also Luys Milan, *Libro de musica de vihuela da mano, Intitulado Il Maestro*, where the accordance is D, G, C, E, A, D from bass to treble.

10 Mariano Soriano, *Fuertes Historia de la musica española* (Madrid, 1855), i. 105, and iv. 208, &c.

11 *De natura deorum*, ii. 8, 22.

12 See *Etymologiarium*, lib. iii., cap. 21.

13 See British Museum, Harleian MS. 1419, fol. 200.

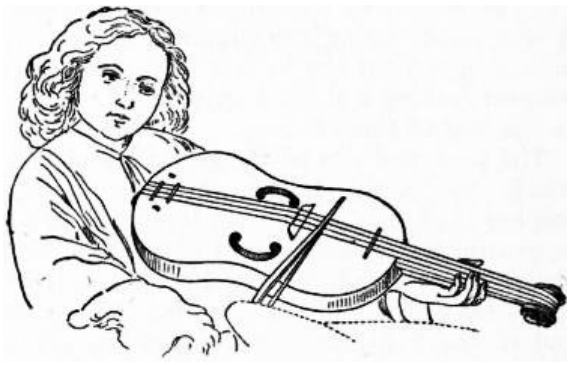
14 The literature of the Utrecht Psalter embraces a large number of books and pamphlets in many languages of which the principal are here given: Professor J. O. Westwood, *Facsimiles of the Miniatures and Ornaments of Anglo-Saxon and Irish MSS.* (London, 1868); Sir Thos. Duffus-Hardy, *Report on the Athanasian Creed in connection with the Utrecht Psalter* (London, 1872); *Report on the Utrecht Psalter*, addressed to the Trustees of the British Museum (London, 1874); Sir Thomas Duffus-Hardy, *Further Report on the Utrecht Psalter* (London, 1874); Walter de Gray Birch, *The History, Art and Palaeography of the MS. styled the Utrecht Psalter* (London, 1876); Anton Springer, "Die Psalterillustrationen im frühen Mittelalter mit besonderer Rücksicht auf den Utrecht Psalter," *Abhandlungen der kgl. sächs. Ges. d. Wissenschaften, phil.-hist. Klasse*, Bd. viii. pp. 187-296, with 10 facsimile plates in autotype from the MS.; Adolf Goldschmidt, "Der Utrecht Psalter," in *Repertorium für Kunstwissenschaft*, Bd. xv. (Stuttgart, 1892), pp. 156-166; Franz Friedrich Leitschuh, *Geschichte der karolingischen Malerei, ihr Bilderkreis und seine Quellen* (Berlin, 1894), pp. 321-330; Adolf Goldschmidt, *Der Albani Psalter in Hildesheim*, &c. (Berlin, 1895); Paul Durrieu, *L'Origine du MS. célèbre dit le Psaultier d'Utrecht* (Paris, 1895); Hans Graeven, "Die Vorlage des Utrecht Psalters," paper read before the XI. International Oriental Congress, Paris, 1897. See also *Repertorium für Kunstwissenschaft* (Stuttgart, 1898), Bd. xxi. pp. 28-35; J. J. Tikkanen, *Abendländische Psalter-Illustration im Mittelalter*, part iii. "Der Utrecht Psalter" (Helsingfors, 1900), 320 pp. and 77 ills. (Professor Tikkanen now accepts the Greek or Syrian origin of the Utrecht Psalter); Georg Swarzenski, "Die karolingische Malerei und Plastik in Reims." in *Jahrbuch d. kgl. preussischen Kunstsammlungen*, Bd. xxiii. (Berlin, 1902), pp. 81-100; Ormonde M. Dalton, "The Crystal of Lothair," in *Archäologie*, vol. lix. (1904); Kathleen Schlesinger, *The Instruments of the Orchestra*, part ii. "The Precursors of the Violin Family," chap. viii. "The Question of the Origin of the Utrecht Psalter," pp. 352-382 (with illustrations), where all the foregoing are summarized.

15 Reproduced in Hubert Janitschek's *Geschichte der deutschen Malerei*, Bd. iii. of *Gesch. der deutschen Kunst* (Berlin, 1890), p. 118.

16 *Harmonie universelle* (Paris, 1636), livre ii. prop. xiv.

17 See C. F. Becker, *Darstellung der musik. Literatur* (Leipzig, 1836); and Wilhelm Tappert, "Zur Geschichte der Guitarre," in *Monatshefte für Musikgeschichte* (Berlin, 1882), No. 5. pp. 77-85.

GUITAR FIDDLE (*Troubadour Fiddle*), a modern name bestowed retrospectively upon certain precursors of the violin possessing characteristics of both guitar and fiddle. The name "guitar fiddle" is intended to emphasize the fact that the instrument in the shape of the guitar, which during the middle ages represented the most perfect principle of construction for stringed instruments with necks, adopted at a certain period the use of the bow from instruments of a less perfect type, the rebab and its hybrids. The use of the bow with the guitar entailed certain constructive changes in the instrument: the large central rose sound-hole was replaced by lateral holes of various shapes; the flat bridge, suitable for instruments whose strings were plucked, gave place to the arched bridge required in order to enable the bow to vibrate each string separately; the arched bridge, by raising the strings higher above the soundboard, made the stopping of strings on the neck extremely difficult if not impossible; this matter was adjusted by the addition of a finger-board of suitable shape and dimensions (fig. 1). At this stage the guitar fiddle possesses the essential features of the violin, and may justly claim to be its immediate predecessor[1] not so much through the viols which were the outcome of the Minnesinger fiddle with sloping shoulders, as through the intermediary of the Italian *lyra*, a guitar-shaped bowed instrument with from 7 to 12 strings.



From Ruhlmann's *Geschichte der Bogeninstrumente*.

FIG. 1.—Typical Alto Guitar Fiddle, 15th century (Pinakothek, Munich).

From such evidence as we now possess, it would seem that the evolution of the early guitar with a neck from the Greek cithara took place under Greek influence in the Christian East. The various stages of this transition have been definitely established by the remarkable miniatures of the Utrecht Psalter.[2] Two kinds of citharas are shown: the antique

From a Byzantine MS. in the British Museum.

Fig. 2.—Earliest example of the Guitar Fiddle. A.D. 1066.

rectangular,[3] and the later design with rounded body having at the point where the arms are added indications of the waist or incurvations characteristic of the outline of the Spanish guitar.[4] The first stage in the transition is shown by a cithara or rotta[5] in which arms and transverse bar are replaced by a kind of frame repeating the outline of the body and thus completing the second lobe of the Spanish guitar. The next stages in the transition are concerned with the addition of a neck[6] and of frets.[7] All these instruments are twanged by the fingers. One may conclude that the use of the bow was either unknown at this time (*c.* 6th century A.D.), or that it was still confined to instruments of the rebab type. The earliest known representation of a guitar fiddle complete with bow[8] (fig. 2) occurs in a Greek Psalter written and illuminated in Caesarea by the archpriest Theodorus in 1066 (British Museum, Add. MS. 19352). Instances of perfect guitar fiddles abound in the 13th century MSS. and monuments, as for instance in a picture by Cimabue (1240-1302). in the Pitti Gallery in Florence.[9]

An evolution on parallel lines appears also to have taken place from the antique rectangular cithara[10] of the *citharoedes*, which was a favourite in Romano-Christian art.[11] In this case examples illustrative of the transitions are found represented in great variety in Europe. The old German rotta[12] of the 6th century preserved in the Völker Museum, Berlin, and the instruments played by King David in two early Anglo-Saxon illuminated MSS., one a Psalter (Cotton MS. Vesp. A. i. British Museum) finished in A.D. 700, the other "A Commentary on the Psalms by Cassiodorus *manu Bedae*" of the 8th century preserved in the Cathedral Library at Durham[13] form examples of the first stage of transition. From such types as these the rectangular *crwth* or crowd was evolved by the addition of a finger-board and the reduction in the number of strings, which follows as a natural consequence as soon as an extended compass can be obtained by stopping the strings. By the addition of a neck we obtain the clue to the origin of rectangular citterns with rounded corners and of certain instruments played with the bow whose bodies or sound-chests have an outline based upon the rectangle with various modifications. We may not look upon this type of guitar fiddle as due entirely to western or southern European initiative; its origin like that of the type approximating to the violin is evidently Byzantine. It is found among the frescoes which cover walls and barrel vaults in the palace of Kosseir 'Amra,[14] believed to be that of Caliph Walid II. (A.D. 744) of the Omayyad dynasty, or of Prince Ahmad, the Abbasid (862-866). The instrument, a cittern with four strings, is being played by a bear. Other examples occur in the Stuttgart Carolingian Psalter[15] (10th century); in MS. 1260 (Bibl. Imp. Paris) *Tristan and Yseult*; as guitar fiddle in the Liber Regalis preserved in Westminster Abbey (14th century); in the Sforza Book[16] (1444-1476), the Book of Hours executed for Bona of Savoy, wife of Galeazzo Maria Sforza; on one of the carvings of the 13th century in the Cathedral of Amiens. It has also been painted by Italian artists of the 15th and 16th centuries.

(K. S.)

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1 See "The Precursors of the Violin Family," by Kathleen Schlesinger, part ii. of *An Illustrated Handbook on the Instruments of the Orchestra* (London, 1908), chs. ii. and x.

2 See Kathleen Schlesinger, *op. cit.* part ii., the "Utrecht Psalter," pp. 127-135, and the "Question of the Origin of the Utrecht Psalter," pp. 136-166, where the subject is discussed and illustrated.

3 *Idem*, see pl. vi. (2) to the right centre.

4 *Idem*, see pl. iii. centre and figs. 118 and 119.

5 *Idem*, see fig. 117, p. 341, and figs. 172 and 116.

6 *Idem*, see fig. 121, p. 246, figs. 122, 123, 125 and 126 pl. iii. vi. (1) and (2).

7 *Idem*, see fig. 126, p. 350, and pl. iii. right centre.

8 *Idem*, see fig. 173, p. 448.

9 *Idem*, see fig. 205, p. 480.

10 See *Museo Pio Clementino*, by Visconti (Milan, 1818).

11 See for example *Georgics*, iv. 471-475 in the Vatican Virgil (Cod. 3225), in facsimile (Rome, 1899) (British Museum press-mark 8, tab. f. vol. ii.).

12 This rotta was found in an Alamannic tomb of the 4th to the 7th centuries at Oberflacht in the Black Forest. A facsimile is preserved in the collection of the Kgl. Hochschule, Berlin, illustrations in "Grabfunde am Berge Lupfen bei Oberflacht, 1846," *Jahresberichte d. Württemb. Altertums-Vereins*, iii. (Stuttgart, 1846), tab. viii. also Kathleen Schlesinger, *op. cit.* part ii. fig. 168 (drawing from the facsimile).

13 Reproductions of both miniatures are to be found in Professor J. O. Westwood's *Facsimiles of the Miniatures and Ornaments of Anglo-Saxon and Irish MSS.* (London, 1868).

14 An illustration occurs in the fine publication of the Austrian Academy of Sciences, *Kusejr ʻAmra* (Vienna, 1907, pl. xxxiv.).

15 See reproduction of some of the miniatures in Jacob and H. von Hefner-Alteneck, *Trachten des christlichen Mittelalters* (Darmstadt. 1840-1854, 3 vols.), and in *Trachten, Kunstwerke und Gerätschaften vom frühen Mittelalter* (Frankfort-on-Main, 1879-1890),

16 Add. MS. 34294, British Museum, vol. ii. fol. 83, 161, vol. iii. fol. 402, vol. iv. fols. 534 and 667.

GUITRY, LUCIEN GERMAIN (1860-), French actor, was born in Paris. He became prominent on the French stage at the Porte Saint-Martin theatre in 1900, and the Variétés in 1901, and then became a member of the Comédie Française, but he resigned very soon in order to become director of the Renaissance, where he was principally associated with the actress Marthe Brandès, who had also left the Comédie. Here he established his reputation, in a number of plays, as the greatest contemporary French actor in the drama of modern reality.

GUIZOT, FRANÇOIS PIERRE GUILLAUME (1787-1874), historian, orator and statesman, was born at Nîmes on the 4th of October 1787, of an honourable Protestant family belonging to the *bourgeoisie* of that city. It is characteristic of the cruel disabilities which still weighed upon the Protestants of France before the Revolution, that his parents, at the time of their union, could not be publicly or legally married by their own pastors, and that the ceremony was clandestine. The liberal opinions of his family did not, however, save it from the sanguinary intolerance of the Reign of Terror, and on the 8th April 1794 his father perished at Nîmes upon the scaffold. Thenceforth the education of the future minister devolved entirely upon his mother, a woman of slight appearance and of homely manners, but endowed with great strength of character and clearness of judgment. Madame Guizot was a living type of the Huguenots of the 16th century, stern in her principles and her faith, immovable in her convictions and her sense of duty. She formed the character of her illustrious son and shared every vicissitude of his life. In the days of his power her simple figure, always clad in deep mourning for her martyred husband, was not absent from the splendid circle of his political friends. In the days of his exile in 1848 she followed him to London, and there at a very advanced age closed her life and was buried at Kensal Green. Driven from Nîmes by the Revolution, Madame Guizot and her son repaired to Geneva, where he received his education. In spite of her decided Calvinistic opinions, the theories of Rousseau, then much in fashion, were not without their influence on Madame Guizot. She was a strong Liberal, and she even adopted the notion inculcated in the *Émile* that every man ought to learn a manual trade or craft. Young Guizot was taught to be a carpenter, and he so far succeeded in his work that he made a table with his own hands, which is still preserved. Of the progress of his graver studies little is known, for in the work which he entitled *Memoirs of my own Times* Guizot omitted all personal details of his earlier life. But his literary attainments must have been precocious and considerable, for when he arrived in Paris in 1805 to pursue his studies in the faculty of laws, he entered at eighteen as tutor into the family of M. Stapfer, formerly Swiss minister in France, and he soon began to write in a journal edited by M. Suard, the *Publiciste*. This connexion introduced him to the literary society of Paris. In October 1809, being then twenty-two, he wrote a review of M. de Chateaubriand's *Martyrs*, which procured for him the approbation and cordial thanks of that eminent person, and he continued to contribute largely to the periodical press. At Suard's he had made the acquaintance of Pauline Meulan, an accomplished lady of good family, some fourteen years older than himself, who had been forced by the hardships of the Revolution to earn her living by literature, and who also was engaged to contribute a series of articles to Suard's journal. These contributions were interrupted by her illness, but immediately resumed and continued by an unknown hand. It was discovered that François Guizot had quietly supplied the deficiency on her behalf. The acquaintance thus begun ripened into friendship and love, and in 1812 Mademoiselle de Meulan consented to marry her youthful ally. She died in 1827; she was the author of many esteemed works on female education. An only son, born in 1819, died in 1837 of consumption. In 1828 Guizot married Elisa Dillon, niece of his first wife, and also an author. She died in 1833, leaving a son, Maurice Guillaume (1833-1892), who attained some reputation as a

scholar and writer.

During the empire, Guizot, entirely devoted to literary pursuits, published a collection of French synonyms (1809), an essay on the fine arts (1811), and a translation of Gibbon with additional notes in 1812. These works recommended him to the notice of M. de Fontanes, then grand-master of the university of France, who selected Guizot for the chair of modern history at the Sorbonne in 1812. His first lecture (which is reprinted in his *Memoirs*) was delivered on the 11th of December of that year. The customary compliment to the all-powerful emperor he declined to insert in it, in spite of the hints given him by his patron, but the course which followed marks the beginning of the great revival of historical research in France in the 19th century. He had now acquired a considerable position in the society of Paris, and the friendship of Royer-Collard and the leading members of the liberal party, including the young duc de Broglie. Absent from Paris at the moment of the fall of Napoleon in 1814, he was at once selected, on the recommendation of Royer-Collard, to serve the government of Louis XVIII. in the capacity of secretary-general of the ministry of the interior, under the abbé de Montesquiou. Upon the return of Napoleon from Elba he immediately resigned, on the 25th of March 1815 (the statement that he retained office under General Carnot is incorrect), and returned to his literary pursuits. After the Hundred Days, he repaired to Ghent, where he saw Louis XVIII., and in the name of the liberal party pointed out to his majesty that a frank adoption of a liberal policy could alone secure the duration of the restored monarchy—advice which was ill-received by M. de Blacas and the king's confidential advisers. This visit to Ghent, at the time when France was a prey to a second invasion, was made a subject of bitter reproach to Guizot in after life by his political opponents, as an unpatriotic action. "The Man of Ghent" was one of the terms of insult frequently hurled against him in the days of his power. But the reproach appears to be wholly unfounded. The true interests of France were not in the defence of the falling empire, but in establishing a liberal policy on a monarchical basis and in combating the reactionary tendencies of the ultra-royalists. It is at any rate a remarkable circumstance that a young professor of twenty-seven, with none of the advantages of birth or political experience, should have been selected to convey so important a message to the ears of the king of France, and a proof, if any were wanting, that the Revolution had, as Guizot said, "done its work."

On the second restoration, Guizot was appointed secretary-general of the ministry of justice under M. de Barbé-Marbois, but resigned with his chief in 1816. Again in 1819 he was appointed general director of communes and departments in the ministry of the interior, but lost his office with the fall of Decazes in February 1820. During these years Guizot was one of the leaders of the *Doctrinaires*, a small party strongly attached to the charter and the crown, and advocating a policy which has become associated (especially by Faguet) with the name of Guizot, that of the *juste milieu*, a *via media* between absolutism and popular government. Their opinions had more of the rigour of a sect than the elasticity of a political party. Adhering to the great principles of liberty and toleration, they were sternly opposed to the anarchical traditions of the Revolution. They knew that the elements of anarchy were still fermenting in the country; these they hoped to subdue, not by reactionary measures, but by the firm application of the power of a limited constitution, based on the suffrages of the middle class and defended by the highest literary talent of the times. Their motives were honourable. Their views were philosophical. But they were opposed alike to the democratical spirit of the age, to the military traditions of the empire, and to the bigotry and absolutism of the court. The fate of such a party might be foreseen. They lived by a policy of resistance; they perished by another revolution (1830). They are remembered more for their constant opposition to popular demands than by the services they undoubtedly rendered to the cause of temperate freedom.

In 1820, when the reaction was at its height after the murder of the duc de Berri, and the fall of the ministry of the duc Decazes, Guizot was deprived of his offices, and in 1822 even his course of lectures were interdicted. During the succeeding years he played an important part among the leaders of the liberal opposition to the government of Charles X., although he had not yet entered parliament, and this was also the time of his greatest literary activity. In 1822 he had published his lectures on representative government (*Histoire des origines du gouvernement représentatif*, 1821-1822, 2 vols.; Eng. trans. 1852); also a work on capital punishment for political offences and several important political pamphlets. From 1822 to 1830 he published two important collections of historical sources, the memoirs of the history of England in 26 volumes, and the memoirs of the history of France in 31 volumes, and a revised translation of Shakespeare, and a volume of essays on the history of France. The most remarkable work from his own pen was the first part of his *Histoire de la révolution d'Angleterre depuis Charles I*^{er} *à Charles II.* (2 vols., 1826-1827; Eng. trans., 2 vols., Oxford, 1838), a book of great merit and impartiality, which he resumed and completed during his exile in England after 1848. The Martignac administration restored Guizot in 1828 to his professor's chair and to the council of state. Then it was that he delivered the celebrated

courses of lectures which raised his reputation as an historian to the highest point of fame, and placed him amongst the best writers of France and of Europe. These lectures formed the basis of his general *Histoire de la civilisation en Europe* (1828; Eng. trans, by W. Hazlitt, 3 vols., 1846), and of his *Histoire de la civilisation en France* (4 vols., 1830), works which must ever be regarded as classics of modern historical research.

Hitherto Guizot's fame rested on his merits as a writer on public affairs and as a lecturer on modern history. He had attained the age of forty-three before he entered upon the full display of his oratorical strength. In January 1830 he was elected for the first time by the town of Lisieux to the chamber of deputies, and he retained that seat during the whole of his political life. Guizot immediately assumed an important position in the representative assembly, and the first speech he delivered was in defence of the celebrated address of the 221, in answer to the menacing speech from the throne, which was followed by the dissolution of the chamber, and was the precursor of another revolution. On his returning to Paris from Nîmes on the 27th of July, the fall of Charles X. was already imminent. Guizot was called upon by his friends Casimir-Périer, Laffitte, Villemain and Dupin to draw up the protest of the liberal deputies against the royal ordinances of July, whilst he applied himself with them to control the revolutionary character of the late contest. Personally, Guizot was always of opinion that it was a great misfortune for the cause of parliamentary government in France that the infatuation and ineptitude of Charles X. and Prince Polignac rendered a change in the hereditary line of succession inevitable. But, though convinced that it was inevitable, he became one of the most ardent supporters of Louis-Philippe. In August 1830 Guizot was made minister of the interior, but resigned in November. He had now passed into the ranks of the conservatives, and for the next eighteen years was the most determined foe of democracy, the unyielding champion of "a monarchy limited by a limited number of bourgeois."

In 1831 Casimir-Périer formed a more vigorous and compact administration, which was terminated in May 1832 by his death; the summer of that year was marked by a formidable republican rising in Paris, and it was not till the 11th of October 1832 that a stable government was formed, in which Marshal Soult was first minister, the duc de Broglie took the foreign office, Thiers the home department, and Guizot the department of public instruction. This ministry, which lasted for nearly four years, was by far the ablest that ever served Louis Philippe. Guizot, however, was already marked with the stigma of unpopularity by the more advanced liberal party. He remained unpopular all his life, "not," said he, "that I court unpopularity, but that I think nothing about it." Yet never were his great abilities more useful to his country than whilst he filled this office of secondary rank but of primary importance in the department of public instruction. The duties it imposed on him were entirely congenial to his literary tastes, and he was master of the subjects they concerned. He applied himself in the first instance to carry the law of the 28th of June 1833, and then for the next three years to put it into execution. In establishing and organizing primary education in France, this law marked a distinct epoch in French history. In fifteen years, under its influence, the number of primary schools rose from ten to twenty-three thousand; normal schools for teachers, and a general system of inspection, were introduced; and boards of education, under mixed lay and clerical authority, were created. The secondary class of schools and the university of France were equally the subject of his enlightened protection and care, and a prodigious impulse was given to philosophical study and historical research. The branch of the Institute of France known as the "Académie des Sciences Morales et Politiques," which had been suppressed by Napoleon, was revived by Guizot. Some of the old members of this learned body—Talleyrand, Siéyès, Roederer and Lakanal—again took their seats there, and a host of more recent celebrities were added by election for the free discussion of the great problems of political and social science. The "Société de l'Histoire de France" was founded for the publication of historical works; and a vast publication of medieval chronicles and diplomatic papers was undertaken at the expense of the state (see History; and France, *History*, section *Sources*).

The object of the cabinet of October 1832 was to organize a conservative party, and to carry on a policy of resistance to the republican faction which threatened the existence of the monarchy. It was their pride and their boast that their measures never exceeded the limits of the law, and by the exercise of legal power alone they put down an insurrection amounting to civil war in Lyons and a sanguinary revolt in Paris. The real strength of the ministry lay not in its nominal heads, but in the fact that in this government and this alone Guizot and Thiers acted in cordial co-operation. The two great rivals in French parliamentary eloquence followed for a time the same path; but neither of them could submit to the supremacy of the other, and circumstances threw Thiers almost continuously on a course of opposition, whilst Guizot bore the graver responsibilities of power.

Once again indeed, in 1839, they were united, but it was in opposition to M. Molé, who had formed an intermediate government, and this coalition between Guizot and the leaders of the left centre and the left, Thiers and Odilon Barrot, due to his ambition and jealousy of Molé, is

justly regarded as one of the chief inconsistencies of his life. Victory was secured at the expense of principle, and Guizot's attack upon the government gave rise to a crisis and a republican insurrection. None of the three chiefs of that alliance took ministerial office, however, and Guizot was not sorry to accept the post of ambassador in London, which withdrew him for a time from parliamentary contests. This was in the spring of 1840, and Thiers succeeded shortly afterwards to the ministry of foreign affairs.

Guizot was received with marked distinction by the queen and by the society of London. His literary works were highly esteemed, his character was respected, and France was never more worthily represented abroad than by one of her greatest orators. He was known to be well versed in the history and the literature of England, and sincerely attached to the alliance of the two nations and the cause of peace. But, as he himself remarked, he was a stranger to England and a novice in diplomacy; and unhappily the embroiled state of the Syrian question, on which the French government had separated itself from the joint policy of Europe, and possibly the absence of entire confidence between the ambassador and the minister of foreign affairs, placed him in an embarrassing and even false position. The warnings he transmitted to Thiers were not believed. The warlike policy of Thiers was opposed to his own convictions. The treaty of the 15th of July was signed without his knowledge and executed in the teeth of his remonstrances. For some weeks Europe seemed to be on the brink of war, until the king put an end to the crisis by refusing his assent to the military preparations of Thiers, and by summoning Guizot from London to form a ministry and to aid his Majesty in what he termed "ma lutte tenace contre l'anarchie." Thus began, under dark and adverse circumstances, on the 29th of October 1840, the important administration in which Guizot remained the master-spirit for nearly eight years. He himself took the office of minister for foreign affairs, to which he added some years later, on the retirement of Marshal Soult, the ostensible rank of prime minister. His first care was the maintenance of peace and the restoration of amicable relations with the other powers of Europe. If he succeeded, as he did succeed, in calming the troubled elements and healing the wounded pride of France, the result was due mainly to the indomitable courage and splendid eloquence with which he faced a raging opposition, gave unity and strength to the conservative party, who now felt that they had a great leader at their head, and appealed to the thrift and prudence of the nation rather than to their vanity and their ambition. In his pacific task he was fortunately seconded by the formation of Sir Robert Peel's administration in England, in the autumn of 1841. Between Lord Palmerston and Guizot there existed an incompatibility of character exceedingly dangerous in the foreign ministers of two great and in some respects rival countries. With Lord Palmerston in office, Guizot felt that he had a bitter and active antagonist in every British agent throughout the world; the combative element was strong in his own disposition; and the result was a system of perpetual conflict and counter-intrigues. Lord Palmerston held (as it appears from his own letters) that war between England and France was, sooner or later, inevitable. Guizot held that such a war would be the greatest of all calamities, and certainly never contemplated it. In Lord Aberdeen, the foreign secretary of Sir Robert Peel, Guizot found a friend and an ally perfectly congenial to himself. Their acquaintance in London had been slight, but it soon ripened into mutual regard and confidence. They were both men of high principles and honour; the Scotch Presbyterianism which had moulded the faith of Lord Aberdeen was reflected in the Huguenot minister of France; both were men of extreme simplicity of taste, joined to the refinement of scholarship and culture; both had an intense aversion to war and felt themselves ill-qualified to carry on those adventurous operations which inflamed the imagination of their respective opponents. In the eyes of Lord Palmerston and Thiers their policy was mean and pitiful; but it was a policy which secured peace to the world, and united the two great and free nations of the West in what was termed the *entente cordiale*. Neither of them would have stooped to snatch an advantage at the expense of the other; they held the common interest of peace and friendship to be paramount; and when differences arose, as they did arise, in remote parts of the world,—in Tahiti, in Morocco, on the Gold Coast,—they were reduced by this principle to their proper insignificance. The opposition in France denounced Guizot's foreign policy as basely subservient to England. He replied in terms of unmeasured contempt,—"You may raise the pile of calumny as high as you will; vous n'arriverez jamais à la hauteur de mon dédain!" The opposition in England attacked Lord Aberdeen with the same reproaches, but in vain. King Louis Philippe visited Windsor. The queen of England (in 1843) stayed at the Château d'Eu. In 1845 British and French troops fought side by side for the first time in an expedition to the River Plate.

The fall of Sir Robert Peel's government in 1846 changed these intimate relations; and the return of Lord Palmerston to the foreign office led Guizot to believe that he was again exposed to the passionate rivalry of the British cabinet. A friendly understanding had been established at Eu between the two courts with reference to the future marriage of the young queen of Spain. The language of Lord Palmerston and the conduct of Sir Henry Bulwer (afterwards Lord Dalling) at Madrid led Guizot to believe that this understanding was broken, and that it was

intended to place a Coburg on the throne of Spain. Determined to resist any such intrigue, Guizot and the king plunged headlong into a counter-intrigue, wholly inconsistent with their previous engagements to England, and fatal to the happiness of the queen of Spain. By their influence she was urged into a marriage with a despicable offset of the house of Bourbon, and her sister was at the same time married to the youngest son of the French king, in direct violation of Louis Philippe's promises. This transaction, although it was hailed at the time as a triumph of the policy of France, was in truth as fatal to the monarch as it was discreditable to the minister. It was accomplished by a mixture of secrecy and violence. It was defended by subterfuges. By the dispassionate judgment of history it has been universally condemned. Its immediate effect was to destroy the Anglo-French alliance, and to throw Guizot into closer relations with the reactionary policy of Metternich and the Northern courts.

The history of Guizot's administration, the longest and the last which existed under the constitutional monarchy of France, bears the stamp of the great qualities and the great defects of his political character, for he was throughout the master-spirit of that government. His first object was to unite and discipline the conservative party, which had been broken up by previous dissensions and ministerial changes. In this he entirely succeeded by his courage and eloquence as a parliamentary leader, and by the use of all those means of influence which France too liberally supplies to a dominant minister. No one ever doubted the purity and disinterestedness of Guizot's own conduct. He despised money; he lived and died poor; and though he encouraged the fever of money-getting in the French nation, his own habits retained their primitive simplicity. But he did not disdain to use in others the baser passions from which he was himself free. Some of his instruments were mean; he employed them to deal with meanness after its kind. Gross abuses and breaches of trust came to light even in the ranks of the government, and under an incorruptible minister the administration was denounced as corrupt. *Licet uti alieno vitio* is a proposition as false in politics as it is in divinity.

Of his parliamentary eloquence it is impossible to speak too highly. It was terse, austere, demonstrative and commanding,—not persuasive, not humorous, seldom adorned, but condensed with the force of a supreme authority in the fewest words. He was essentially a ministerial speaker, far more powerful in defence than in opposition. Like Pitt he was the type of authority and resistance, unmoved by the brilliant charges, the wit, the gaiety, the irony and the discursive power of his great rival. Nor was he less a master of parliamentary tactics and of those sudden changes and movements in debate which, as in a battle, sometimes change the fortune of the day. His confidence in himself, and in the majority of the chamber which he had moulded to his will, was unbounded; and long success and the habit of authority led him to forget that in a country like France there was a people outside the chamber elected by a small constituency, to which the minister and the king himself were held responsible.

A government based on the principle of resistance and repression and marked by dread and distrust of popular power, a system of diplomacy which sought to revive the traditions of the old French monarchy, a sovereign who largely exceeded the bounds of constitutional power and whose obstinacy augmented with years, a minister who, though far removed from the servility of the courtier, was too obsequious to the personal influence of the king, were all singularly at variance with the promises of the Revolution of July, and they narrowed the policy of the administration. Guizot's view of politics was essentially historical and philosophical. His tastes and his acquirements gave him little insight into the practical business of administrative government. Of finance he knew nothing; trade and commerce were strange to him; military and naval affairs were unfamiliar to him; all these subjects he dealt with by second hand through his friends, P. S. Dumon (1797-1870), Charles Marie Tanneguy, Comte Duchâtel (1803-1867), or Marshal Bugeaud. The consequence was that few measures of practical improvement were carried by his administration. Still less did the government lend an ear to the cry for parliamentary reform. On this subject the king's prejudices were insurmountable, and his ministers had the weakness to give way to them. It was impossible to defend a system which confined the suffrage to 200,000 citizens, and returned a chamber of whom half were placemen. Nothing would have been easier than to strengthen the conservative party by attaching the suffrage to the possession of land in France, but blank resistance was the sole answer of the government to the just and moderate demands of the opposition. Warning after warning was addressed to them in vain by friends and by foes alike; and they remained profoundly unconscious of their danger till the moment when it overwhelmed them. Strange to say, Guizot never acknowledged either at the time or to his dying day the nature of this error; and he speaks of himself in his memoirs as the much-enduring champion of liberal government and constitutional law. He utterly fails to perceive that a more enlarged view of the liberal destinies of France and a less intense confidence in his own specific theory might have preserved the constitutional monarchy and averted a vast series of calamities, which were in the end fatal to every principle he most cherished. But with the stubborn conviction of absolute truth he dauntlessly adhered to his own doctrines to the

end.

The last scene of his political life was singularly characteristic of his inflexible adherence to a lost cause. In the afternoon oí the 23rd of February 1848 the king summoned his minister from the chamber, which was then sitting, and informed him that the aspect of Paris and the country during the banquet agitation for reform, and the alarm and division of opinion in the royal family, led him to doubt whether he could retain his ministry. That doubt, replied Guizot, is decisive of the question, and instantly resigned, returning to the chamber only to announce that the administration was at an end and that Molé had been sent for by the king. Molé failed in the attempt to form a government, and between midnight and one in the morning Guizot, who had according to his custom retired early to rest, was again sent for to the Tuileries. The king asked his advice. “We are no longer the ministers of your Majesty,” replied Guizot; “it rests with others to decide on the course to be pursued. But one thing appears to be evident: this street riot must be put down; these barricades must be taken; and for this purpose my opinion is that Marshal Bugeaud should be invested with full power, and ordered to take the necessary military measures, and as your Majesty has at this moment no minister, I am ready to draw up and countersign such an order.” The marshal, who was present, undertook the task, saying, “I have never been beaten yet, and I shall not begin to-morrow. The barricades shall be carried before dawn.” After this display of energy the king hesitated, and soon added: “I ought to tell you that M. Thiers and his friends are in the next room forming a government!” Upon this Guizot rejoined, “Then it rests with them to do what they think fit,” and left the palace. Thiers and Barrot decided to withdraw the troops. The king and Guizot next met at Claremont. This was the most perilous conjuncture of Guizot’s life, but fortunately he found a safe refuge in Paris for some days in the lodging of a humble miniature painter whom he had befriended, and shortly afterwards effected his escape across the Belgian frontier and thence to London, where he arrived on the 3rd of March. His mother and daughters had preceded him, and he was speedily installed in a modest habitation in Pelham Crescent, Brompton.

The society of England, though many persons disapproved of much of his recent policy, received the fallen statesman with as much distinction and respect as they had shown eight years before to the king’s ambassador. Sums of money were placed at his disposal, which he declined. A professorship at Oxford was spoken of, which he was unable to accept. He stayed in England about a year, devoting himself again to history. He published two more volumes on the English revolution, and in 1854 his *Histoire de la république d’Angleterre et de Cromwell* (2 vols., 1854), then his *Histoire du protectorat de Cromwell et du rétablissement des Stuarts* (2 vols., 1856). He also published an essay on Peel, and amid many essays on religion, during the ten years 1858-1868, appeared the extensive *Mémoires pour servir à l’histoire de mon temps*, in nine volumes. His speeches were included in 1863 in his *Histoire parlementaire de la France* (5 vols. of parliamentary speeches, 1863).

Guizot survived the fall of the monarchy and the government he had served twenty-six years. He passed abruptly from the condition of one of the most powerful and active statesmen in Europe to the condition of a philosophical and patriotic spectator of human affairs. He was aware that the link between himself and public life was broken for ever; and he never made the slightest attempt to renew it. He was of no party, a member of no political body; no murmur of disappointed ambition, no language of asperity, ever passed his lips; it seemed as if the fever of oratorical debate and ministerial power had passed from him and left him a greater man than he had been before, in the pursuit of letters, in the conversation of his friends, and as head of the patriarchal circle of those he loved. The greater part of the year he spent at his residence at Val Richer, an Augustine monastery near Lisieux in Normandy, which had been sold at the time of the first Revolution. His two daughters, who married two descendants of the illustrious Dutch family of De Witt, so congenial in faith and manners to the Huguenots of France, kept his house. One of his sons-in-law farmed the estate. And here Guizot devoted his later years with undiminished energy to literary labour, which was in fact his chief means of subsistence. Proud, independent, simple and contented he remained to the last; and these years of retirement were perhaps the happiest and most serene portion of his life.

Two institutions may be said even under the second empire to have retained their freedom—the Institute of France and the Protestant Consistory. In both of these Guizot continued to the last to take an active part. He was a member of three of the five academies into which the Institute of France is divided. The Academy of Moral and Political Science owed its restoration to him, and he became in 1832 one of its first associates. The Academy of Inscriptions and Belles Lettres elected him in 1833 as the successor to M. Dacier; and in 1836 he was chosen a member of the French Academy, the highest literary distinction of the country. In these learned bodies Guizot continued for nearly forty years to take a lively interest and to exercise a powerful influence. He was the jealous champion of their independence. His voice had the greatest weight in the choice of new candidates; the younger generation of French writers

never looked in vain to him for encouragement; and his constant aim was to maintain the dignity and purity of the profession of letters.

In the consistory of the Protestant church in Paris Guizot exercised a similar influence. His early education and his experience of life conspired to strengthen the convictions of a religious temperament. He remained through life a firm believer in the truths of revelation, and a volume of *Meditations on the Christian Religion* was one of his latest works. But though he adhered inflexibly to the church of his fathers and combated the rationalist tendencies of the age, which seemed to threaten it with destruction, he retained not a tinge of the intolerance or asperity of the Calvinistic creed. He respected in the Church of Rome the faith of the majority of his countrymen; and the writings of the great Catholic prelates, Bossuet and Bourdaloue, were as familiar and as dear to him as those of his own persuasion, and were commonly used by him in the daily exercises of family worship.

In these literary pursuits and in the retirement of Val Richer years passed smoothly and rapidly away; and as his grandchildren grew up around him, he began to direct their attention to the history of their country. From these lessons sprang his last and not his least work, the *Histoire de France racontée à mes petits enfants*, for although this publication assumed a popular form, it is not less complete and profound than it is simple and attractive. The history came down to 1789, and was continued to 1870 by his daughter Madame Guizot de Witt from her father's notes.

Down to the summer of 1874 Guizot's mental vigour and activity were unimpaired. His frame, temperate in all things, was blessed with a singular immunity from infirmity and disease; but the vital power ebbed away, and he passed gently away on the 12th of September 1874, reciting now and then a verse of Corneille or a text of Scripture.

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(H. R.; J. T. S.*)

GUJARAT or GUZERAT, a region of India, in the Bombay Presidency. In the widest sense of the name it includes the whole of the country where the Gujarati language is spoken, *i.e.* the northern districts and states of the Presidency from Palanpur to Damaun, with Kathiawar and Cutch. But it is more properly confined to the country north of the Nerbudda and east of the Rann of Cutch and Kathiawar. In this sense it has an area of 29,071 sq. m., with a population in 1901 of 4,798,504. It includes the states distributed among the agencies of Palanpur, Mahi Kantha, Rewa Kantha and Cambay, with most of Baroda and the British districts of Ahmedabad, Kaira, Panch Mahals and Broach. Less than one-fourth is British territory. The region takes its name from the Gujars, a tribe who passed into India from the north-west, established a kingdom in Rajputana, and spread south in A.D. 400-600. The ancient Hindu capital was Anhilvada; the Mahommedan dynasty, which ruled from 1396 to 1572, founded Ahmedabad, which is still the largest city; but Gujarat owed much of its historical importance to the seaports of Broach, Cambay and Surat. Its fertile plain, with a regular rainfall and numerous rivers, has caused it to be styled the "garden of India." It suffered, however, severely from the famine of 1899-1901. For an account of the history, geography, &c., of Gujarat see the articles on the various states and districts. Gujarat gives its name to the vernacular of northern Bombay, viz. Gujarati, one of the three great languages of that Presidency, spoken by more than 9 millions. It has an ancient literature and a peculiar character. As the language of the Parsis it is prominent in the Bombay press; and it is also the commercial language of Bombay city, which lies outside the territorial area of Gujarat.

See J. Campbell, *History of Gujarat* (Bombay, 1896); Sir E. C. Bayley, *The Muhammedan Kingdom of Gujarat* (1886); A. K. Forbes, *Ras Mala* (1856).

GUJARATI and **RAJASTHANI**, the names of two members of the western sub-group of the Intermediate Group of Indo-Aryan languages (*q.v.*). The remaining member of this sub-group is Panjabi or Punjabi (see HINDOSTANI). In 1901 the speakers of those now dealt with numbered: Gujarati, 9,439,925, and Rajasthani, 10,917,712. The two languages are closely connected and might almost be termed co-dialects of the same form of speech. Together they occupy an almost square block of country, some 400 m. broad, reaching from near Agra and Delhi on the river Jumna to the Arabian Sea. Gujarati (properly *Gujarātī*) is spoken in Gujarat, the northern maritime province of the Bombay Presidency, and also in Baroda and the native states adjoining. Rajasthani (properly *Rājasthānī*, from "*Rājasthān*," the native name for Rajputana) is spoken in Rajputana and the adjoining parts of Central India.

In the articles INDO-ARYAN LANGUAGES and PRAKRIT the history of the earlier stages of the Indo-Aryan vernaculars is given at some length. It is there shown that, from the most ancient times, there were two main groups of these forms of speech—one, the language of the Midland, spoken in the country near the Gangetic Doab, and the other, the so-called "Outer Band," containing the Midland on three sides, west, north and south. The country to the west and south-west of the Midland, in which this outer group of languages was spoken, included the modern Punjab, Rajputana and Gujarat. In process of time the population of the Midland expanded and carried its language to its new homes. It occupied the eastern and central Punjab, and the mixed (or "intermediate") language which there grew up became the modern Panjabi. To the west it spread into Rajputana, till its progress was stopped by the Indian desert, and in Rajputana another intermediate language took rise and became Rajasthani. As elsewhere explained, the language-wave of the Midland exercised less and less influence as it travelled farther from its home, so that, while in eastern Rajputana the local dialect is now almost a pure midland speech, in the west there are many evident traces of the old outer language still surviving. To the south-west of Rajputana there was no desert to stop the wave of Midland expansion, which therefore rolled on unobstructed into Gujarat, where it reached the sea. Here the survivals of the old outer language are stronger still. The old outer Prakrit of north Gujarat was known as "Saurāṣṭrī," while the Prakrit of the Midland invaders was called "Śaurasēnī," and we may therefore describe Gujarati as being an intermediate language derived (as explained in the articles PRAKRIT) from a mixture of the Apabhramśa forms of Saurāṣṭrī and Śaurasēnī, in which the latter predominated.

It will be observed that, at the present day, Gujarati breaks the continuity of the outer band of Indo-Aryan languages. To its north it has Sindhi and to its south Marathi, both outer languages with which it has only a slight connexion. On the other hand, on the east and north-east it has Rajasthani, into which it merges so gradually and imperceptibly that at the conventional border-line, in the state of Palanpur, the inhabitants of Rajputana say that the local dialect is a form of Gujarati, while the inhabitants of Gujarat say that it is Rajasthani.

Language.

Gujarati has no important local dialects, but there is considerable variation in the speeches of different classes of the community. Parsees and Mussulmans (when the latter use the language—as a rule the Gujarat Mussulmans speak Hindostani) have some striking peculiarities of pronunciation, the most noticeable of which is the disregard by the latter of the distinction between cerebral and dental letters. The uneducated Hindus do not pronounce the language in the same way as their betters, and this difference is accentuated in northern Gujarat, where the lower classes substitute *ē* for *ī*, *c* for *k*, *ch* for *kh*, *s* for *c* and *ch*, *h* for *s*, and drop *h* as readily as any cockney. There is also (as in the case of the Mussulmans) a tendency to confuse cerebral and dental consonants, to substitute *r* for *ḍ* and *l*, to double medial consonants, and to pronounce the letter *ā* as *å*, something like the *a* in "all." The Bhils of the hills east of Gujarat also speak a rude Gujarati, with special dialectic peculiarities of their own, probably due to the fact that the tribes are of Dravidian origin. These Bhil peculiarities are further mixed with corruptions of Marathi idioms in Nimar and Khandesh, where we have almost a new language.

Rajasthani has numerous dialects, each state claiming one or more of its own. Thus, in the state of Jaipur there have been catalogued no less than ten dialects among about 1,688,000 people. All Rajasthani dialects can, however, be easily classed in four well-defined groups, a north-eastern, a southern, a western and an east-central. The north-eastern (Mēwātī) is that form of Rajasthani which is merging into the Western Hindi of the Midland. It is a mixed form of speech, and need not detain us further. Similarly, the southern (Mālvī) is much mixed with the neighbouring Bundēlī form of Western Hindi. The western (Mārwāṛī) spoken in Marwar and its neighbourhood, and the east-central (Jaipurī) spoken in Jaipur and its neighbourhood,

may be taken as the typical Rajasthani dialects. In the following paragraphs we shall therefore confine ourselves to Gujarati, Marwari and Jaipuri.

We know more about the ancient history of Gujarati than we do about that of any other Indo-Aryan language. The one native grammar of Apabhraṁśa Prakrit which we possess in a printed edition, was written by Hēmacandra (12th century A.D.), who lived in what is now north Gujarat, and who naturally described most fully the particular vernacular with which he was personally familiar. It was known as the Nāgara Apabhraṁśa, closely connected (as above explained) with Śaurasēnī, and was so named after the Nāgara Brahmans of the locality. These men carried on the tradition of learning inherited from Hēmacandra, and we see Gujarati almost in the act of taking birth in a work called the *Mugdhāvabōdhamauktika*, written by one of them only two hundred years after his death. Formal Gujarati literature is said to commence with the poet Narsingh Mētā in the 15th century. Rajasthani literature has received but small attention from European or native scholars, and we are as yet unable to say how far back the language goes.

Both Gujarati and Rajasthani are usually written in current scripts related to the well-known Nāgarī alphabet (see Sanskrit). The form employed in Rajputana is known all over northern India as the "Mahājanī" alphabet, being used by bankers or *Mahājans*, most of whom are Marwaris. It is noteworthy as possessing two distinct characters for *ḍ* and *ṛ*. The Gujarati character closely resembles the Kaithī character of northern India (see Bihari). The Nāgarī character is also freely used in Rajputana, and to a less extent in Gujarat, where it is employed by the Nāgara Brahmans, who claim that their tribe has given the alphabet its name.

In the following description of the main features of our two languages, the reader is presumed to be familiar with the leading facts stated in the articles Indo-Aryan Languages and Prakrit. The article Hindostani may also be perused with advantage.

(Abbreviations. Skr. = Sanskrit. Pr. = Prakrit. Ap. = Apabhraṁśa. G. = Gujarātī. R. = Rājasthānī. H. = Hindōstāanī.)

Vocabulary.—The vocabulary of both Gujarat and Rajasthani is very free from *tatsama* words. The great mass of both vocabularies is *tadbhava* (see Indo-Aryan Languages). Rajputana was from an early period brought into close contact with the Mogul court at Agra and Delhi, and even in the 13th century A.D. official documents of the Rajput princes contained many borrowed Persian and Arabic words. Gujarati, under the influence of the learned Nāgara Brahmans, has perhaps more *tatsama* words than Rajasthani, but their employment is not excessive. On the other hand, Parsees and Mussulmans employ Persian and Arabic words with great freedom; while, owing to its maritime connexions, the language has also borrowed occasional words from other parts of Asia and from Europe. This is specially marked in the strange dialect of the Kathiawar boatmen who travel all over the world as lascars on the great steamships. Their language is a mixture of Hindostani and Gujarati with a heterogeneous vocabulary.

Phonetics.—With a few exceptions to be mentioned below, the sound-system of the two languages is the same as that of Sanskrit, and is represented in the same manner in the Roman character (see Sanskrit). The simplest method for considering the subject in regard to Gujarati is to compare it with the phonetical system of Hindostani (*q.v.*). As a rule, Rajasthani closely follows Gujarati and need not be referred to except in special cases. G. invariably simplifies a medial Pr. double consonant, lengthening the preceding vowel in compensation. Thus Skr. *mrakṣaṇam*, Ap. *makkhaṇu*, H. *makkhan*, but G. *mākhaṇ*, butter. In H. this rule is generally observed, but in G. it is universal, while, on the other hand, in Panjabi the double consonant is never simplified, but is retained as in Ap. In G. (and sometimes in R.) when *a* is followed by *h* it is changed to *e*, as in H. *shahr*, G. *śeher*, a city. As in other outer languages H. *ai* and *au* are usually represented by a short *e* and by *å* (sounded like the *a* in "all") respectively. Thus H. *baiṭhā*. G. *beṭhō*, seated; H. *cauthā*, G. *cåthō* (written *cōthō*), fourth. In R. this *e* is often further weakened to the sound of *a* in "man," a change which is also common in Bengali. Many words which have *i* in H. have *a* in G. and R., thus, H. *likhē*, G. *lakhē*, he writes; H. din, G. and R. *dan*, a day. Similarly we have *a* for *u*, as in H. *tum*, G., R. *tamē*, you. In colloquial G. *ā* often becomes *å*, and *ī* becomes *ē*; thus, *påṇī* for *pāṇī*, water; *mārēs* for *mārīs*, I shall strike. As in most Indo-Aryan vernaculars an *a* after an accented syllable is very lightly pronounced, and is here represented by a small ^{a} above the line.

The Vedic cerebral *ḷ* and the cerebral *ṇ* are very common as medial letters in both G. and R. (both being unknown to literary H.). The rule is, as elsewhere in western and southern intermediate and outer languages, that when *n* and *l* represent a double *ṇṇ* (or *nn*) or a double *ll* in Pr. they are dental, but when they represent single medial letters they are cerebralized. Thus Ap. *soṇṇaũ*, G. *sōnũ*, gold; Ap. *ghaṇaũ*, G. *ghaṇũ*, dense; Ap. *callai*, G. *cālē*, he goes; Ap. *calai*, G. *caḷē*, he moves. In northern G. and in some caste dialects dental and cerebral letters are absolutely interchangeable, as in *ḍāh*^{a}*dō* or *dahāḍō*, a day; *tũ* or *ṭũ*, thou; *dīdhō* or *dīḍhō*, given. In G. and R. medial *ḍ* is pronounced as a rough cerebral *ṛ*, and is then so transcribed.

We have seen that in the Marwari alphabet there are actually distinct letters for these two sounds. In colloquial G. *c* and *ch* are pronounced *s*, especially in the north, as in *pẽs* for *pẽc*, five; *pusyō* for *puchyō*, he asked. Similarly, in the north, *j* and *jh* become *z*, as in *zāḍ* for *jhāḍ*, a tree. In some localities (as in Marathi) we have *ts* and *dz* for these sounds, as in *Tsarōtar* (name of a tract of country) for *Carōtar*. On the other hand, *k*, *kh* and *g*, especially when preceded or followed by *i*, *e* or *y*, become in the north *c*, *ch* and *j* respectively; thus, *dic^{a}rō* for *dik^{a}rō*, a son; *chētar* for *khētar*, a field; *lājyō* for *lāgyō*, begun. A similar change is found in dialectic Marathi, and is, of course, one of the commonplaces of the philology of the Romance languages. The sibilants *s* and *ś* are colloquially pronounced *h* (as in several outer languages), especially in the north. Thus *dēh* for *dēś*, a country; *hũ* for *śũ*, what; *ham^{a}jāvyō* for *sam^{a}jāvyō*, he explained. An original aspirate is, however, often dropped, as in *'ũ* for *hũ*, I; *'ātē* for *hāthē*, on the hand. Standard G. is at the same time fond of pronouncing an *h* where it is not written, as in *amē*, we, pronounced *ahmē*. In other respects both G. and R. closely agree in their phonetical systems with the Apabhraṁśa form of Śaurasēnī Prakrit from which the Midland language is derived.

Declension.—Gujarati agrees with Marathi (an outer language) as against Hindostani in retaining the neuter gender of Sanskrit and Prakrit. Moreover, the neuter gender is often employed to indicate living beings of which the sex is uncertain, as in the case of *dik^{a}rũ*, a child, compared with *dik^{a}rō*, a son, and *dik^{a}rī*, a daughter. In R. there are only sporadic instances of the neuter, which grow more and more rare as we approach the Midland. Nouns in both G. and R. may be weak or strong as is fully explained in the article Hindostani. We have there seen that the strong form of masculine nouns in Western Hindi generally ends in *au*, the *ā* of words like the Hindostani *ghōṛā*, a horse, being an accident due to the fact that the Hindostani dialect of Western Hindi borrows this termination from Panjabi. G. and R. follow Western Hindi, for their masculine strong forms end in *ō*. Feminine strong forms end in *ī* as elsewhere. Neuter strong forms in G. end in *ũ*, derived as follows: Skr, *svarṇakam*, Ap. *soṇṇaũ*, G. *sōnũ*, gold. As an example of the three genders of the same word we may take G. *chōk^{a}rō* (masc.), a boy; *chōk^{a}rī* (fem.), a girl; *chōk^{a}rũ* (neut.), a child. Long forms corresponding to the Eastern Hindi *ghoṛ^{a}wā*, a horse, are not much used, but we not infrequently meet another long form made by suffixing the pleonastic termination *ḍō* or *ṛō* (fem. *ḍī* or *ṛī*; G. neut. *ḍũ* or *ṛũ*) which is directly descended from the Ap. pleonastic termination *ḍaü*, *ḍaī*, *ḍaũ*. We come across this most often in R., where it is used contemptuously, as in *Turuk-ṛō*, a Turk.

In the article Hindostani it is shown that all the oblique cases of each number in Sanskrit and Prakrit became melted down in the modern languages into one general oblique case, which, in the Midland, is derived in the singular from the Ap. termination *-hi* or *-hĩ*, and that even this has survived only in the case of strong masculine nouns; thus, *ghōṛā*, obl. *ghōṛē*. In G. and R. this same termination has also survived, but for all nouns as the case sign of the agent and locative cases. The general oblique case is the same as the nominative, except in the case of strong masculine and neuter nouns in *ō* and *ũ* respectively, where it ends in *ā*, not *ē*. This *ā*-termination is characteristic of the outer band of languages, and is one of the survivals already referred to. It is derived from the Apabhraṁśa genitive form in *-aha*, corresponding to the Māgadhī Pr. (an outer Prakrit) termination *-āha*. Thus, G. *chōk^{a}rō*, a son; *chōk^{a}rũ*, a child; obl. sing. *chōk^{a}rā*.

In G. the nominative and oblique plural for all nouns are formed by adding *ō* to the oblique form singular, but in the neuter strong forms the oblique singular is nasalized. The real plural is the same in form as the oblique singular in the case of masculines, and as a nasalized oblique singular in the case of neuter strong forms, as in other modern Indo-Aryan vernaculars, and the added *ō* is a further plural termination (making a double plural, exactly as it does in the Ardhamāgadhī Prakrit *puttā-ō*, sons) which is often dropped. The nasalization of the strong neuter plurals is inherited from Ap., in which the neuter nom. plural of such nouns ended in *-aāĩ* In R. the nominative plural of masculine nouns is the same in form as the oblique case singular, and the oblique plural ends in *ā̃*. The feminine has *ā̃* both in the nominative and in the oblique plural. These are all explained in the article Hindostani. We thus get the following paradigms of the declension of nouns.

		Apabhraṁśa.	Gujarati.	Rajasthani.
Strong Noun Masc.—				
"A horse."	Sing. Nom.	*ghōḍaũ*	*ghōḍō*	*ghōḍō*
	Obl.	*ghōḍaaha*	*ghōḍā*	*ghōḍā*
	Ag.-Loc.	*ghōḍaahi*	*ghōḍē*, *ghōḍāē*	*ghōḍai*
	Plur. Nom.	*ghōḍaā*	*ghōḍā-ō*	*ghōḍā*
	Obl.	*ghōḍaāhā*	*ghōḍā-ō*	*ghōḍā̃*
	Ag.-Loc.	*ghōḍaahĩ*	*ghōḍā-ō-ē*	*ghōḍā̃*
Strong Noun Neut.—				
"Gold."	Sing. Nom.	*soṇṇaũ*	*sōnũ*	..
	Obl.	*soṇṇaaha*	*sōnā*	..

	Ag.-Loc.	*soṇṇaahi*	*sōnē, sōnāē*	..
	Plur. Nom.	*soṇṇaāĩ*	*sōnē*	..
	Obl.	*soṇṇaāhā*	*sōnẽ̃-ō*	..
	Ag.-Loc.	*soṇṇaahĩ*	*sōnẽ̃-ō-ē*	..
Strong Noun Fem.—				
"A mare."	Sing. Nom.	*ghōḍiā*	*ghōḍī*	*ghōḍī*
	Obl.	*ghōḍiahi*	*ghōḍī*	*ghōḍī*
	Ag.-Loc.	*ghōḍiae*	*ghōḍīē*	*ghōḍī*
	Plur. Nom.	*ghōḍiā-ō*	*ghōḍī-ō*	*ghōḍyẽ̃*
	Obl.	*ghōḍiahu*	*ghōḍī-ō*	*ghōḍyẽ̃*
	Ag.-Loc.	*ghōḍiahĩ*	*ghōḍī-ō-ē*	*ghōḍyẽ̃*
Weak Noun Masc. or Neut.—				
"A house."	Sing. Nom.	*gharu* (neut.)	*ghar*	*ghar*
	Obl.	*gharaha*	*ghar*	*ghar*
	Ag.-Loc.	*gharahi*	*gharē*	*gharai*
	Plur. Nom.	*gharāĩ*	*ghar-ō*	*ghar*
	Obl.	*gharāhā*	*ghar-ō*	*gharẽ̃*
	Ag.-Loc.	*gharahĩ*	*ghar-ō-ē*	*gharẽ̃*
Weak Noun Fem.—				
"A word."	Sing. Nom.	*vattā*	*wāt*	*bāt*
	Obl.	*vattahi*	*wāt*	*bāt*
	Ag.-Loc.	*vattae*	*wātē*	*bāt*
	Plur. Nom.	*vattā-ō*	*wāt-ō*	*bātẽ̃*
	Obl.	*vattahu*	*wāt-ō*	*bātẽ̃*
	Ag.-Loc.	*vattahĩ*	*wāt-ō-ē*	*bātẽ̃*

The general oblique case can be employed for any case except the nominative, but, in order to define the meaning, it is customary to add postpositions as in Hindostani. These are:

	Genitive.	Dative.	Ablative.	Locative.
Gujarati	*nō*	*nē*	*thī*	*mẽ̃*
Rajasthani	*rō, kō*	*nai, rai, kai*	*sū̃*	*maī*

The suffix *nō* of the genitive is believed to be a contraction of *taṇō*, which is found in old Gujarati poetry, and which, under the form *tanas* in Sanskrit and *taṇaü* in Apabhraṁśa, mean "belonging to." It is an adjective, and agrees in gender, number and case with the thing possessed. Thus, *rājā-nō dik^{a}rō*, the king's son; *rājā-nī dik^{a}rī*, the king's daughter; *rājā-nũ ghar*, the king's house; *rājā-nā dik^{a}rā-nē*, to the king's son (*nā* is in the oblique case masculine to agree with *dik^{a}rā*); *rājā-nē gharē*, in the king's house. The *rō* and *kō* of R. are similarly treated, but, of course, have no neuter. The dative postpositions are simply locatives of the genitive ones, as in all modern Indo-Aryan languages (see HINDOSTANI). *Thī*, the postposition of the G. ablative, is connected with *thawũ*, to be, one of the verbs substantive in that language. The ablative suffix is made in this way in many modern Indo-Aryan languages (*e.g.* Bengali, *q.v.*). It means literally "having been" and is to be ultimately referred to the Sanskrit root, *sthā*, stand. The derivation of the other postpositions is discussed in the article HINDOSTANI.

Strong adjectives agree with the nouns they qualify in gender, number and case, as in the examples of the genitive above. Weak adjectives are immutable.

Pronouns closely agree with those found in Hindostani. In the table on following page we give the first two personal pronouns, and the demonstrative pronoun "this."

Similarly are formed the remaining pronouns, viz. G. *ā*, R. *ũ*, he, that; G. *tē*, R. *sō* (obl. sing. *tẽ̃*), that; G. *jē*, R. *jō*, who; G. *kảṇ* (obl. *kảṇ*, *kō*, or *kē*), R. *kuṇ* (obl. *kuṇ*), who?; G. *śũ*, R. *kā̃ĩ*, what?; G., R. *kōī*, anyone, someone, *kā̃ĩ* anything, something. G. has two other demonstratives, *pēlō* and *ōlyō*, both meaning "that." The derivation of these and of *śũ* has been discussed without any decisive result. The rest are explained in the article HINDOSTANI. The reflexive pronoun is G. *āp^{a}ṇē*, R. *āpẽ̃*. It is generally employed as a plural of the first personal pronoun including the person addressed; thus G. *āp^{a}ṇē*, we (including you), but *amē*, we (excluding you). In G. *pōtē*, obl. *pōtā*, is used to mean "self."

		Apabhraṁśa.	Gujarati.	Rajasthani.
I	Nom.	*haũ*	*hũ*	*hū̃, mhū̃, maī*
	Obl.	*maĩ, mahu, majjhu*	*ma, maj*	*ma, mha, mū̃*
MY		*mahāraü*	*mārō*	*mārō, mhārō*
WE	Nom.	*amhē*	*amē*	*mhē*
	Obl.	*amhahã̃*	*am-ō*	*mhẽ̃*
OUR		*amhāraü*	*amārō*	*mhẽ̃-rō, mhẽ̃-kō*

THOU	Nom.	*tuhũ*	*tũ*	*tw̃*
	Obl.	*taĩ, tuha, tujjhu*	*ta, tuj*	*ta, tha, tw̃*
THY		*tuhāraü*	*tārō*	*thārō*
YOU	Nom.	*tumhē*	*tamē*	*thē, tamē*
	Obl.	*tumhahã*	*tam-ō*	*thẽ, tamẽ*
YOUR		*tumhāraü*	*tamārō*	*thẽ-rō, thẽ-kō*
THIS, HE	Nom.	*ēho*	*ē*	*yō*
	Obl.	(?) *ēhaha, imaha*	*ē*	*ĩ*
THESE, THEY	Nom.	*ēi*	*ē-ō*	*ē, yē*
	Obl.	*ēammi, ēhāṇa*	*em*	*iṇẽ, yẽ.*

Conjugation.—The old present has survived as in Hindostani and other Indian languages. Taking the base *call* or *caḷ*, go, as our model, we have:

		Apabhraṁśa.	Gujarati.	Rajasthani.
Sing.	1	*callaũ*	*cālũ*	*caḷw̃*
	2	*callahi*	*cālē*	*caḷai*
	3	*callai*	*cālē*	*caḷai*
Plur.	1	*callahũ*	*cālīē*	*caḷẽ*
	2	*callahu*	*cālō*	*caḷō*
	3	*callahĩ*	*cālē*	*caḷai*

The derivation of the G. 1 plural is unknown. That of the other G. and R. forms is manifest. The imperative closely follows this, but as usual has no termination in the second person singular.

In R. the future may be formed by adding *gō* (cf. Hindostani *gā*), *lō*, or *lā* to the old present. Thus, *caḷw̃-gō*, *caḷw̃-lo* or *calw̃-lā* I shall go. The *gō* and *lō* agree in gender and number with the subject, but *lā* is immutable. The termination with *l* is also found in Bhojpuri (see Bihari), in Marathi and in Nepali. For *gō* see Hindostani. Another form of the future has *s* or *h* for its characteristic letter, and is the only one employed in G. Thus, Ap. *callisaũ* or *callihaũ*, G. *cālīś*, R. (Jaipuri) *caḷ^{a}syw̃*, (Marwari) *caḷ^{a}hũ*. The other personal terminations differ considerably from those of the old present, and closely follow Ap. Thus, Ap. 3 sing. *callisai* or *callihi*, G. *cāl^{a}śē*, Marwari *caḷ^{a}hī*.

The participles and infinitive are as follows:

	Apabhraṁśa.	Gujarati.	Rajasthani.
Pres. Part. Active	*callantau*	*cāl^{a}tō*	*caḷ^{a}tō*
Past. Part. Passive	*calliau*	*cālyō*	*caḷyō*
Future Part. Passive	*calliavvau*	*cāl^{a}vō*	*caḷ^{a}bō*
Infinitive	..	*cāl^{a}vũ*	*caḷ^{a}bō*

In G. the infinitive is simply the neuter of the future passive participle. The participles are employed to form finite tenses; thus G. *hũ cāl^{a}tō*, I used to go; *hũ cālyō*, I went. If the verb is transitive (see Hindostani) the passive meaning of the past participle comes into force. The subject is put into the case of the agent, and the participle inflects to agree with the object, or, if there is no object, is employed impersonally in the neuter (in G.) or in the masculine (in R.). In Hindostani, if the object is expressed in the dative, the participle is also employed impersonally, in the masculine; thus *rājā-nē shērnī-kō mārā* (masc.), not *mārī*, (fem.), by-the-king, with reference-to-the-tigress, it-(impersonal)-was-killed, *i.e.* the king killed the tigress. But in G. and R., even if the object is in the dative, the past participle agrees with it; thus, G. *rājāē wāghaṇ-nē mārī*, by-the-king, with-reference-to-the-tigress, she-was-killed. Other examples from G. of this passive construction are *mw̃ē kahyũ*, by me it was said, I said; *tēṇē cit̤ṭhī lakhī*, by him a letter was written, he wrote a letter; *ē bāīē vag^{a}ḍā-mẽ, dahāḍā kāḍyā*, by this lady, in the wilderness, days were passed, *i.e.* she passed her days in the wilderness; *rājāē vicāryũ*, the king considered. The idiom of R. is exactly the same in these cases, except that the masculine must be used where G. has the neuter; thus, *rājāai vicāryo*. The future passive participle is construed in much the same way, but (as in Latin) the subject may be put into the dative. Thus, *mārē ā cåp^{a}dī vẽc^{a}vī, mihi ille liber (est) legendus*, I must read that book, but also *tēṇē* (agent case) *ē kām kar^{a}vũ*, by him this business is to be done.

G. also forms a past participle in *ēlō* (*cālēlō*), which is one of the many survivals of the outer language. This *-l-* participle is typical of most of the languages of the outer band, including Marathi, Oriya, Bengali, Bihari and Assamese. It is formed by the addition of the Prakrit pleonastic suffix *-illa-*, which was not used by the Prakrit of the Midland, but was common elsewhere. Compare, for instance, the Ardhamāgadhī past participle passive *āṇ-illia-*, brought.

The usual verbs substantive are as follows: G. *chũ*, R. *hữ* or *chữ*, I am, which are conjugated regularly as old presents, and G. *hatō*, R. *hō* or *chō*, was, which is a past participle, like the Hindostani (*q.v.*) *thā*. *Hữ*, *hatō* and *hō* are explained in the article on that language. *Chũ* is for Skr. *ṙcchāmi*, Ap. *acchaũ*. The use of this base is one of the outer band survivals. Even in Prakrit, it is not found (so far as the present writer is aware) in the Śaurasēnī of the Midland. Using these as auxiliaries the finite verb makes a whole series of periphrastic tenses. A present definite is formed by conjugating the old present tense (not the present participle) with the present tense of the verb substantive. Thus, G. *cālũ chũ*, I am going. A similar idiom is found in some Western Hindi dialects, but Hindostani employs the present participle; thus, *caltā hữ*. In G. and R., however, the imperfect is formed with the present participle as in H. Thus, G. *hũ cāl^{a}tō hatō*, I was going. So, as in H., we have a perfect *hũ cālyō* (or *cālēlō*) *chũ*, I have gone, and a pluperfect *hũ cālyō* (or *cālēlō*) *hatō*, I had gone. The R. periphrastic tenses are made on the same principles. With the genitive of the G. future passive participle, *cāl^{a}vā-nō*, we have a kind of gerundive, as in *hũ cāl^{a}vānō chũ*, I am to be gone, *i.e.* I am about to go; *hũ cāl^{a}vānō hatō*, I was about to go.

The same series of derivative verbs occurs in G. and R. as in H. Thus, we have a potential passive (a simple passive in G.) formed by adding *ā* to the base, as in G. *lakh^{a}vũ*, to write, *lakhāvũ*, to be written; and a causal by adding *āv* or *āḍ*, as in *lakhāv^{a}vũ*, to cause to write; *bes^{a}vũ*, to sit, *besāḍ^{a}vũ*, to seat. A new passive may be formed in G. from the causal, as in *tap^{a}vũ*, to be hot; *tapāv^{a}vũ*, to cause to be hot; to heat; *tapāvāvũ*, to be heated.

Several verbs have irregular past participles. These must be learnt from the grammars. So also the numerous compound verbs, such as (G.) *cālī śak^{a}vũ*, to be able to go; *cālī cuk^{a}vũ*, to have completed going; *cālyā kar^{a}vũ*, to be in the habit of going, and so on.

Literature.

Very little is known about the literature of Rajputana, except that it is of large extent. It includes a number of bardic chronicles of which only one has been partially edited, but the contents of which have been described by Tod in his admired *Rajasthan*. It also includes a considerable religious literature, but the whole mass of this is still in MS. From those specimens which the present writer has examined, it would appear that most of the authors wrote in Braj Bhasha, the Hindu literary dialect of Hindostani (*q.v.*) In Marwar it is an acknowledged fact that the literature falls into two branches, one called *Pingal* and couched in Braj Bhasha, and the other called *Ḍingal* and couched in Rajasthani. The most admired work in Ḍingal is the *Raghunāth Rũpak* written by Mansā Rām in the beginning of the 19th century. It is nominally a treatise on prosody, but, like many other works of the same kind, it contrives to pay a double debt, for the examples of the metres are so arranged as to form a complete epic poem celebrating the deeds of the hero Rāma.

The earliest writer of importance in Gujarati, and its most admired poet, was Narsingh Mētā, who lived in the 15th century A.D. Before him there were writers on Sanskrit grammar, rhetoric and the like, who employed an old form of Gujarati for their explanations. Narsingh does not appear to have written any considerable work, his reputation depending on his short songs, many of which exhibit much felicity of diction. He had several successors, all admittedly his inferiors. Perhaps the most noteworthy of these was Rēwā Śankar, the translator of the *Mahābhārata* (see SANSKRIT: *Literature*). A more important side of Gujarati literature is its bardic chronicles, the contents of which have been utilized by Forbes in his *Rās Mālā*. Modern Gujarati literature mostly consists of translations or imitations of English works.

AUTHORITIES.—Volume ix. of the *Linguistic Survey of India* contains a full and complete account of Gujarati and Rajasthani, including their various dialectic forms.

For Rajasthani, see S. H. Kellogg, *Grammar of the Hindi Language* (2nd ed., London, 1893). In this are described several dialects of Rajasthani. See also Rām Karṇ Śarmā, *Mārwāṛi Vyākaraṇa* (Jodhpur, 1901) (a Marwari grammar written in that language), and G. Macalister, *Specimens of the Dialects spoken in the State of Jaipur* (contains specimens, vocabularies and grammars) (Allahabad, 1898).

For Gujarati, there are numerous grammars, amongst which we may note W. St C. Tisdall, *Simplified Grammar of the Gujarati Language* (London, 1892) and (the most complete) G. P. Taylor, *The Student's Gujarati Grammar* (2nd ed., Bombay, 1908). As for dictionaries, the most authoritative is the *Narma-kōś* of Narmadā Śankar (Bhaunagar and Surat, 1873), in Gujarati throughout. For English readers we may mention Shahpurji Edalji's (2nd ed., Bombay, 1868), the introduction to which contains an account of Gujarati literature by J. Glasgow, Belsare's (Ahmedabad, 1895), and Karbhari's (Ahmedabad, 1899).

(G. A. GR.)

GUJRANWALA, a town and district of British India, in the Lahore division of the Punjab. The town is situated 40 m. N. of Lahore by rail. It is of modern growth, and owes its importance to the father and grandfather of Maharaja Ranjit Singh, whose capital it formed during the early period of the Sikh power. Pop. (1901) 29,224. There are manufactures of brass-ware, jewellery, and silk and cotton scarves.

The DISTRICT comprises an area of 3198 sq. m. In 1901 the population was 756,797, showing an increase of 29% in the decade. The district is divided between a low alluvial tract along the rivers Chenab and Degh and the upland between them, which forms the central portion of the Rechna Doab, intermediate between the fertile submontane plains of Sialkot and the desert expanses of Jhang. Part of the upland tract has been brought under cultivation by the Chenab canal. The country is very bare of trees, and the scenery throughout is tame and in the central plateau becomes monotonous. It seems likely that the district once contained the capital of the Punjab, at an epoch when Lahore had not begun to exist. We learn from the Chinese Buddhist pilgrim, Hsuan Tsang, that about the year 630 he visited a town known as Tse-kia (or Taki), the metropolis of the whole country of the five rivers. A mound near the modern village of Asarur has been identified as the site of the ancient capital. Until the Mahommedan invasions little is known of Gujranwala, except that Taki had fallen into oblivion and Lahore had become the chief city. Under Mahommedan rule the district flourished for a time; but a mysterious depopulation fell upon the tract, and the whole region seems to have been almost entirely abandoned. On the rise of Sikh power, the waste plains of Gujranwala were seized by various military adventurers. Charat Singh took-possession of the village of Gujranwala, and here his grandson the great Maharaja Ranjit Singh was born. The Sikh rule, which was elsewhere so disastrous, appears to have been an unmitigated benefit to this district. Ranjit Singh settled large colonies in the various villages, and encouraged cultivation throughout the depopulated plain. In 1847 the district came under British influence in connexion with the regency at Lahore; and in 1849 it was included in the territory annexed after the second Sikh war. A large export trade is carried on in cotton, wheat and other grains. The district is served by the main line and branches of the North-Western railway.

GUJRAT, a town and district of British India, in the Rawalpindi division of the Punjab, lying on the south-western border of Kashmir. The town stands about 5 m. from the right bank of the river Chenab, 70 m. N. of Lahore by rail. Pop. (1901) 19,410. It is built upon an ancient site, formerly occupied, according to tradition, by two successive cities, the second of which is supposed to have been destroyed in 1303, the year of a Mongol invasion. More than 200 years later either Sher Shah or Akbar founded the existing town. Though standing in the midst of a Jat neighbourhood, the fort was first garrisoned by Gujars, and took the name of Gujrat. Akbar's fort, largely improved by Gujar Singh, stands in the centre of the town. The neighbouring shrine of the saint Shah Daula serves as a kind of native asylum for lunatics. The town has manufactures of furniture, inlaid work in gold and iron, brass-ware, boots, cotton goods and shawls.

The DISTRICT OF GUJRAT comprises a narrow wedge of sub-Himalayan plain country, possessing few natural advantages. From the basin of the Chenab on the south the general level rises rapidly towards the interior, which, owing to the great distance of the water beneath the surface, assumes a dreary and desert aspect. A range of low hills, known as the Pabbi, traverses the northern angle of Gujrat. They are composed of a friable Tertiary sandstone and conglomerate, destitute of vegetation, and presenting a mere barren chaos of naked rock, deeply scored with precipitous ravines. Immediately below the Pabbi stretches a high plateau, terminating abruptly in a precipitous bluff some 200 ft. in height. At the foot of this plateau is a plain, which forms the actual valley of the Chenab and participates in the irrigation from the river bed.

Numerous relics of antiquity stud the surface of the district. Mounds of ancient construction yield early coins, and bricks are found whose size and type prove them to belong to the prehistoric period. A mound now occupied by the village of Moga or Mong has been identified as the site of Nicaea, the city built by Alexander the Great on the field of his victory over Porus. The Delhi empire established its authority in this district under Bahlol Lodi (1451-1489). A century later it was visited by Akbar, who founded Gujrat as the seat of government. During the decay of the Mogul power, the Ghakkars of Rawalpindi overran this portion of the Punjab and established themselves in Gujrat about 1741. Meanwhile the Sikh power had been asserting itself in the eastern Punjab, and in 1765 the Ghakkar chief was defeated by Sirdar

Gujar Singh, chief of the Bhangi confederacy. On his death, his son succeeded him, but after a few months' warfare, in 1798, he submitted himself as vassal to the Maharaja Ranjit Singh. In 1846 Gujrat first came under the supervision of British officials. Two years later the district became the theatre for the important engagements which decided the event of the second Sikh war. After several bloody battles in which the British were unsuccessful, the Sikh power was irretrievably broken at the engagement which took place at Gujrat on the 22nd of February 1849. The Punjab then passed by annexation under British rule.

The district comprises an area of 2051 sq. m. In 1901 the population was 750,548, showing a decrease of 1%, compared with an increase of 10% in the previous decade. The district has a large export trade in wheat and other grains, oil, wool, cotton and hides. The main line and the Sind-Sagar branch of the North-Western railway traverse it.

GULA, a Babylonian goddess, the consort of Ninib. She is identical with another goddess, known as Bau, though it would seem that the two were originally independent. The name Bau is more common in the oldest period and gives way in the post-Khammurabic age to Gula. Since it is probable that Ninib (*q.v.*) has absorbed the cults of minor sun-deities, the two names may represent consorts of different gods. However this may be, the qualities of both are alike, and the two occur as synonymous designations of Ninib's female consort. Other names borne by this goddess are Nin-Karrak, Ga-tum-dug and Nin-din-dug, the latter signifying "the lady who restores to life." The designation well emphasizes the chief trait of Bau-Gula which is that of healer. She is often spoken of as "the great physician," and accordingly plays a specially prominent rôle in incantations and incantation rituals intended to relieve those suffering from disease. She is, however, also invoked to curse those who trample upon the rights of rulers or those who do wrong with poisonous potions. As in the case of Ninib, the cult of Bau-Gula is prominent in Shirgulla and in Nippur. While generally in close association with her consort, she is also invoked by herself, and thus retains a larger measure of independence than most of the goddesses of Babylonia and Assyria. She appears in a prominent position on the designs accompanying the Kudurrus boundary-stone monuments of Babylonia, being represented by a statue, when other gods and goddesses are merely pictured by their shrines, by sacred animals or by weapons. In neo-Babylonian days her cult continues to occupy a prominent position, and Nebuchadrezzar II. speaks of no less than three chapels or shrines within the sacred precincts of E-Zida in the city of Borsippa, besides a temple in her honour at Babylon.

(M. Ja.)

GULBARGA, an ancient city of India, situated in the Nizam's dominions, 70 m. S.E. of Sholapur. Pop. (1901) 29,228. Originally a Hindu city, it was made the capital of the Bahmani kings when that dynasty established their independence in the Deccan in 1347, and it remained such until 1422. The palaces, mosques and tombs of these kings still stand half-ruined. The most notable building is a mosque modelled after that of Cordova in Spain, covering an area of 38,000 sq. ft., which is almost unique in India as being entirely covered in. Since the opening of a station on the Great India Peninsula railway, Gulbarga has become a centre of trade, with cotton-spinning and weaving mills. It is also the headquarters of a district and division of the same name. The district, as recently reconstituted, has an area of 6004 sq. m.; pop. (1901), 1,041,067.

GULF STREAM,[1] the name properly applied to the stream current which issues from the Gulf of Mexico and flows north-eastward, following the eastern coast of North America, and separated from it by a narrow strip of cold water (the *Cold Wall*), to a point east of the Grand Banks off Newfoundland. The Gulf Stream is a narrow, deep current, and its velocity is

estimated at about 80 m. a day. It is joined by, and often indistinguishable from, a large body of water which comes from outside the West Indies and follows the same course. The term was formerly applied to the drift current which carries the mixed waters of the Gulf Stream and the Labrador current eastwards across the Atlantic. This is now usually known as the “Gulf Stream drift,” although the name is not altogether appropriate. See Atlantic.

1 The word “gulf,” a portion of the sea partially enclosed by the coast-line, and usually taken as referring to a tract of water larger than a bay and smaller than a sea, is derived through the Fr. *golfe*, from Late Gr. κόλφος, class. Gr. κόλπος, bosom, hence bay, cf. Lat. sinus. In University slang, the term is used of the position of those who fail to obtain a place in the honours list at a public examination, but are allowed a “pass.”

GULFWEED, in botany, a popular name for the seaweed *Sargassum bacciferum*, one of the brown seaweeds (Phaeophyceae), large quantities of which are found floating in the Gulf of Mexico, whence it is carried northwards by the Gulf Stream, small portions sometimes being borne as far as the coasts of the British Isles. It was observed by Columbus, and is remarkable among seaweeds for its form, which resembles branches bearing leaves and berries; the latter, to which the species-name *bacciferum* refers, are hollow floats answering the same purpose as the bladders in another brown seaweed, *Fucus vesiculosus*, which is common round the British Isles between high and low water.

GULL, SIR WILLIAM WITHEY, 1st Bart. (1816-1890), English physician, was the youngest son of John Gull, a barge-owner and wharfinger of Thorpe-le-Soken, Essex, and was born on the 31st of December 1816 at Colchester. He began life as a schoolmaster, but in 1837 Benjamin Harrison, the treasurer of Guy’s Hospital, who had noticed his ability, brought him up to London from the school at Lewes where he was usher, and gave him employment at the hospital, where he also gained permission to attend the lectures. In 1843 he was made a lecturer in the medical school of the hospital, in 1851 he was chosen an assistant physician, and in 1856 he became full physician. In 1847 he was elected Fullerian professor of physiology in the Royal Institution, retaining the post for the usual three years, and in 1848 he delivered the Gulstonian Lectures at the College of Physicians, where he filled every office of honour but that of president. He died in London on the 29th of January 1890 after a series of paralytic strokes, the first of which had occurred nearly three years previously. He was created a baronet in 1872, in recognition of the skill and care he had shown in attending the prince of Wales during his attack of typhoid in 1871. Sir William Gull’s fame rested mainly on his success as a clinical practitioner; as he said himself, he was “a clinical physician or nothing.” This success must be largely ascribed to his remarkable powers of observation, and to the great opportunities he enjoyed for gaining experience of disease. He was sometimes accused of being a disbeliever in drugs. That was not the case, for he prescribed drugs like other physicians when he considered them likely to be beneficial. He felt, however, that their administration was only a part of the physician’s duties, and his mental honesty and outspokenness prevented him from deluding either himself or his patients with unwarranted notions of what they can do. But though he regarded medicine as primarily an art for the relief of physical suffering, he was far from disregarding the scientific side of his profession, and he made some real contributions to medical science. His papers were printed chiefly in *Guy’s Hospital Reports* and in the proceedings of learned societies: among the subjects he wrote about were cholera, rheumatic fever, taenia, paraplegia and abscess of the brain, while he distinguished for the first time (1873) the disease now known as myxoedema, describing it as a “cretinoid state in adults.”

GULL (Welsh *gwylan*, Breton, *goelann*, whence Fr. *goêland*), the name commonly adopted,

to the almost entire exclusion of the O. Eng. Mew (Icel. *máfur*, Dan. *maage*, Swedish *måse*, Ger. *Meve*, Dutch *meeuw*, Fr. *mouette*), for a group of sea-birds widely and commonly known, all belonging to the genus *Larus* of Linnaeus, which subsequent systematists have broken up in a very arbitrary and often absurd fashion. The family *Laridae* is composed of two chief groups, *Larinae* and *Sterninae*—the gulls and the terns, though two other subfamilies are frequently counted, the skuas (*Stercorariinae*), and that formed by the single genus *Rhynchops*, the skimmers; but there seems no strong reason why the former should not be referred to the *Larinae* and the latter to the *Sterninae*.

Taking the gulls in their restricted sense, Howard Saunders, who has subjected the group to a rigorous revision (*Proc. Zool. Society*, 1878, pp. 155-211), admits forty-nine species of them, which he places in five genera instead of the many which some prior investigators had sought to establish. Of the genera recognized by him, *Pagophila* and *Rhodostethia* have but one species each, *Rissa* and *Xema* two, while the rest belong to *Larus*. The *Pagophila* is the so-called ivory-gull, *P. eburnea*, names which hardly do justice to the extreme whiteness of its plumage, to which its jet-black legs offer a strong contrast. The young, however, are spotted with black. An inhabitant of the most northern seas, examples, most commonly young birds of the year, find their way in winter to more temperate shores. Its breeding-place has seldom been discovered, and the first of its eggs ever seen by ornithologists was brought home by Sir L. M'Clintock in 1853 from Cape Krabbe (*Journ. R. Dubl. Society*, i. 60, pl. 1); others were subsequently obtained by Dr Malmgren in Spitsbergen. Of the species of *Rissa*, one is the abundant and well-known kittiwake, *R. tridactyla*, of circumpolar range, breeding, however, also in comparatively low latitudes, as on the coasts of Britain, and in winter frequenting southern waters. The other is *R. brevirostris*, limited to the North Pacific, between Alaska and Kamchatka. The singular fact requires to be noticed that in both these species the hind toe is generally deficient, but that examples of each are occasionally found in which this functionless member has not wholly disappeared. We have then the genus *Larus*, which ornithologists have attempted most unsuccessfully to subdivide. It contains the largest as well as the smallest of gulls. In some species the adults assume a dark-coloured head every breeding-season, in others any trace of dark colour is the mark of immaturity. The larger species prey fiercely on other kinds of birds, while the smaller content themselves with a diet of small animals, often insects and worms. But however diverse be the appearance, structure or habits of the extremities of the series of species, they are so closely connected by intermediate forms that it is hard to find a gap between them that would justify a generic division. Forty-three species of this genus are recognized by Saunders. About fifteen belong to Europe and fourteen to North America, of which (excluding stragglers) some five only are common to both countries. Our knowledge of the geographical distribution of several of them is still incomplete. Some have a very wide range, others very much the reverse, as witness *L. fuliginosus*, believed to be confined to the Galapagos, and *L. scopulinus* and *L. bulleri* to New Zealand,—the last indeed perhaps only to the South Island. The largest species of the group are the glaucous gull and greater black-backed gull, *L. glaucus* and *L. marinus*, of which the former is circumpolar, and the latter nearly so—not being hitherto found between Labrador and Japan. The smallest species is the European *L. minutus*, though the North American *L. Philadelphia* does not much exceed it in size. Many of the gulls congregate in vast numbers to breed, whether on rocky cliffs of the sea-coast or on healthy islands in inland waters. Some of the settlements of the 715
black-headed or "peewit" gull, *L. ridibundus*, are a source of no small profit to their proprietors,—the eggs, which are rightly accounted a great delicacy, being taken on an orderly system up to a certain day, and the birds carefully protected. Ross's or the roseate gull, *Rhodostethia rosea*, forms a well-marked genus, distinguished not so much by the pink tint of its plumage (for that is found in other species) but by its small dove-like bill and wedge-shaped tail. It is an exceedingly scarce bird, and beyond its having an Arctic habitat, little has yet been ascertained about it. More rare still is one of the species of *Xema*, *X. furcatum*, of which only two specimens, both believed to have come from the Galapagos, have been seen. Its smaller congener Sabine's gull, *X. sabinii*, is more common, and has been found breeding both in Arctic America and in Siberia, and several examples, chiefly immature birds, have been obtained in the British islands. Both species of *Xema* are readily distinguished from all other gulls by their forked tails.

(A. N.)

GULLY, JOHN (1783-1863), English sportsman and politician, was born at Wick, near Bath, on the 21st of August 1783, the son of an innkeeper. He came into prominence as a boxer, and in 1805 he was matched against Henry Pearce, the "Game Chicken," before the duke of

Clarence (afterwards William IV.) and numerous other spectators, and after fighting sixty-four rounds, which occupied an hour and seventeen minutes, was beaten. In 1807 he twice fought Bob Gregson, the Lancashire giant, for two hundred guineas a side, winning on both occasions. As the landlord of the "Plough" tavern in Carey Street, London, be retired from the ring in 1808, and took to horse-racing. In 1827 he lost £40,000 by backing his horse "Mameluke" (for which he had paid four thousand guineas) for the St Leger. In partnership with Robert Ridskale, in 1832, he made £85,000 by winning the Derby and St Leger with "St Giles" and "Margrave." In partnership with John Day he won the Two Thousand Guineas with "Ugly Buck" in 1844, and two years later he took the Derby and the Oaks with "Pyrrhus the First" and "Mendicant," in 1854 the Two Thousand Guineas with "Hermit," and in the same year, in partnership with Henry Padwick, the Derby with "Andover." Having bought Ackworth Park near Pontefract he was M.P. from December 1832 to July 1837. In 1862 he purchased the Wingate Grange estate and collieries. Gully was twice married and had twelve children by each wife. He died at Durham on the 9th of March 1863. He appears to have been no relation of the subsequent Speaker, Lord Selby.

GULPÁÏGÁN (*Jerbádegán* of the Arab geographers), a district and city in Central Persia, situated N.W. of Isfahán and S.E. of Irák. Together with Khunsár it forms a small province, paying a yearly revenue of about £6000. The city of Gulpáïgán is situated 87 m. N.W. of Isfahán, at an elevation of 5875 ft. in 33° 24′ N. and 50° 20′ E., and has a population of about 5000. The district is fertile and produces much grain and some opium. Sometimes it is under the governor-general of the Isfahán province, at others it forms part of the province of Irák, and at times, as in 1906, is under a governor appointed from Teheran.

GUM (Fr. *gomme*, Lat. *gommi*, Gr. κόμμι, possibly a Coptic word; distinguish "gum," the fleshy covering of the base of a tooth, in O. Eng. *góma*, palate, cf. Ger. *Gaumen*, roof of the mouth; the ultimate origin is probably the root *gha*, to open wide, seen in Gr. χαίνειν, to gape, cf. "yawn"), the generic name given to a group of amorphous carbo-hydrates of the general formula $(C_6H_{10}O_5)_n$, which exist in the juices of almost all plants, and also occur as exudations from stems, branches and fruits of plants. They are entirely soluble or soften in water, and form with it a thick glutinous liquid or mucilage. They yield mucic and oxalic acids when treated with nitric acid. In structure the gums are quite amorphous, being neither organized like starch nor crystallized like sugar. They are odourless and tasteless, and some yield clear aqueous solutions—the real gums—while others swell up and will not percolate filter paper—the vegetable mucilages. The acacias and the Rosaceae yield their gums most abundantly when sickly and in an abnormal state, caused by a fulness of sap in the young tissues, whereby the new cells are softened and finally disorganized; the cavities thus formed fill with liquid, which exudes, dries and constitutes the gum.

Gum arabic may be taken as the type of the gums entirely soluble in water. Another variety, obtained from the *Prosopis dulcis*, a leguminous plant, is called gum mesquite or mezquite; it comes from western Texas and Mexico, and is yellowish in colour, very brittle and quite soluble in water.

> Gum arabic occurs in pieces of varying size, and some kinds are full of minute cracks. The specific gravity of Turkey picked gum (the purest variety) is 1.487, or, when dried at 100° C., 1.525. It is soluble in water to an indefinite extent; boiled with dilute sulphuric acid it is converted into the sugar galactose. Moderately strong nitric acid changes it into mucic, saccharic, tartaric and oxalic acids. Under the influence of yeast it does not enter into the alcoholic fermentation, but M. P. E. Berthelot, by digesting with chalk and cheese, obtained from it 12% of its weight of alcohol, along with calcium lactate, but no appreciable quantity of sugar. Gum arabic may be regarded as a potassium and calcium salt of gummic or arabic acid. T. Graham (*Chemical and Physical Researches*) recommended dialysis as the best mode of preparing gummic acid, and stated that the power of gum to penetrate the parchment septum is 400 times less than that of sodium chloride, and, further, that by mixing the gum with substances of the crystalloid class the diffusibility is lowered, and may be even reduced to nothing. The mucilage must be acidulated with hydrochloric acid before dialysing, to set free

the gummic acid. By adding alcohol to the solution, the acid is precipitated as a white amorphous mass, which becomes glassy at 100°. Its formula is $(C_6H_{10}O_5)_2H_2O$, and it forms compounds with nearly all bases which are easily soluble in water. Gummic acid reddens litmus, its reaction being about equal to carbonic acid. When solutions of gum arabic and gelatin are mixed, oily drops of a compound of the two are precipitated, which on standing form a nearly colourless jelly, melting at 25° C., or by the heat of the hand. This substance can be washed without decomposition. Gummic acid is soluble in water; when well dried at 100° C., it becomes transformed into metagummic acid, which is insoluble, but swells up in water like gum tragacanth.

Gum arabic, when heated to 150° C. with two parts of acetic anhydride, swells up to a mass which, when washed with boiling water, and then with alcohol, gives a white amorphous insoluble powder called acetyl arabin $C_6H_8(C_2H_3O)_2O_5$. It is saponified by alkalies, with reproduction of soluble gum. Gum arabic is not precipitated from solution by alum, stannous chloride, sulphate or nitrate of copper, or neutral lead acetate; with basic lead acetate it forms a white jelly, with ferric chloride it yields a stiff clear gelatinoid mass, and its solutions are also precipitated by borax.

The finer varieties are used as an emollient and demulcent in medicine, and in the manufacture of confectionery; the commoner qualities are used as an adhesive paste, for giving lustre to crape, silk, &c., in cloth finishing to stiffen the fibres, and in calico-printing. For labels, &c., it is usual to mix sugar or glycerin with it to prevent it from cracking.

Gum senegal, a variety of gum arabic produced by *Acacia Verek*, occurs in pieces generally rounded, of the size of a pigeon’s egg, and of a reddish or yellow colour, and specific gravity 1.436. It gives with water a somewhat stronger mucilage than gum arabic, from which it is distinguished by its clear interior, fewer cracks and greater toughness. It is imported from the river Gambia, and from Senegal and Bathurst.

Chagual gum, a variety brought from Santiago, Chile, resembles gum senegal. About 75% is soluble in water. Its solution is not thickened by borax, and is precipitated by neutral lead acetate; and dilute sulphuric acid converts it into *d*-glucose.

Gum tragacanth, familiarly called gum dragon, exudes from the stem, the lower part especially, of the various species of *Astragalus*, especially *A. gummifer*, and is collected in Asia Minor, the chief port of shipment being Smyrna. Formerly only what exuded spontaneously was gathered; this was often of a brownish colour; but now the flow of the gum is aided by incisions cut near the root, and the product is the fine, white, flaky variety so much valued in commerce. The chief flow of gum takes place during the night, and hot and dry weather is the most favourable for its production.

In colour gum tragacanth is of a dull white; it occurs in horny, flexible and tough, thin, twisted flakes, translucent, and with peculiar wavy lines on the surface. When dried at temperatures under 100° C. it loses about 14% of water, and is then easily powdered. Its specific gravity is 1.384. With water it swells by absorption, and with even fifty times its weight of that liquid forms a thick mucilage. Part of it only is soluble in water, and that resembles gummic acid in being precipitated by alcohol and ammonium oxalate, but differs from it in giving a precipitate with neutral lead acetate and none with borax. The insoluble part of the gum is a calcium salt of bassorin $(C_{12}H_{20}O_{10})$, which is devoid of taste and smell, forms a gelatinoid mass with water, but by continued boiling is rendered soluble.

Gum tragacanth is used in calico-printing as a thickener of colours and mordants; in medicine as a demulcent and vehicle for insoluble powders, and as an excipient in pills; and for setting and mending beetles and other insect specimens. It is medicinally superior to gum acacia, as it does not undergo acetous fermentation. The best pharmacopeial preparation is the *Mucilago Tragacanthae*. The compound powder is a useless preparation, as the starch it contains is very liable to ferment.

Gum kuteera resembles in appearance gum tragacanth, for which the attempt has occasionally been made to substitute it. It is said to be the product of *Sterculia urens*, a plant of the natural order Sterculiaceae.

Cherry tree gum is an exudation from trees of the genera *Prunus* and *Cerasus*. It occurs in shiny reddish lumps, resembling the commoner kinds of gum arabic. With water, in which it is only partially soluble, it forms a thick mucilage. Sulphuric acid converts it into l-arabinose; and nitric acid oxidizes it to oxalic acid (without the intermediate formation of mucic acid as in the case of gum arabic).

Gum of Bassora, from Bassora or Bussorah in Asia, is sometimes imported into the London market under the name of the hog tragacanth. It is insipid, crackles between the teeth, occurs in variable-sized pieces, is tough, of a yellowish-white colour, and opaque, and has properties

similar to gum tragacanth. Its specific gravity is 1.36. It contains only 1% of soluble gum or arabin. Under the name of Caramania gum it is mixed with inferior kinds of gum tragacanth before exportation.

Mucilage.—Very many seeds, roots, &c., when infused in boiling water, yield mucilages which, for the most part, consist of bassorin. Linseed, quince seed and marshmallow root yield it in large quantity. In their reactions the different kinds of mucilage present differences; *e.g.* quince seed yields only oxalic acid when treated with nitric acid, and with a solution of iodine in zinc iodide it gives, after some time, a beautiful red tint. Linseed does not give the latter reaction; by treatment with boiling nitric acid it yields mucic and oxalic acids.

Gum Resins.—This term is applied to the inspissated milky juices of certain plants, which consist of gum soluble in water, resin and essential oil soluble in alcohol, other vegetable matter and a small amount of mineral matter. They are generally opaque and solid, and often brittle. When finely powdered and rubbed down with water they form emulsions, the undissolved resin being suspended in the gum solution. Their chief uses are in medicine. Examples are ammoniacum, asafetida, bdellium, euphorbium, gamboge, myrrh, sagapanum and scammony.

GÜMBEL, KARL WILHELM VON, Baron (1823-1898), German geologist, was born at Dannenfels, in the Palatinate of the Rhine, on the 11th of February 1823, and is known chiefly by his researches on the geology of Bavaria. He received a practical and scientific education in mining at Munich and Heidelberg, taking the degree of Ph.D. at Munich in 1862; and he was engaged for a time at the colliery of St Ingbert and as a surveyor in that district. In 1851, when the Geological Survey of Bavaria was instituted, Gümbel was appointed chief geologist; in 1863 he was made honorary professor of geognosy and surveying at the university of Munich, and in 1879, Oberberg director of the Bavarian mining department with which the Geological Survey was incorporated. His geological map of Bavaria appeared in 1858, and the official memoir descriptive of the detailed work, entitled *Geognostische Beschreibung des Königreichs Bayern* was issued in three parts (1861, 1868 and 1879). He subsequently published his *Geologie von Bayern* in 2 vols. (1884-1894), an elaborate treatise on geology, with special reference to the geology of Bavaria. In the course of his long and active career he engaged in much palaeontological work: he studied the fauna of the Trias, and in 1861 introduced the term Rhaetic for the uppermost division of that system; he supported at first the view of the organic nature of *Eozoon* (1866 and 1876), he devoted special attention to Foraminifera, and described those of the Eocene strata of the northern Alps (1868); he dealt also with Receptaculites (1875) which he regarded as a genus belonging to the Foraminifera. He died on the 18th of June 1898.

GUMBINNEN, a town of Germany, in the Prussian province of East Prussia, on the Pissa, an affluent of the Pregel, 22 m. by rail S.W. of Eydtkuhnen on the line to Königsberg. Pop. (1905), 14,194. The surrounding country is pleasant and fruitful, and the town has spacious and regular streets shaded by linden trees. It has a Roman Catholic and three Evangelical churches, a synagogue, a gymnasium, two public schools, a public library, a hospital and an infirmary. In the market square there is a statue of the king of Prussia Frederick William I., who in 1724 raised Gumbinnen to the rank of a town, and in 1732 brought to it a number of persons who had been driven from Salzburg by religious persecution. On the bridge over the Pissa a monument has been erected to the soldiers from the neighbourhood who fell in the Franco-German war of 1870-71. Iron founding and the manufacture of machinery, wool, cotton, and linen weaving, stocking-making, tanning, brewing and distilling are the principal industries. There are horse and cattle markets, and some trade in corn and linseed.

See J. Schneider, *Aus Gumbinnens Vergangenheit* (Gumbinnen, 1904).

GUMBO, or Okra, termed also *Okro, Ochro, Ketmia, Gubbo* and Syrian mallow (Sans. *Tindisa*, Bengali *Dheras*, Pers. *Bámiyah*—the *Bammia* of Prosper Alpinus; Fr. *Gombaut*, or better *Gombo*, and *Ketmie comestible*), *Hibiscus esculentus*, a herbaceous hairy annual plant of the natural order *Malvaceae*, probably of African origin, and now naturalized or cultivated in all tropical countries. The leaves are cordate, and 3 to 5-lobed, and the flowers yellow, with a crimson centre; the fruit or pod, the *Bendi-Kai* of the Europeans of southern India, is a tapering, 10-angled capsule, 4 to 10 in. in length, except in the dwarf varieties of the plant, and contains numerous oval dark-coloured seeds, hairy at the base. Three distinct varieties of the gumbo (*Quiabo* and *Quimgombo*) in Brazil have been described by Pacheco. The unripe fruit is eaten either pickled or prepared like asparagus. It is also an ingredient in various dishes, *e.g.* the *gumbo* of the Southern United States and the *calalou* of Jamaica; and on account of the large amount of mucilage it contains, it is extensively consumed, both fresh and in the form of the prepared powder, for the thickening of broths and soups. For winter use it is salted or sliced and dried. The fruit is grown on a very large scale in the vicinity of Constantinople. It was one of the esculents of Egypt in the time of Abul-Abbas el-Nebāti, who journeyed to Alexandria in 1216 (Wüstenfeld, *Gesch. d. arab. Ärzte*, p. 118, Gött., 1840), and is still cultivated by the Egyptians, who called it *Bammgé*.

The seeds of the gumbo are used as a substitute for coffee. From their demulcent and emollient properties, the leaves and immature fruit have long been in repute in the East for the preparation of poultices and fomentations. Alpinus (1592) mentions the employment of their decoction in Egypt in ophthalmia and in uterine and other complaints.

The musk okra (Sans., *Latákasturiká*, cf. the Gr. κάστωρ; Bengali, *Latákasturi*; Ger. *Bisamkörnerstrauch*; Fr. *Ketmie musquée*), *Hibiscus Abelmoschus* (*Abelmoschus moschatus*), indigenous to India, and cultivated in most warm regions of the globe, is a suffruticose plant, bearing a conical 5-ridged pod about 3 in. in length, within which are numerous brown reniform seeds, smaller than those of *H. esculentus.* The seeds possess a musky odour, due to an oleo-resin present in the integument, and are known to perfumers under the name of *ambrette* as a substitute for musk. They are said to be used by the Arabs for scenting coffee. The seeds (in the Fantee language, *Incromahom*) are used in Africa as beads; and powdered and steeped in rum they are valued in the West Indies as a remedy for snakebites. The plant yields an excellent fibre, and, being rich in mucilage, is employed in Upper India for the clarifying of sugar. The best-perfumed seeds are reported to come from Martinique.

See P. Alpinus, *De plantis Aegypti*, cap. xxvii. p. 38 (Venice, 1592); J. Sontheimer's *Abd Allah ibn Ahmad*, &c., i. 118 (Stuttgart, 1840-1842); P. P. Pacheco, "La Ketmie potagère ou comestible," *La Belgique horticole*, iv. 63 (1853); Della Sudda, "De l'emploi à Constantinople de la racine de l'Hibiscus esculentus," *Répert. de pharm.*, January 1860, p. 229; E. J. Waring, *Pharm. of India*, p. 35 (1868); O. Popp, "Über die Aschenbestandteile der Samen von Acacia nilotica und Hibiscus esculentus in Ägypten," *Arch. der Pharm.* cxcv. p. 140 (1871); Drury, *The Useful Plants of India*, pp. 1, 2 (2nd ed., 1873); U. C. Dutt, *The Mat. Med. of the Hindus*, pp. 123, 321 (1877); Lanessan, *Hist. des drogues*, i. 181-184 (1878); G. Watt, *Dictionary of the Economic Products of India* (1890).

GUMTI, a river of northern India. It rises in a depression in the Pilibhit district of the United Provinces, and after a sinuous but generally south-easterly course of 500 m. past Lucknow and Jaunpur joins the Ganges in Ghazipar district. At Jaunpur it is a fine stream, spanned by a 16th-century bridge of sixteen arches, and is navigable by vessels of 17 tons burden. There is also a small river of the same name in the Tippera district of eastern Bengal and Assam.

GUMULJINA, or Gumurdjina, a town of European Turkey, in the vilayet of Adrianople. Pop. (1905), about 8000, of whom three-fourths are Turks and the remainder Greeks, Jews or Armenians. Gumuljina is situated on the river Karaja-Su, south of the eastern extremity of the Rhodope range of mountains and 13 m. inland from the Aegean Sea. It has a station on the railway between Salonica and Dédéagatch. The district produces wheat, maize, barley and tobacco; sericulture and viticulture are both practised on a limited scale. A cattle fair is held annually on Greek Palm Sunday. Copper and antimony are found in the neighbourhood.

GUMUS, or Gumz, Negroes of the Shangalla group of tribes, dwelling in the mountainous district of Fazogli on the Sudan-Abyssinian frontier. They live in independent groups, some being mountaineers while others are settled on the banks of the Blue Nile. Gumz in the native tongue signifies “people,” and the sub-tribes have distinctive names. The Gumus are nature-worshippers, God and the sun being synonymous. On ceremonial occasions they carry parasols of honour (see Shangalla).

GÜMÜSH-KHANEH, the chief town of a sanjak of the same name in the Trebizond vilayet of Asiatic Turkey, situated on high ground (4400 ft.) in the valley of the Kharshut Su, about ½ m. to south of the Trebizond-Erzerum *chaussée*. The silver mines from which the place takes its name were noted in ancient times and are mentioned by Marco Polo. Pop. about 3000, chiefly Greeks, who are in the habit of emigrating to great distances to work in mines. They practically supply the whole lead and silver-mining labour in Asiatic Turkey, and in consequence the Greek bishop of Gümüsh-Khaneh has under his jurisdiction all the communities engaged in this particular class of mines.

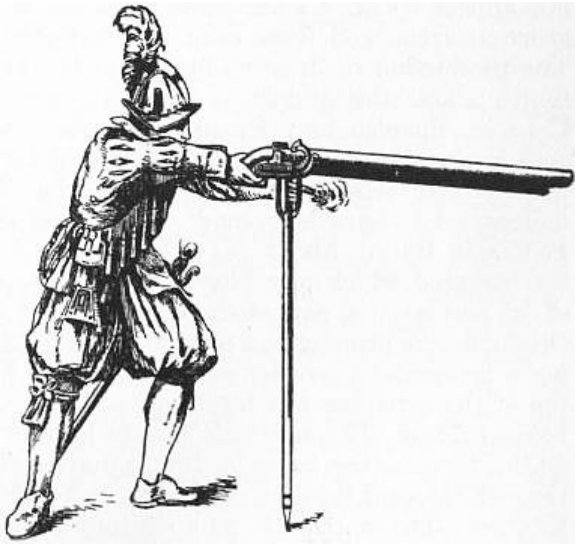
GUN, a general term for a weapon, tubular in form, from which a projectile is discharged by means of an explosive. When applied to artillery the word is confined to those pieces of ordnance which have a direct as opposed to a high-angle fire, in which case the terms “howitzer” and “mortar” are used (see Ordnance and Machine-Gun). “Gun” as applied to firearms which are carried in the hand and fired from the shoulder, the old “hand gun,” is now chiefly used of the sporting shot-gun, with which this article mainly deals; in military usage this type of weapon, whether rifle, carbine, &c., is known collectively as “small arms” (see Rifle and Pistol). The origin of the word, which in Mid. Eng. is *gonne* or *gunne*, is obscure, but it has been suggested by Professor W. W. Skeat that it conceals a female name, *Gunnilde* or *Gunhilda*. The names, *e.g.* Mons Meg at Edinburgh Castle and *faule Grete* (heavy Peg), known to readers of Carlyle’s *Frederick the Great*, will be familiar parallelisms. “Gunne” would be a shortened “pet name” of Gunnhilde. The *New English Dictionary* finds support for the suggestion in the fact that in Old Norwegian *gunne* and *hilde* both mean “war,” and quotes an inventory of war material at Windsor Castle in 1330-1331, where is mentioned “una magna balista de cornu quae vocatur Domina Gunilda.” Another suggestion for the origin of the word is that the word represents a shortened form, *gonne*, of a supposed French *mangonne*, a mangonel, but the French word is *mangonneau*.

Fig. 1.—Hand Gun.

Fig. 2.—Mounted Man with Hand Gun.

Firearms are said to have been first used in European warfare in the 14th century. The hand gun (see fig. 1) came into practical use in 1446 and was of very rude construction. It consisted of a simple iron or brass tube with a touch-hole at the top fixed in a straight stock of wood, the end of which passed under the right armpit when the “gonne” was about to be fired. A similar

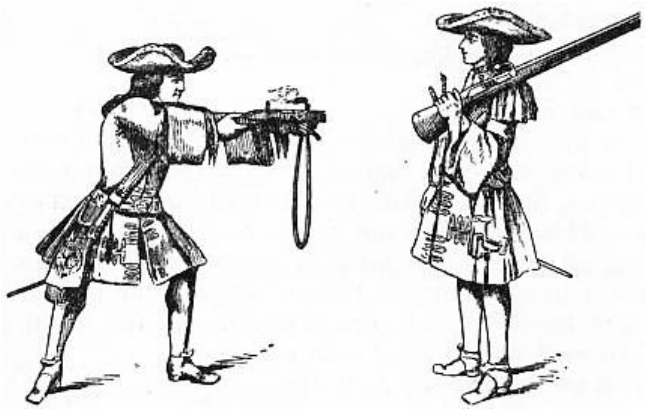
weapon (see fig. 2) was also used by the horse-soldier, with a ring at the end of the stock, by which it was suspended by a cord round the neck; a forked rest, fitted by a ring to the saddlebow, served to steady the gun. This rest, when not in use, hung down in front of the right leg. A match was made of cotton or hemp spun slack, and boiled in a strong solution of saltpetre or in the lees of wine. The touch-hole was first placed on the top of the barrel, but afterwards at the side, with a small pan underneath to hold the priming, and guarded by a cover moving on a pivot.



From General Hardÿ de Périnï's *Turenne et Condé 1626-1675*.

FIG. 3.—Musketeer, 1626.

An improvement in firearms took place in the first year of the reign of Henry VII., or at the close of Edward IV., by fixing a cock (Fr. *serpentine*) on the hand gun to hold the match, which was brought down to the priming by a trigger, whence the term matchlock. This weapon is still in use among the Chinese, Tatars, Sikhs, Persians and Turks. An improvement in the stock was also made during this period by forming it with a wide butt end to be placed against the right breast. Subsequently the stock was bent, a German invention, and the arm was called a hackbutt or hagbut, and the smaller variety a demihague. The arquebus and hackbutt were about a yard in length, including barrel and stock, and the demihague was about half the size and weight, the forerunner of the pistol. The arquebus was the standard infantry firearm in Europe from the battle of Pavia to the introduction of the heavier and more powerful musket. It did not as a rule require a rest, as did the musket. The wheel-lock, an improvement on the matchlock, was invented in Nuremberg in 1517; was first used at the siege of Parma in 1521; was brought to England in 1530, and continued in partial use there until the time of Charles II. This wheel-lock consisted of a fluted or grooved steel wheel which protruded into the priming pan, and was connected with a strong spring. The cock, also regulated by a spring, was fitted with a piece of iron pyrites. In order to discharge the gun the lock was wound up by a key, the cock was let down on the priming pan, the pyrites resting on the wheel; on the trigger being pressed the wheel was released and rapidly revolved, emitting sparks, which ignited the powder in the pan. The complicated and expensive nature of this lock, with its liability to injury, no doubt prevented its general adoption.



From General Hardÿ de Périnï's *Turenne et Condé*, 1626-1675.

FIGS. 4 and 5.—Musketeers, 1675.

About 1540 the Spaniards constructed a larger and heavier firearm (matchlock), carrying a ball of 10 to the pound, called a musket. This weapon was introduced into England before the middle of the 16th century, and soon came into general use throughout Europe. The snaphance was invented about this period in Germany, and from its comparative cheapness was much used in England,

France and Holland. It held a flint instead of the pyrites of the wheel or firelock, which ignited the powder in the pan by striking on a piece of furrowed steel, when released by the trigger, and emitting sparks.

As a sporting weapon the gun may be said to date from the invention of the wheel-lock in the beginning of the 16th century, though firearms were used for sporting purposes in Italy, Spain, Germany, and to some extent in France, in the 15th century. Before that period the longbow in England and the crossbow on the Continent were the usual weapons of the chase. In Great Britain little use appears to have been made of firearms for game shooting until the latter half of the 17th century, and the arms then used for the purpose were entirely of foreign make.

The French gunmakers of St-Étienne claim for their town that it is the oldest centre of the firearms industry. They do not appear to have made more than the barrels of the finest sporting arms, and these even were sometimes made in Paris. The production of firearms by the artists of Paris reached its zenith about the middle of the 17th century. The Italian, German, Spanish and Russian gunsmiths also showed great skill in the elegance and design of their firearms, the Spaniards in particular being makers of fine barrels. The pistol (*q.v.*) is understood to have been made for the first time about 1540 at Pistoia in Italy. About 1635 the modern firelock or flint-lock was invented, which only differed from the snaphance by the cover of the pan forming part of the furrowed steel struck by the flint. Originally the priming was put into the pan from a flask containing a fine-grained powder called serpentine powder. Later the top of the cartridge was bitten off and the pan filled therefrom before loading. The mechanism of the flint-lock musket rendered all this unnecessary, as, in loading, a portion of the charge passed through the vent into the pan, where it was held by the cover or hammer. The matchlock, as a military weapon, gradually gave way to the firelock, which came into general use in the last half of the 17th century, and was the weapon of Marlborough's and Wellington's armies. This was the famous "Brown Bess" of the British army. The highest development of the flint-lock is found in the fowling-pieces of the end of the 18th and beginning of the 19th centuries, particularly those made by Joseph Manton, the celebrated English gunsmith and inventor. The Napoleonic wars afforded English gunmakers an opportunity, which they fully utilized, of gaining the supremacy over their foreign competitors in the gunmaking trade. English gunmakers reduced the weight, improved the shooting powers, and perfected the lock mechanism of the sporting gun, and increased the range and efficiency of the rifle. This transference of the gunmaking craft from the Continent to England was also assisted by the tyranny of the foreign gunmaking gilds. In 1637 the London gunmakers obtained their charter of incorporation. The important gunmaking industry of Birmingham dates from 1603, and soon rivalled that of London. Double shot-guns do not appear to have been generally used until the 19th century. The first successful double guns were built with the barrels over and

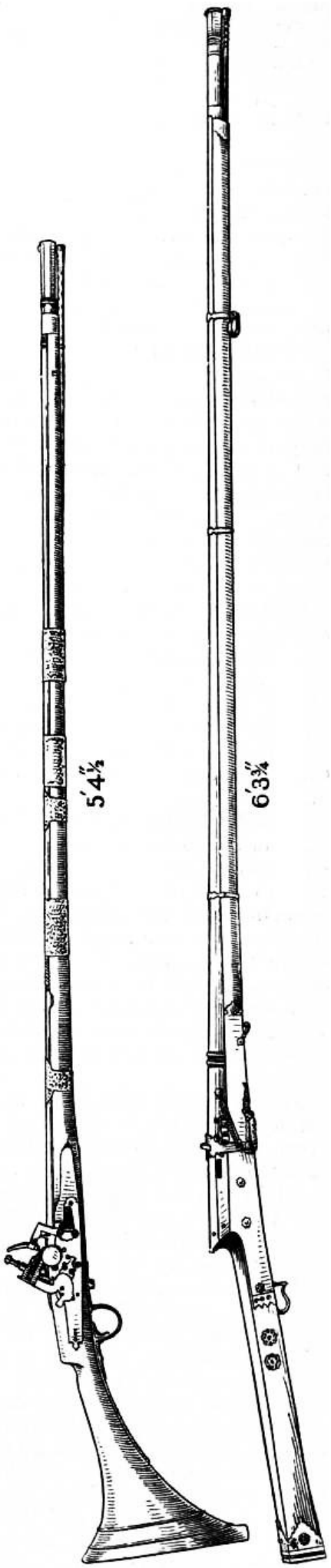


Fig. 6. (left)—Moorish Flint-lock.

Fig. 7. (right)—Indian Matchlock.

under, and not side by side, and were invented about 1616 by one Guilliano Bossi of Rome. In 1784 double shot guns were described as a novelty. Joseph Manton patented the elevated rib which rested on the barrels. The general success of the double gun was eventually due to the light weight which the better material and workmanship of the best gunmakers made possible, and to the quickness and certainty of ignition of the modern cartridge.

The objections to the flint-lock were that it did not entirely preserve the priming from wet, and that the flint sparks sometimes failed to ignite the charge. In 1807 the Rev. Alexander John Forsyth obtained a patent for priming with a fulminating powder made of chlorate of potash, sulphur and charcoal, which exploded by concussion. This important improvement in firearms was not recognized and adopted by the military authorities until more than thirty years later. In the meantime it was gradually developed, and the copper percussion cap invented, by various gunmakers and private individuals. Thomas Shaw of Philadelphia first used fulminate in a steel cap in 1814, which he changed to a copper cap in 1816. It was not until the introduction of the copper cap that the percussion gun could be considered in every way superior to the flint. In 1834, in the reign of William IV., Forsyth's invention was tested at Woolwich by firing 6000 rounds from six flint-lock muskets, and a similar number from six percussion muskets, in all weathers. This trial established the percussion principle. The shooting was found to be more accurate, the recoil less, the charge of powder having been reduced from 6 to 4½ drs., the rapidity of firing greater and the number of miss-fires much reduced, being as 1 to 26 nearly in favour of the percussion system. In consequence of this successful trial the military flint-lock in 1839 was altered to suit the percussion principle. This was easily accomplished by replacing the hammer and pan by a nipple with a hole through its centre to the vent or touch-hole, and by replacing the cock which held the flint by a smaller cock or hammer with a hollow to fit on the nipple when released by the trigger. On the nipple was placed the copper cap containing the detonating composition, now made of three parts of chlorate of potash, two of fulminate of mercury and one of powdered glass.

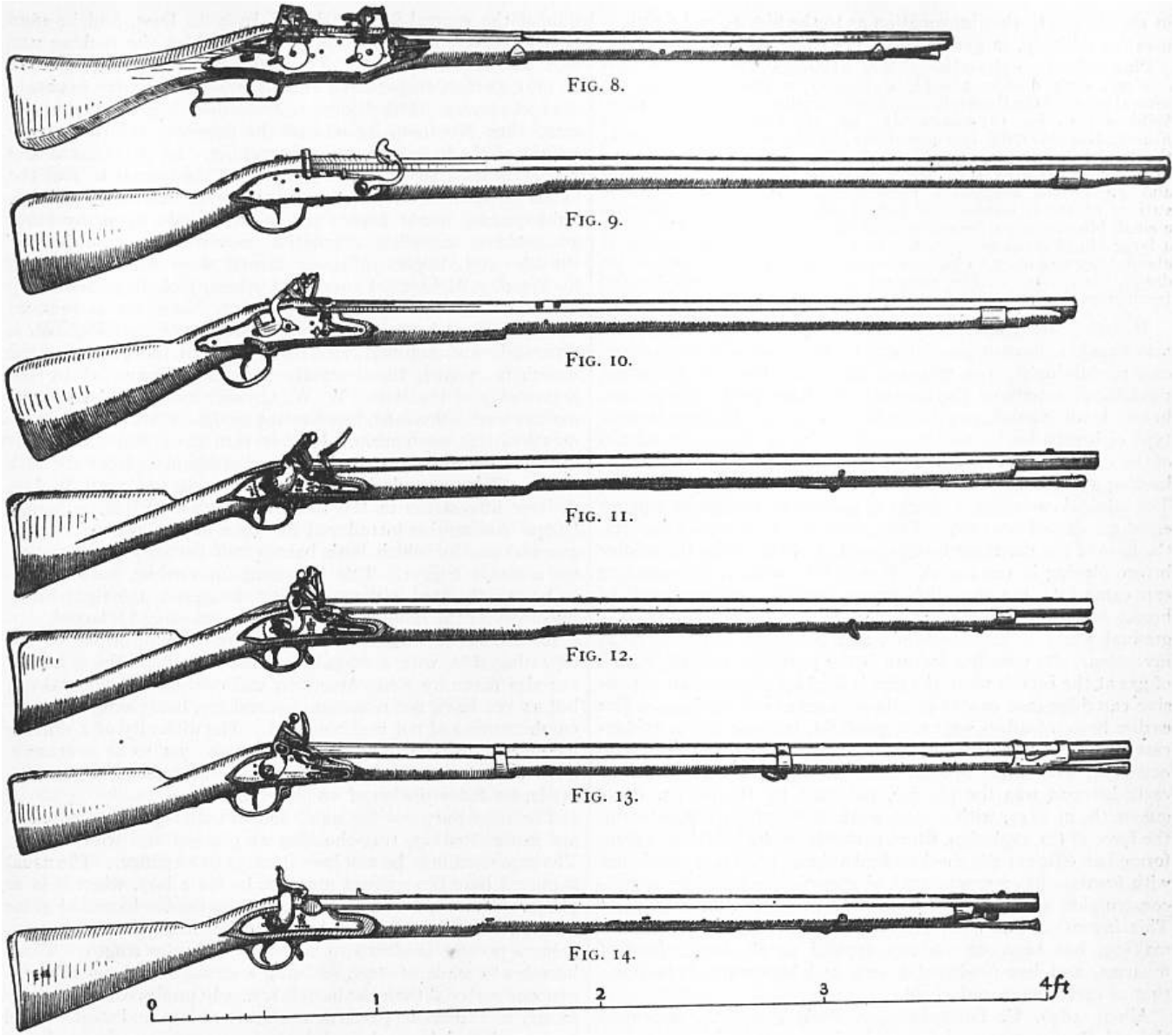


FIG. 8.

FIG. 9.

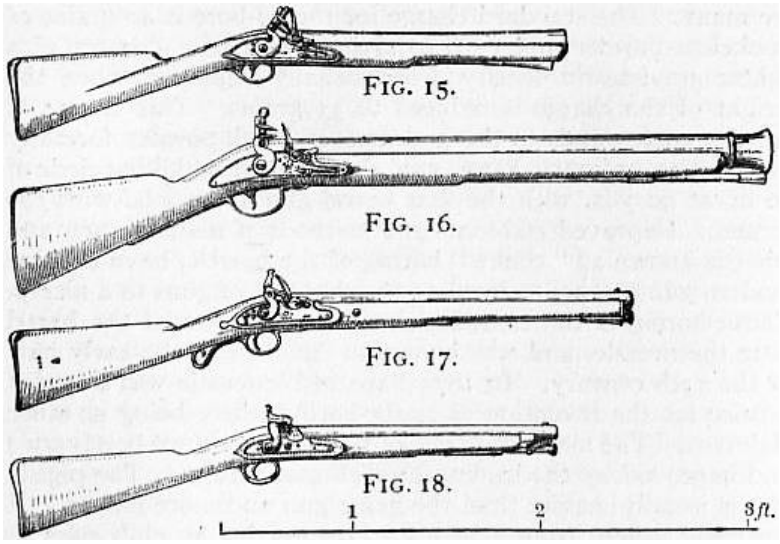
FIG. 10.

FIG. 11.

FIG. 12.

FIG. 13.

FIG. 14.



In 1840 the Austrian army was supplied with the percussion musket, and in 1842 a new model percussion musket with a block or back-sight for 150 yds. was issued to the British army, 11 ℔ 6 oz. in weight, 4 ft. 6¾ in. in length without bayonet, 6 ft. with bayonet and with a barrel 3 ft. 3 in. in length, firing a bullet of 14½ to the ℔ with 4½ drs. of powder. This musket was larger in bore than that of France, Belgium, Russia and Austria, and thus had the advantage of being able to fire their balls, while the English balls could not be fired from their barrels. But the greater weight and momentum of the English ball was counteracted by the excess of windage. This percussion musket of 1842, the latest development of the renowned Brown Bess, continued in use in the British army until partially superseded in 1851 by the Minié rifle, and altogether by the Enfield rifle in 1855. For further information as to the history and development of military, target and sporting rifles see Rifle. 720

Illustrations are given herewith of a German carbine of the 16th century, with double wheel-lock (fig. 8); a snaphance (fig. 9); several forms of the Brown Bess or flint-lock military musket (English, William III., fig. 10; George II., fig. 11; George III., fig. 12; French, Napoleon, fig. 13); and of the percussion musket adopted in the British service in 1839 (fig. 14). Examples of non-European firearms are shown in figs. 6 and 7, representing a Moorish flint-lock and an Indian matchlock respectively. Figs. 15-18 represent various carbines, musketoons and blunderbusses, fig. 15 showing a small blunderbuss or musketoon of the early 18th century, fig. 16 a large blunderbuss of 1750, fig. 17 a flint-lock cavalry carbine of about 1825 and fig. 18 a percussion carbine of 1830. All these are drawn from arms in the museum of the Royal United Service Institution, London.

Modern Shot Guns.—The modern sporting breech-loaders may be said to have originated with the invention of the cartridge-case containing its own means of ignition. The breech-loading mechanism antedated the cartridge by many years, the earliest breech-loading hand guns dating back to 1537. Another distinct type of breech-loader was invented in France about the middle of the 17th century. During the 17th and 18th centuries breech-loading arms were very numerous and of considerable variety. The original cartridge, a charge of powder and bullet in a paper envelope, dates from 1586. These were used with muzzle-loaders, the base of the cartridge being ripped or bitten off by the soldier before placing in the barrel. It was only when the detonating cap came into use that the paper cartridge answered well in breech-loaders. The modern breech-loader has resulted from a gradual series of improvements, and not from any one great invention. Its essential feature is the prevention of all escape of gas at the breech when the gun is fired by means of an expansive cartridge-case containing its own means of ignition. The earlier breech-loaders were not gas-tight, because the cartridge-cases were either consumable or the load was placed in a strong non-expansive breech-plug. The earliest efficient modern cartridge-case was the pin-fire, patented by Houiller, a Paris gunsmith, in 1847, with a thin weak shell which expanded by the force of the explosion, fitted perfectly in the barrel, and thus formed an efficient gas check. Probably no invention connected with firearms has wrought such changes in the principle of gun-construction as those effected by the expansive cartridge-case. This invention has completely revolutionized the art of gunmaking, has been successfully applied to all descriptions of firearms, and has produced a new and important industry—that of cartridge manufacture.

About 1836, C. Lefaucheux, a Paris gunsmith, improved the old Pauly system of breech-loading, but its breech action was a crude mechanism, with single grip worked by a bottom lever. The double grip for the barrels was the subsequent invention of a Birmingham

gunmaker. The central-fire cartridge, practically as now in use, was introduced into England in 1861 by Daw. It is said to have been the invention of Pottet, of Paris, improved upon by Schneider, and gave rise to considerable litigation in respect of its patent rights. Daw, who controlled the English patents, was the only exhibitor of central-fire guns and cartridges at the International Exhibition of 1862. In his system the barrels work on a hinge joint, the bottom lever withdraws the holding-down bolt; the cartridge is of the modern type, the cap being detonated by a striker passing through the standing breech to the inner face. The cartridge-case is withdrawn by a sliding extractor fitted to the breech ends of the barrels. Daw was subsequently defeated in his control of the patents by Eley Bros., owing to the patent not having been kept in force in France. The modern breech-loading gun has been gradually and steadily improved since 1860. Westley Richards adopted and improved Matthews' top-lever mechanism. About 1866 the rebounding lock was introduced, and improved in 1869. The treble wedge-fast mechanism for holding down the barrels was originated by W. W. Greener in 1865, and perfected in 1873. A very important improvement was the introduction of the hammerless gun, in which the mechanism for firing is placed entirely within the gun. This was made possible by the introduction of the central-fire cartridge. In 1862 Daw, and in 1866 Green, introduced hammerless guns in which the cocking was effected by the under lever. These guns did not attain popularity. In 1871 T. Murcott patented a hammerless gun, the first to obtain distinct success. This also was a lever-cocking gun. About the same time Needham introduced the principle of utilizing the weight of the barrels to assist in cocking. In 1875 Anson and Deeley utilized the fore-end attached to the barrels to cock the locks. From this date hammerless guns became really popular. Subsequently minor improvements were made by many other gun-makers, including alternative movements introduced by Purdey and Rogers. Improvements were also introduced by Westley Richards, Purdey and others, including cocking by means of the mainspring. In 1874 J. Needham introduced the ejector mechanism, by which each empty cartridge-case is separately and automatically thrown out of the gun when the breech is opened, the necessary force being provided by the mainspring of the lock. W. W. Greener and some other gunmakers have since introduced minor modifications and improvements of this mechanism. Next in turn came Perks and other inventors, who separated the ejector mechanism from the lock work. This very decided improvement is universal to-day. A later innovation in the modern breech-loader is the single trigger mechanism introduced by some of the leading English gun-makers, by which both barrels can be fired in succession by a single trigger. This improvement enables both barrels to be rapidly fired without altering the grip of the right hand, but deprives the shooter of the power of selecting his barrel.

Repeating or magazine shot-guns on the principle of the repeating rifle, with a magazine below the single firing barrel, are also made by some American and continental gun-makers, but as yet have not come into general use, being comparatively cumbersome and not well balanced. The difficulty of a shifting balance as each cartridge is fired has also yet to be overcome. Several varieties of a combination rifle and shot-gun are also made, for a description of which see Rifle.

The chief purposes for which modern shot-guns are required are game-shooting, trap-shooting at pigeons and wild-fowling. The game gun may be any bore from 32 to 10 gauge. The usual standard bore is 12 gauge unless it be for a boy, when it is 20 gauge. The usual weight of the 12-bore double-barrelled game gun is from 6 to 7 ℔ with barrels 30 in. long, there, however, being a present tendency to barrels of a shorter length. These barrels are made of steel, as being a stronger and more homogeneous material than the barrels formerly produced, which were mostly of Damascus pattern, a mixture of iron and steel. Steel barrels, drilled from the solid block, were originally produced by Whitworth. To-day the makers of steel for this purpose are many. The standard charge for the 12-bore is 42 grains of smokeless powder and 1 oz. to 1⅛th oz. of shot. Powder of a lighter gravimetric density is occasionally employed, when the weight of the charge is reduced to 33 grains. This charge of powder corresponds to the 3 drams of black powder formerly used. The ordinary game gun should have a killing circle of 30 in. at 30 yds. with the first barrel and at 40 yds. with the second. Improved materials and methods of manufacture, and what is known as "choke" boring of the barrels, have enabled modern gun-makers to regulate the shooting of guns to a nicety. Choke-boring is the constriction of the diameter of the barrel near the muzzle, and was known in America in the early part of the 19th century. In 1875 Pape of Newcastle was awarded a prize for the invention of choke-boring, there being no other claimant. The methods of choke-boring have since been varied and improved by the leading English gun-makers. The pigeon gun is usually heavier than the game gun and more choked. It generally weighs from 7 to 8 ℔. Its weight, by club rules, is frequently restricted to 7½ ℔ and its bore to 12 gauge. The standard wild-fowling gun is a double 8-bore with 30-in. barrels weighing 15 ℔ and firing a charge of 7 drams of powder and 2¾ to 3 oz. of shot. These guns are also made in both smaller and larger varieties, including a single barrel 4-bore, which is the largest gun that can be used from the

shoulder, and single barrel punt guns of 1½-in. bore, weighing 100 lb. While no conspicuous advance in improved gun-mechanism and invention has been made during the last few years, the materials and methods of manufacture, and the quality and exactitude of the gun-maker's work, have continued gradually and steadily to improve. English, and particularly London-made, guns stand pre-eminent all over the world.

(H. S.-K.)

GUNA, a town and military station in Central India, in the state of Gwalior. Pop. (1901) 11,452. After the Mutiny, it became the headquarters of the Central India Horse, whose commanding officer acts as ex-officio assistant to the resident of Gwalior; and its trade has developed rapidly since the opening of a station on a branch of the Great Indian Peninsula railway in 1899.

GUNCOTTON, an explosive substance produced by the action of strong nitric acid on cellulose at the ordinary temperature; chemically it is a nitrate of cellulose, or a mixture of nitrates, according to some authorities. The first step in the history of guncotton was made by T. J. Pelouze in 1838, who observed that when paper or cotton was immersed in cold concentrated nitric acid the materials, though not altered in physical appearance, became heavier, and after washing and drying were possessed of self-explosive properties. At the time these products were thought to be related to the nitrated starch obtained a little previously by Henri Braconnot and called *xyloidin*; they are only related in so far as they are nitrates. C. F. Schönbein of Basel published his discovery of guncotton in 1846 (*Phil. Mag.* [3], 31, p. 7), and this was shortly after followed by investigations by R. R. Böttger of Frankfort and Otto and Knop, all of whom added to our knowledge of the subject, the last-named introducing the use of sulphuric along with nitric acid in the nitration process. The chemical composition and constitution of guncotton has been studied by a considerable number of chemists and many divergent views have been put forward on the subject. W. Crum was probably the first to recognize that some hydrogen atoms of the cellulose had been replaced by an oxide of nitrogen, and this view was supported more or less by other workers, especially Hadow, who appears to have distinctly recognized that at least three compounds were present, the most violently explosive of which constituted the main bulk of the product commonly obtained and known as guncotton. This particular product was insoluble in a mixture of ether and alcohol, and its composition could be expressed by the term tri-nitrocellulose. Other products were soluble in the ether-alcohol mixture: they were less highly nitrated, and constituted the so-called collodion guncotton.

The smallest empirical formula for cellulose (*q.v.*) may certainly be written $C_6H_{10}O_5$. How much of the hydrogen and oxygen are in the hydroxylic (OH) form cannot be absolutely stated, but from the study of the acetates at least three hydroxyl groups may be assumed. The oldest and perhaps most reasonable idea represents guncotton as cellulose trinitrate, but this has been much disputed, and various formulae, some based on cellulose as $C_{12}H_{20}O_{10}$, others on a still more complex molecule, have been proposed. The constitution of guncotton is a difficult matter to investigate, primarily on account of the very insoluble nature of cellulose itself, and also from the fact that comparatively slight variations in the concentration and temperature of the acids used produce considerable differences in the products. The nitrates are also very insoluble substances, all the so-called solvents merely converting them into jelly. No method has yet been devised by which the molecular weight can be ascertained.[1] The products of the action of nitric acid on cellulose are not nitro compounds in the sense that picric acid is, but are nitrates or nitric esters.

Guncotton is made by immersing cleaned and dried cotton waste in a mixture of strong nitric and sulphuric acids. The relative amounts of the acids in the mixture and the time of duration of treatment of the cotton varies somewhat in different works, but the underlying idea is the same, viz. employing such an excess of sulphuric over nitric that the latter will be rendered anhydrous or concentrated and maintained as such in solution in the sulphuric acid, and that the sulphuric acid shall still be sufficiently strong to absorb and combine with the water produced during the actual formation of the guncotton. In the recent methods the cotton

remains in contact with the acids for two to four hours at the ordinary air temperature (15° C.), in which time it is almost fully nitrated, the main portion, say 90%, having a composition represented by the formula[2] $C_6H_7O_2(NO_3)_3$, the remainder consisting of lower nitrated products, some oxidation products and traces of unchanged cellulose and cellulose sulphates. The acid is then slowly run out by an opening in the bottom of the pan in which the operation is conducted, and water distributed carefully over its surface displaces it in the interstices of the cotton, which is finally subjected to a course of boiling and washing with water. This washing is a most important part of the process. On its thoroughness depends the removal of small quantities of products other than the nitrates, for instance, some sulphates and products from impurities contained in the original cellulose. Cellulose sulphates are one, and possibly the main, cause of instability in guncotton, and it is highly desirable that they should be completely hydrolysed and removed in the washing process. The nitrated product retains the outward form of the original cellulose. In the course of the washing, according to a method introduced by Sir F. Abel, the cotton is ground into a pulp, a process which greatly facilitates the complete removal of acids, &c. This pulp is finally drained, and is then either compressed, while still moist, into slabs or blocks when required for blasting purposes, or it is dried when required for the manufacture of propellants. Sometimes a small quantity of an alkali (*e.g.* sodium carbonate) is added to the final washing water, so that quantities of this alkaline substance ranging from 0.5% to a little over 1% are retained by the guncotton. The idea is that any traces of acid not washed away by the washing process or produced later by a slow decomposition of the substance will be thereby neutralized and rendered harmless. Guncotton in an air-dry state, whether in the original form or after grinding to pulp and compressing, burns with very great rapidity but does not detonate unless confined.

Immediately after the discovery of guncotton Schönbein proposed its employment as a substitute for gunpowder, and General von Lenk carried out a lengthy and laborious series of experiments intending to adapt it especially for artillery use. All these and many subsequent attempts to utilize it, either loose or mechanically compressed in any way, signally failed. However much compressed by mechanical means it is still a porous mass, and when it is confined as in a gun the flame and hot gases from the portion first ignited permeate the remainder, generally causing it actually to detonate, or to burn so rapidly that its action approaches detonation. The more closely it is confined the greater is the pressure set up by a small part of the charge burning, and the more completely will the explosion of the remainder assume the detonating form. The employment of guncotton as a propellant was possible only after the discovery that it could be gelatinized or made into a colloid by the action of so-called solvents, *e.g.* ethylacetate and other esters, acetone and a number of like substances (see Cordite).

When quite dry guncotton is easily detonated by a blow on an anvil or hard surface. If dry and warm it is much more sensitive to percussion or friction, and also becomes electrified by friction under those conditions. The amount of contained moisture exerts a considerable effect on its sensitiveness. With about 2% of moisture it can still be detonated on an anvil, but the action is generally confined to the piece struck. As the quantity of contained water increases it becomes difficult or even impossible to detonate by an ordinary blow. Compressed dry guncotton is easily detonated by an initiative detonator such as mercuric fulminate. Guncotton containing more than 15% of water is uninflammable, may be compressed or worked without danger and is much more difficult to detonate by a fulminate detonator than when dry.[3] A small charge of dry guncotton will, however, detonate the wet material, and this peculiarity is made use of in the employment of guncotton for blasting purposes. A charge of compressed wet guncotton may be exploded, even under water, by the detonation of a small primer of the dry and waterproofed material, which in turn can be started by a small fulminate detonator. The explosive wave from the dry guncotton primer is in fact better responded to by the wet compressed material than the dry, and its detonation is somewhat sharper than that of the dry. It is not necessary for the blocks of wet guncotton to be actually in contact if they be under water, and the peculiar explosive wave can also be conveyed a little distance by a piece of metal such as a railway rail. The more nearly the composition of guncotton approaches that represented by $C_6H_7O_2(NO_3)_3$, the more stable is it as regards storing at ordinary temperatures, and the higher the igniting temperature. Carefully prepared guncotton after washing with alcohol-ether until nothing more dissolves may require to be heated to 180-185° C. before inflaming. Ordinary commercial guncottons, containing from 10 to 15% of lower nitrated products, will ignite as a rule some 20-25° lower.

Assuming the above formula to represent guncotton, there is sufficient oxygen for internal combustion without any carbon being left. The gaseous mixture obtained by burning guncotton in a vacuum vessel contains steam, carbon monoxide, carbon dioxide, nitrogen, nitric oxide, and methane. When slowly heated in a vacuum vessel until ignition takes place, some nitrogen dioxide, NO_2, is also produced. When kept for some weeks at a temperature of 100° in steam, a considerable number of fatty acids, some bases, and glucose-like substances result. Under

different pressures the relative amounts of the combustion products vary considerably. Under very great pressures carbon monoxide, steam and nitrogen are the main products, but nitric oxide never quite disappears.

Dilute mineral acids have little or no action on guncotton. Strong sulphuric acid in contact with it liberates first nitric acid and later oxides of nitrogen, leaving a charred residue or a brown solution according to the quantity of acid. It sometimes fires on contact with strong sulphuric acid, especially when slightly warmed. The alkali hydroxides (*e.g.* sodium hydroxide) will in a solid state fire it on contact. Strong or weak solutions of these substances also decompose it, producing some alkali nitrate and nitrite, the cellulose molecule being only partially restored, some quantity undergoing oxidation. Ammonia is also active, but not quite in the same manner as the alkali hydroxides. Dry guncotton heated in ammonia gas detonates at about 70°, and ammonium hydroxide solutions of all strengths slowly decompose it, yielding somewhat complex products. Alkali sulphohydrates reduce guncotton, or other nitrated celluloses, completely to cellulose. The production of the so-called "artificial silk" depends on this action.

A characteristic difference between guncotton and collodion cotton is the insolubility of the former in ether or alcohol or a mixture of these liquids. The so-called collodion cottons are nitrated celluloses, but of a lower degree of nitration (as a rule) than guncotton. They are sometimes spoken of as "lower" or "soluble" cottons or nitrates. The solubility in ether-alcohol may be owing to a lower degree of nitration, or to the temperature conditions under which the process of manufacture has been carried on. If guncotton be correctly represented by the formula $C_6H_7O_2(NO_3)_3$, it should contain a little more than 14% of nitrogen. Guncottons are examined for degree of nitration by the nitrometer, in which apparatus they are decomposed by sulphuric acid in contact with mercury, and all the nitrogen is evolved as nitric oxide, NO, which is measured and the weight of its contained nitrogen calculated. Ordinary guncottons seldom contain more than 13% of nitrogen, and in most cases the amount does not exceed 12.5%. Generally speaking, the lower the nitrogen content of a guncotton, as found by the nitrometer, the higher the percentage of matters soluble in a mixture of ether-alcohol. These soluble matters are usually considered as "lower" nitrates.

Guncottons are usually tested by the Abel heat test for stability (see CORDITE). Another heat test, that of Will, consists in heating a weighed quantity of the guncotton in a stream of carbon dioxide to 130° C., passing the evolved gases over some red-hot copper, and finally collecting them over a solution of potassium hydroxide which retains the carbon dioxide and allows the nitrogen, arising from the guncotton decomposition, to be measured. This is done at definite time intervals so that the *rate* of decomposition can be followed. The relative stability is then judged by the amount of nitrogen gas collected in a certain time. Several modifications of this and of the Abel heat test are also in use. (See EXPLOSIVES.)

(W. R. E. H.)

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1 The composition of the cellulose nitrates was reviewed by G. Lunge (*Jour. Amer. Chem. Soc.*, 1901, 23, p. 527), who, assuming the formula $C_{24}H_{40}O_{20}$ for cellulose, showed how the nitrocelluloses described by different chemists may be expressed by the formula $C_{24}H\{46\text{-}x\}O_{20}(NO_2)_x$, where x has the values 4, 5, 6, ... 12.

2 This formula is retained mainly on account of its simplicity. It also expresses all that is necessary in this connexion.

3 Air-dried guncotton will contain 2% or less of moisture.

GUNDULICH, IVAN (1588-1638), known also as Giovanni Gondola, Servian poet, was born at Ragusa on the 8th of January 1588. His father, Franco Gundulich, once the Ragusan envoy to Constantinople and councillor of the republic, gave him an excellent education. He studied the "humanities" with the Jesuit, Father Muzzi, and philosophy with Father Ricasoli. After that he studied Roman law and jurisprudence in general. He was member of the Lower Council and once served as the chief magistrate of the republic. He died on the 8th of December 1638. A born poet, he admired much the Italian poets of his time, from whom he made many translations into Servian. It is believed that he so translated Tasso's *Gerusalemme liberata*. He is known to have written eighteen works, of which eleven were dramas, but of these only three have been fully preserved, others having perished during the great earthquake and fire in 1667. Most of those dramas were translations from the Italian, and were played, seemingly with great success, by the amateurs furnished by the noble families of Ragusa. But his greatest and justly celebrated work is an epic, entitled *Osman*, in twenty cantos. It is the first political epic on the Eastern Question, glorifying the victory of the Poles over Turks and Tatars

in the campaign of 1621, and encouraging a league of the Christian nations, under the guidance of Vladislaus, the king of Poland, for the purpose of driving away the Turks from Europe. The fourteenth and fifteenth cantos are lost. It is generally believed that the Ragusan government suppressed them from consideration for the Sultan, the protector of the republic, those two cantos having been violently anti-Turkish.

Osman was printed for the first time in Ragusa in 1826, the two missing cantos being replaced by songs written by Pietro Sorgo (or Sorkochevich). From this edition the learned Italian, Francesco Appendini, made an Italian translation published in 1827. Since that time several other editions have been made. The best are considered to be the edition of the South Slavonic Academy in Agram (1877) and the edition published in Semlin (1889) by Professor Yovan Boshkovich. In the edition of 1844 (Agram) the last cantos, fourteen and fifteen, were replaced by very fine compositions of the Serbo-Croatian poet, Mazhuranich (Mažuranić). The complete works of Gundulich have been published in Agram, 1847, by V. Babukich and by the South Slavonic Academy of Agram in 1889.

(C. Mi.)

GUNG'L, JOSEF (1810-1889), Hungarian composer and conductor, was born on the 1st of December 1810, at Zsámbék, in Hungary. After starting life as a school-teacher, and learning the elements of music from Ofen, the school-choirmaster, he became first oboist at Graz, and, at twenty-five, bandmaster of the 4th regiment of Austrian artillery. His first composition, a Hungarian march, written in 1836, attracted some notice, and in 1843 he was able to establish an orchestra in Berlin. With this band he travelled far, even (in 1849) to America. It is worth recording that Mendelssohn's complete *Midsummer Night's Dream* music is said to have been first played by Gung'l's band. In 1853 he became bandmaster to the 23rd Infantry Regiment at Brünn, but in 1864 he lived at Munich, and in 1876 at Frankfort, after (in 1873) having conducted with great success a series of promenade concerts at Covent Garden, London. From Frankfort Gung'l went to Weimar to live with his daughter, a well-known German opera singer and local prima donna. There he died, on the 31st of January 1889. Gung'l's dances number over 300, perhaps the most popular being the "Amoretten," "Hydropaten," "Casino," "Dreams on the Ocean" waltzes; "In Stiller Mitternacht" polka, and "Blue Violets" mazurka. His Hungarian march was transcribed by Liszt. His music is characterized by the same easy flowing melodies and well-marked rhythm that distinguish the dances of Strauss, to whom alone he can be ranked second in this kind of composition.

GUNNER, or Master Gunner, in the navy, the warrant officer who has charge of the ordnance and ammunition, and of the training of the men at gun drill. His functions in this respect are of less relative importance than they were in former times, when specially trained corps of seamen gunners had not been formed.

GUNNING, PETER (1614-1684), English divine, was born at Hoo, in Kent, and educated at the King's School, Canterbury, and Clare College, Cambridge, where he became a fellow in 1633. Having taken orders, he advocated the royalist cause from the pulpit with much eloquence. In 1644 he retired to Oxford, and held a chaplaincy at New College until the city surrendered to the parliamentary forces in 1646. Subsequently he was chaplain, first to the royalist Sir Robert Shirley of Eatington (1629-1656), and then at the Exeter House chapel. After the Restoration in 1660 he returned to Clare College as master, and was appointed Lady Margaret professor of divinity. He also received the livings of Cottesmore, Rutlandshire, and Stoke Bruerne, Northamptonshire. In 1661 he became head of St John's College, Cambridge, and was elected Regius professor of divinity. He was consecrated bishop of Chichester in 1669, and was translated to the see of Ely in 1674-1675. Holding moderate religious views, he deprecated alike the extremes represented by Puritanism and Roman Catholicism.

His works are chiefly reports of his disputations, such as that which appears in the *Scisme Unmask't* (Paris, 1658), in which the definition of a schism is discussed with two Romanist opponents.

GUNNY, a sort of cloth, the name of which is supposed to be derived from *ganga* or *gania* of Rumphius, or from *gonia*, a vernacular name of the *Crotolaria juncea*—a plant common in Madras. One of the first notices of the term itself is to be found in Knox's *Ceylon*, in which he says: "The filaments at the bottom of the stem (coir from the coco-nut husk, *Cocos nucifera*) may be made into a coarse cloth called gunny, which is used for bags and similar purposes."

Warden, in *The Linen Trade*, says:

> "A very large proportion of the jute grown in Bengal is made into cloth in the districts where it is cultivated, and this industry forms the grand domestic manufacture of all the populous eastern districts of Bengal. It pervades all classes, and penetrates into every household, almost every one, man, woman and child, being in some way engaged in it. Boatmen, husbandmen, palankeen carriers, domestic servants, everyone, in fact, being Hindu—for Mussulmans spin cotton only—pass their leisure moments, distaff in hand, spinning gunny twist. It is spun by the takur and dhara, the former being a kind of spindle, which is turned upon the thigh or the sole of the foot, and the latter a reel, on which the thread, when sufficiently twisted, is wound up. Another kind of spinning machine, called a ghurghurea, is occasionally used. A bunch of the raw material is hung up in every farmer's house, or on the protruding stick of a thatched roof, and every one who has leisure forms with these spindles some coarse pack-thread, of which ropes are twisted for the use of the farm. The lower Hindu castes, from this pack-thread, spin a finer thread for being made into cloth, and, there being a loom in nearly every house, very much of it is woven by the women of the lower class of people. It is especially the employment of the Hindu widow, as it enables her to earn her bread without being a burden on her family. The cloth thus made is of various qualities, such as clothing for the family (especially the women, a great proportion of whom on all the eastern frontier wear almost nothing else), coarse fabrics, bedding, rice and sugar bags, sacking, pack-sheet, &c. Much of it is woven into short lengths and very narrow widths, two or three of which are sometimes sewed into one piece before they are sold. That intended for rice and sugar bags is made about 6 feet long, and from 24 to 27 inches wide, and doubled. A considerable quantity of jute yarn is dyed and woven into cloth for various local purposes, and some of it is also sent out of the district. The principal places where chotee, or jute cloth for gunny bags, is made are within a radius of perhaps 150 to 200 miles around Dacca, and there both labour and land are remarkably cheap. The short, staple, common jute is generally consumed in the local manufacture, the finer and long stapled being reserved for the export trade. These causes enable gunny cloth and bags to be sold almost as cheaply as the raw material, which creates an immense demand for them in nearly every market of the world."

Such appeared to be the definition of gunny cloth at the time the above was written—between 1850 and 1860. Most of the Indian cloth for gunny bags is now made by power, and within about 20 m. of Calcutta. In many respects the term gunny cloth is still applied to all and sundry, but there is no doubt that the original name was intended for cloth which was similar to what is now known as "cotton bagging." This particular type of cloth is still largely made in the hand loom, even in Dundee, this method of manufacture being considered, for certain reasons, more satisfactory than the power loom method (see Jute and Bagging).

GUNPOWDER, an explosive composed of saltpetre, charcoal and sulphur. Very few substances have had a greater effect on civilization than gunpowder. Its employment altered the whole art of war, and its influence gradually and indirectly permeated and affected the whole fabric of society. Its direct effect on the arts of peace was but slight, and had but a limited range, which could not be compared to the modern extended employment of high explosives for blasting in mining and engineering work.

It is probably quite incorrect to speak of the *discovery* of gunpowder. From modern researches it seems more likely and more just to think of it as a thing that has developed, passing through many stages—mainly of improvement, but some undoubtedly retrograde.

There really is not sufficient solid evidence on which to pin down its invention to one man. As Lieutenant-Colonel H. W. L. Hime (*Gunpowder and Ammunition*, 1904) says, the invention of gunpowder was impossible until the properties of nearly pure saltpetre had become known. The honour, however, has been associated with two names in particular, Berthold Schwartz, a German monk, and Friar Roger Bacon. Of the former Oscar Guttmann writes (*Monumenta pulveris pyrii*, 1904, p. 6): "Berthold Schwartz was generally considered to be the inventor of gunpowder, and only in England has Roger Bacon's claim been upheld, though there are English writers who have pleaded in favour of Schwartz. Most writers are agreed that Schwartz invented the first firearms, and as nothing was known of an inventor of gunpowder, it was perhaps considered justifiable to give Schwartz the credit thereof. There is some ambiguity as to when Schwartz lived. The year 1354 is sometimes mentioned as the date of his invention of powder, and this is also to be inferred from an inscription on the monument to him in Freiburg. But considering there can be no doubt as to the manufacture in England of gunpowder and cannon in 1344, that we have authentic information of guns in France in 1338 and in Florence in 1326, and that the Oxford MS. *De officiis regum* of 1325 gives an illustration of a gun, Berthold Schwartz must have lived long before 1354 to have been the inventor of gunpowder or guns." In Germany also there were powder-works at Augsburg in 1340, in Spandau in 1344, and Liegnitz in 1348.

Roger Bacon, in his *De mirabili potestate artis et naturae* (1242), makes the most important communication on the history of gunpowder. Reference is made to an explosive mixture as known before his time and employed for "diversion, producing a noise like thunder and flashes like lightning." In one passage Bacon speaks of saltpetre as a violent explosive, but there is no doubt that he knew it was not a self-explosive substance, but only so when mixed with other substances, as appears from the statement in *De secretis operibus artis et naturae*, printed at Hamburg in 1618, that "from saltpetre and other ingredients we are able to make a fire that shall burn at any distance we please." A great part of his three chapters, 9, 10, 11, long appeared without meaning until the anagrammatic nature of the sentences was realized. The words of this anagram are (chap. 11): "Item ponderis totum 30 sed tamen salis petrae *luru vopo vir can utri*[1] et sulphuris; et sic facies tonitruum et coruscationem, si scias artificium. Videas tamen utrum loquar aenigmate aut secundum veritatem." Hime, in his chapter on the origin of gunpowder, discusses these chapters at length, and gives, omitting the anagram, the translation: "Let the total weight of the ingredients be 30, however, of saltpetre ... of sulphur; and with such a mixture you will produce a bright flash and a thundering noise, if you know the trick. You may find (by actual experiment) whether I am writing riddles to you or the plain truth." The anagram reads, according to Hime, "salis petrae r(ecipe) vii part(es), v nov(ellae) corul(i), v et sulphuris" (take seven parts of saltpetre, five of young hazel-wood, and five of sulphur). Hime then goes on to show that Bacon was in possession of an explosive which was a considerable advance on mere incendiary compositions. Bacon does not appear to have been aware of the projecting power of gunpowder. He knew that it exploded and that perhaps people might be blown up or frightened by it; more cannot be said. The behaviour of small quantities of any explosive is hardly ever indicative of its behaviour in large quantities and especially when under confinement. Hime is of opinion that Bacon blundered upon gunpowder whilst playing with some incendiary composition, such as those mentioned by Marcus Graecus and others, in which he employed his comparatively pure saltpetre instead of crude nitrum. It has been suggested that Bacon derived his knowledge of these fiery mixtures from the MS. *Liber ignium*, ascribed to Marcus Graecus, in the National Library in Paris (Dutens, *Enquiry into Origin of Discoveries attributed to Moderns*). Certainly this Marcus Graecus appears to have known of some incendiary composition containing the gunpowder ingredients, but it was not gunpowder. Hime seems to doubt the existence of any such person as Marcus Graecus, as he says: "The *Liber ignium* was written from first to last in the period of literary forgeries and pseudographs ... and we may reasonably conclude that Marcus Graecus is as unreal as the imaginary Greek original of the tract which bears his name." Albertus Magnus in the *De mirabilibus mundi* repeats some of the receipts given in Marcus Graecus, and several other writers give receipts for Greek fire, rockets, &c. Dutens gives many passages in his work, above-named, from old authors in support of his view that a composition of the nature of gunpowder was not unknown to the ancients. Hime's elaborate arguments go to show that these compositions could only have been of the incendiary type and not real explosives. His arguments seem to hold good as regards not only the Greeks but also the Arabs, Hindus and Chinese (see also Fireworks).

There seems no doubt that incendiary compositions, some perhaps containing nitre, mostly, however, simply combustible substances as sulphur, naphtha, resins, &c., were employed and projected both for defence and offence, but they were projected or blown by engines and not by themselves. It is quite inconceivable that a real propelling explosive should have been known in the time of Alexander or much later, and not have immediately taken its proper place. In a chapter discussing this question of explosives amongst the Hindus, Hime says: "It is

needless to enlarge the list of quotations: incendiaries pursued much the same course in Upper India as in Greece and Arabia." No trustworthy evidence of an explosive in India is to be found until the 21st of April 1526, the date of the decisive battle of Panipat, in which Ibrahim, sultan of Delhi, was killed and his army routed by Baber the Mogul, who possessed both great and small firearms.

As regards also the crusader period (1097-1291), so strange and deadly an agent of destruction as gunpowder could not possibly have been employed in the field without the full knowledge of both parties, yet no historian, Christian or Moslem, alludes to an explosive of any kind, while all of them carefully record the use of incendiaries. The employment of rockets and "wildfire" incendiary composition seems undoubtedly of very old date in India, but the names given to pieces of artillery under the Mogul conqueror of Hindustan point to a European, or at least to a Turkish origin, and it is quite certain that Europeans were retained in the service of Akbar and Aurangzeb. The composition of present day Chinese gunpowder is almost identical with that employed in Europe, so that in all probability the knowledge of it was obtained from Western sources.

In the writings of Bacon there is no mention of guns or the use of powder as a propellant, but merely as an explosive and destructive power. Owing perhaps to this obscurity hanging over the early history of gunpowder, its employment as a propelling agent has been ascribed to the Moors or Saracens. J. A. Conde (*Historia de la dominacion de los Arabes en España*) states that Ismail Ben Firaz, king of Granada, who in 1325 besieged Boza, had among his machines "some that cast globes of fire," but there is not the least evidence that these were guns. The first trustworthy document relative to the use of gunpowder in Europe, a document still in existence, and bearing date February 11, 1326, gives authority to the council of twelve of Florence and others to appoint persons to superintend the manufacture of cannons of brass and iron balls, for the defence of the territory, &c., of the republic. John Barbour, archdeacon of Aberdeen, writing in 1375, states that cannons (crakys of war) were employed in Edward III.'s invasion of Scotland in 1327. An indenture first published by Sir N. H. Nicolas in his *History of the Royal Navy* (London, 1846), and again by Lieutenant-Colonel H. Brackenbury (*Proc. R.A. Inst.*, 1865), stated to be 1338, contains references to small cannon as among the stores of the Tower, and also mentions "un petit barrell de gonpoudre le quart' plein." If authentic, this is possibly the first mention of gunpowder as such in England, but some doubts have been thrown upon the date of this MS. From a contemporary document in the National Library in Paris it seems that in the same year (1338) there existed in the marine arsenal at Rouen an iron weapon called *pot de feu*, for propelling bolts, together with some saltpetre and sulphur to make powder for the same. Preserved in the Record Office in London are trustworthy accounts from the year 1345 of the purchase of ingredients for making powder, and of the shipping of cannon to France. In 1346 Edward III. appears to have ordered all available saltpetre and sulphur to be bought up for him. In the first year of Richard II. (1377) Thomas Norbury was ordered to buy, amongst other munitions, sulphur, saltpetre and charcoal, to be sent to the castle of Brest. In 1414 Henry V. ordered that no gunpowder should be taken out of the kingdom without special licence, and in the same year ordered twenty pipes of willow charcoal and other articles for the use of the guns.

The manufacture of gunpowder seems to have been carried on as a crown monopoly about the time of Elizabeth, and regulations respecting gunpowder and nitre were made about 1623 (James I.). Powder-mills were probably in existence at Waltham Abbey about the middle or towards the end of the 16th century.

Ingredients and their Action.—Roger Bacon in his anagram gives the first real recipe for gunpowder, viz. (according to Hime, ch. xii.) saltpetre 41.2, charcoal 29.4, sulphur 29.4. Dr John Arderne of Newark, who began to practise about 1350 and was later surgeon to Henry IV., gives a recipe (Sloane MSS. 335, 795), saltpetre 66.6, charcoal 22.2, sulphur 11.1, "which are to be thoroughly mixed on a marble and then sifted through a cloth." This powder is nominally of the same composition as one given in a MS. of Marcus Graecus, but the saltpetre of this formula by Marcus Graecus was undoubtedly answerable for the difference in behaviour of the two compositions. Roger Bacon had not only refined and obtained pure nitre, but had appreciated the importance of thoroughly mixing the components of the powder. Most if not all the early powder was a "loose" mixture of the three ingredients, and the most important step in connexion with the development of gunpowder was undoubtedly the introduction of wet mixing or "incorporating." Whenever this was done, the improvement in the product must have been immediately evident. In the damp or wetted state pressure could be applied with comparative safety during the mixing. The loose powder mixture came to be called "serpentine"; after wet mixing it was more or less granulated or corned and was known as "corned" powder. Corned powder seems to have been gradually introduced. It is mentioned in the *Fire Book* of Conrad von Schöngau (in 1429), and was used for hand-guns in England long before 1560. It would seem that corned powder was used for hand-guns or small arms in the 15th century, but cannon were not made strong enough to withstand its explosion for quite

another century (Hime). According to the same writer, in the period 1250-1450, when serpentine only was used, one powder could differ from another in the proportions of the ingredients; in the modern period—say 1700-1886—the powders in use (in each state) differed only as a general rule in the size of the grain, whilst during the transition period—1450-1700—they generally differed both in composition and size of grain.

Corned or grained powder was adopted in France in 1525, and in 1540 the French utilized an observation that large-grained powder was the best for cannon, and restricted the manufacture to three sizes of grain or corn, possibly of the same composition. Early in the 18th century two or three sizes of grain and powder of one composition appear to have become common. The composition of English powder seems to have settled down to 75 nitre, 15 charcoal, and 10 sulphur, somewhere about the middle of the 18th century.

The composition of gunpowders used in different countries at different times is illustrated in the following tables:—

English Powders (*Hime*).

	1250.	1350.	1560.	1647.	1670.	1742.	1781.
Saltpetre	41.2	66.6	50.0	66.6	71.4	75.0	75.0
Charcoal	29.4	22.2	33.3	16.6	14.3	12.5	15.0
Sulphur	29.4	11.1	16.6	16.6	14.3	12.5	10.0[2]

Foreign Powders (*Hime*).

	France.	Sweden.	Germany.	Denmark.	France.	Sweden.	Germany.
	1338.	1560.	1595.	1608.	1650.	1697.	1882.
Saltpetre	50	66.6	52.2	68.3	75.6	73	78
Charcoal	?	16.6	26.1	23.2	13.6	17	19
Sulphur	25	16.6	21.7	8.5	10.8	10	3[3]

When reasonably pure, none of the ingredients of gunpowder absorbs any material quantity of moisture from the atmosphere, and the nitre only is a soluble substance. It seems extremely probable that for a long period the three substances were simply mixed dry, indeed sometimes kept separate and mixed just before being required; the consequence must have been that, with every care as to weighing out, the proportions of any given quantity would alter on carriage. Saltpetre is considerably heavier than sulphur or charcoal, and would tend to separate out towards the bottom of the containing vessel if subjected to jolting or vibration. When pure there can only be one kind of saltpetre or sulphur, because they are chemical individuals, but charcoal is not. Its composition, rate of burning, &c., depend not only on the nature of the woody material from which it is made, but quite as much on the temperature and time of heating employed in the making. The woods from which it is made contain carbon, hydrogen and oxygen, and the two latter are never thoroughly expelled in charcoal-making. If they were, the resulting substance would be of no use for gunpowder. 1-3% of hydrogen and 8-15% of oxygen generally remain in charcoals suitable for gunpowder. A good deal of the fieriness and violence of explosion of a gunpowder depends on the mode of burning of the charcoal as well as on the wood from which it is made.

Properties of Ingredients.—Charcoal is the chief combustible in powder. It must burn freely, leaving as little ash or residue as possible; it must be friable, and grind into a non-gritty powder. The sources from which powder charcoal is made are dogwood (*Rhamnus frangula*), willow (*Salix alba*), and alder (*Betula alnus*). Dogwood is mainly used for small-arm powders. Powders made from dogwood charcoal burn more rapidly than those from willow, &c. The wood after cutting is stripped of bark and allowed to season for two or three years. It is then picked to uniform size and charred in cylindrical iron cases or slips, which can be introduced into slightly larger cylinders set in a furnace. The slips are provided with openings for the escape of gases. The rate of heating as well as the absolute temperature attained have an effect on the product, a slow rate of heating yielding more charcoal, and a high temperature reducing the hydrogen and oxygen in the final product. When heated for seven hours to about 800° C. to 900° C. the remaining hydrogen and oxygen amount to about 2% and 12% respectively. The time of charring is as a rule from 5 to 7 hours. The slips are then removed from the furnace and placed in a larger iron vessel, where they are kept comparatively air-tight until quite cold. The charcoal is then sorted, and stored for some time before grinding. The charcoal is ground, and the powder sifted on a rotating reel or cylinder of fine mesh copper-wire gauze. The sifted powder is again stored for some time before use in closed iron vessels.

Sicilian sulphur is most generally employed for gunpowder, and for complete purification is

first distilled and then melted and cast into moulds. It is afterwards ground into a fine powder and sifted as in the case of the charcoal.

Potassium nitrate is eminently suitable as an oxygen-provider, not being deliquescent. Nitrates are continually being produced in surface soils, &c., by the oxidation of nitrogenous substances. Nitric and nitrous acids are also produced by electric discharges through the atmosphere, and these are found eventually as nitrates in soils, &c. Nitre is soluble in water, and much more so in hot than in cold. Crude nitre, obtained from soils or other sources, is purified by recrystallization. The crude material is dissolved almost to saturation in boiling water: on filtering and then cooling this liquor to about 30° C. almost pure nitre crystallizes out, most of the usual impurities still remaining in solution. By rapidly cooling and agitating the nitre solution crystals are obtained of sufficient fineness for the manufacture of powder without special grinding. Nitre contains nearly 48% of oxygen by weight, five-sixths of which is available for combustion purposes. Nearly all the gases of the powder explosion are derived from the nitre. The specific gravity of nitre is 2.2 : 200 grams will therefore occupy about 100 cubic centimetres volume. This quantity on its decomposition by heat alone yields 28 grams or 22,400 c.c. of nitrogen, and 80 grams or 56,000 c.c. of oxygen as gases, and 94 grams of potassium oxide, a fusible solid which vaporizes at a very high temperature.

Incorporation.—The materials are weighed out separately, mixed by passing through a sieve, and then uniformly moistened with a certain quantity of water, whilst on the bed of the incorporating mill. This consists of two heavy iron wheels mounted so as to run in a circular bed. The incorporation requires about four hours. The mechanical action of rollers on the powder paste is a double one: not only crushing but mixing by pushing forwards and twisting sideways. The pasty mass is deflected so that it repeatedly comes under first one roller and then the next by scrapers, set at an angle to the bed, which follow each wheel.

Although the charge is wet it is possible for it to be fired either by the heat developed by the roller friction, by sparks from foreign matters, as bits of stone, &c., or possibly by heat generated by oxidation of the materials. The mills are provided with a drenching apparatus so arranged that in case of one mill firing it and its neighbours will be drowned by water from a cistern or tank immediately above the mill. The product from the incorporation is termed “mill-cake.”

After this incorporation in the damp state the ingredients never completely separate on drying, however much shaken, because each particle of nitre is surrounded by a thin layer of water containing nitre in solution in which the particles of charcoal and sulphur are entangled and retained. After due incorporation, powders are pressed to a certain extent whilst still moist. The density to which a powder is pressed is an important matter in regard to the rate of burning. The effect of high density is to slow down the initial rate of burning. Less dense powders burn more rapidly from the first and tend to put a great strain on the gun. Fouling is usually less with denser powders; and, as would be expected, such powders bear transport better and give less dust than light powders. Up to a certain pressure, hardness, density, and size of grain of a powder have an effect on the rate of burning and therefore on pressure. Glazing or polishing powder grains, also exerts a slight retarding action on burning and enables the powders to resist atmospheric moisture better. Excess of moisture in gunpowder has a marked effect in reducing the explosiveness. All powders are liable to absorb moisture, the quality and kind of charcoal being the main determinant in this respect; hard burnt black charcoal is least absorbent. The material employed in brown powders absorbs moisture somewhat readily. Powder kept in a very damp atmosphere, and especially in a changeable one, spoils rapidly, the saltpetre coming to the surface in solution and then crystallizing out. The pieces also break up owing to the formation of large crystals of nitre in the mass. After the pressing of the incorporated powder into a “press-cake,” it is broken up or granulated by suitable machines, and the resulting grains separated and sorted by sifting through sieves of determined sizes of mesh. Some dust is formed in this operation, which is sifted away and again worked up under the rollers (for sizes of grains see fig. 1). These grains, cubes, &c., are then either polished by rotating in drums alone or with graphite, which adheres to and coats the surfaces of the grains. This process is generally followed with powders intended for small-arms or moderately small ordnance.

Shaped Powders.—Prisms or prismatic powder are made by breaking up the press-cake into a moderately fine state, whilst still moist, and pressing a certain quantity in a mould. The moulds generally employed consist of a thick plate of bronze in which are a number of hexagonal perforations. Accurately fitting plungers are so applied to these that one can enter at the top and the other at the bottom. The lower plunger being withdrawn to the bottom of the plate the hexagonal hole is charged with the powder and the two plungers set in motion, thus compressing the powder between them. After the desired pressure has been applied the top plunger is withdrawn, and the lower one pushed upward to eject the prism of powder. The axial perforations in prism powders are made by small bronze rods which pass through the lower plunger and fit into corresponding holes in the upper one. If these prisms are made by a steadily applied pressure a density throughout of about 1.78 may be obtained. Further to

regulate the rate of burning so that it shall be slow at first and more rapid as the powder is consumed, another form of machine was devised, the cam press, in which the pressure is applied very rapidly to the powder. It receives in fact one blow, which compresses the powder to the same dimensions, but the density of the outer layers of substance of the prism is much greater than in the interior.

The leading idea in connexion with all shaped powder grains, and with the very large sizes, was to regulate the rate of burning so as to avoid extreme pressure when first ignited and to keep up the pressure in the gun as more space was provided in the chamber or tube by the movement of the shot towards the muzzle. In the perforated prismatic powder the ignition is intended to proceed through the perforations; since in a charge the faces of the prisms fit pretty closely together, it was thought that this arrangement would prevent unburnt cores or pieces of powder from being blown out. These larger grain powders necessitated a lengthened bore to take advantage of the slower production of gases and complete combustion of the powder. General T. J. Rodman first suggested and employed the perforated cake cartridge in 1860, the cake having nearly the diameter of the bore and a thickness of 1 to 2 in. with perforations running parallel with the gun axis. The burning would then start from the comparatively small surfaces of the perforations, which would become larger as the powder burnt away. Experiments bore out this theory perfectly. It was found that small prisms were more convenient to make than large disks, and as the prisms practically fit together into a disk the same result was obtained. This effect of mechanical density on rate of burning is good only up to a certain pressure, above which the gases are driven through the densest form of granular material. After granulating or pressing into shapes, all powders must be dried. This is done by heating in specially ventilated rooms heated by steam pipes. As a rule this drying is followed by the finishing or polishing process. Powders are finally blended, *i.e.* products from different batches or “makes” are mixed so that identical proof results are obtained.

Sizes and Shapes of Powders.—In fig. 1, *a* to *k* show the relative sizes and shapes of grain as formerly employed for military purposes, except that the three largest powders, *e*-*f*-*g* and *h* are figured half-size to save space, whereas the remainder indicate the actual dimensions of the grains. *a* is for small-arms, all the others are for cannon of various sizes.

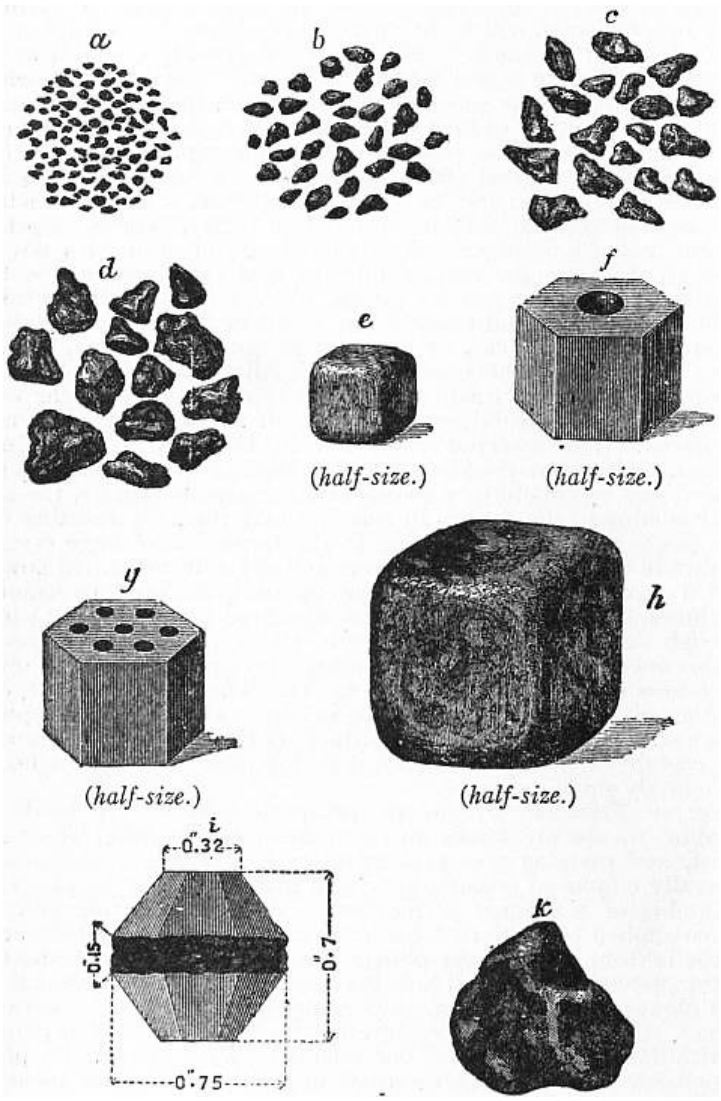

Fig. 1.

Proof of Powder.—In addition to chemical examination powder is passed through certain mechanical tests:—

1. *For colour, glaze, texture and freedom from dust.*

2. *For proper incorporation.*

3. *For shape, size and proportion of the grains.*—The first is judged by eye, and grains of the size required are obtained by the use of sieves of different sizes.

4. *Density.*—The density is generally obtained in some form of mercury densimeter, the powder being weighed in air and then under mercury. In some forms of the instrument the air can be pumped out so that the weighing takes place *in vacuo*.

5. *Moisture and absorption of moisture.*—The moisture and hygroscopic test consists in weighing a sample, drying at 100° C. for a certain time, weighing again, &c., until constant. The dried weighed sample can then be exposed to an artificial atmosphere of known moisture and temperature, and the gain in weight per hour similarly ascertained by periodic weighings.

6. *Firing proof.*—The nature of this depends upon the purpose for which the powder is intended. For sporting powders it consists in the "pattern" given by the shot upon a target at a given distance, or, if fired with a bullet, upon the "figure of merit," or mean radial deviation of a certain number of rounds; also upon the penetrative power. For military purposes the "muzzle" velocity produced by a powder is ascertained by a chronograph which measures the exact time the bullet or other projectile takes to traverse a known distance between two wire screens. By means of "crusher gauges" the exact pressure per square inch upon certain points in the interior of the bore can be found.

In the chemical examination of gunpowder the points to be ascertained are, in addition to moisture, freedom from chlorides or sulphates, and correct proportion of nitre and sulphur to charcoal.

Products of Fired Powder and Changes taking place on Explosion.—With a mixture of the complexity of gunpowder it is quite impossible to say beforehand what will be the relative amounts of products. The desired products are nitrogen and carbon dioxide as gases, and potassium sulphate and carbonate as solids. But the ingredients of the mixture are not in any simple chemical proportion. Burning in contact with air under one atmosphere pressure, and burning in a closed or partially closed vessel under a considerable number of atmospheres pressure, may produce quite different results. The temperature of a reaction always rises with increased pressure. Although the main function of the nitre is to give up oxygen and nitrogen, of the charcoal to produce carbon dioxide and most of the heat, and of the sulphur by vaporizing to accelerate the rate of burning, it is quite impossible to represent the actions taking place on explosion by any simple or single chemical equation. Roughly speaking, the gases from black powder burnt in a closed vessel have a volume at 0° C. and 760 mm. pressure of about 280 times that of the original powder. The temperature produced under one atmosphere is above 2000° C., and under greater pressures considerably higher.

Experiments have been made by Benjamin Robins (1743), Charles Hutton (1778), Count Rumford (1797), Gay-Lussac (1823), R. Bunsen and L. Schiskoff (1857), T. J. Rodman (1861), C. Karolyi (1863), and later many researches by Sir Andrew Noble and Sir F. A. Abel, and by H. Debus and others, all with the idea of getting at the precise mechanism of the explosion. Debus (*Ann.*, 1882, vols. 212, 213; 1891, vol. 265) discussed at great length the results of researches by Bunsen, Karolyi, Noble and Abel, and others on the combustion of powder in closed vessels in such manner that all the products could be collected and examined and the pressures registered. A Waltham Abbey powder, according to an experiment by Noble and Abel, gave when fired in a closed vessel the following quantities of products calculated from one gram of powder:—

	Fractions of a gram.	Fractions of a molecule or atom.
Potassium carbonate	.2615	.00189 molecule
Potassium sulphate	.1268	.00072 ”
Potassium thiosulphate	.1666	.00087 ”
Potassium sulphide	.0252	.00017 ”
Sulphur	.0012	.00004 atom
Carbon dioxide	.2678	.00608 molecule
Carbon monoxide	.0339	.00121 ”
Nitrogen	.1071	.00765 atom
Hydrogen	.0008	.0008 ”
Hydrogen sulphide	.0080	.00023 molecule
Potassium thiocyanate	.0004	
Nitre	.0005	

From this, and other results, Debus concluded that Waltham Abbey powder could be represented by the formula $16KNO_3 + 21.18C + 6.63S$ and that on combustion in a closed vessel the end results could be fairly expressed (rounding off fractions) by $16KNO_3 + 21C + 5S = 5K_2CO_3 + K_2SO_4 + 2K_2S_2 + 13CO_2 + 3CO + 8N_2$. Some of the sulphur is lost, part combining with the metal of the apparatus and part with hydrogen in the charcoal. The military powders of most nations can be represented by the formula $16KNO_3 + 21.2C + 6.6S$, proportions which are reasonably near to a theoretical mixture, that is one giving most complete combustion, greatest gas volume and temperature. The combustion of powder consists of two processes: (i.) oxidation, during which potassium carbonate and sulphate, carbon dioxide and nitrogen are mainly formed, and (ii.) a reduction process in which free carbon acts on the potassium sulphate and free sulphur on the potassium carbonate, producing potassium sulphide and carbon monoxide respectively. Most powders contain more carbon and sulphur than necessary, hence the second stage. In this second stage heat is lost. The potassium sulphide is also the most objectionable constituent as regards fouling.

The energy of a powder is given, according to Berthelot, by multiplying the gas volume by the heat (in calories) produced during burning; Debus shows that a powder composed of $16KNO_3$ to 8C and 8S would have the least, and one of composition $16KNO_3 + 24C + 16S$ the greatest, when completely burnt. The greatest capability with the lowest proportion of carbon and sulphur to nitre would be obtained from the mixture ÷ $16KNO_3 + 22C + 8S$.

Smokeless and even noiseless powders seem to have been sought for during the whole gunpowder period. In 1756 one was experimented with in France, but was abandoned owing to difficulties in manufacture. Modern smokeless powders are certainly less noisy than the black powders, mainly because of the absence of metallic salts which although they may be gaseous whilst in the gun are certainly ejected as solids or become solids at the moment of contact with air.

Brown Powders.—About the middle of the 19th century guns and projectiles were made much larger and heavier than previously, and it was soon found that the ordinary black powders of the most dense form burnt much too rapidly, straining or bursting the pieces. Powders were introduced containing about 3% sulphur and 17-19% of a special form of charcoal made from slightly charred straw, or similar material. This “brown charcoal” contains a considerable amount of the hydrogen and oxygen of the original plant substance. The mechanical processes of manufacture of these brown powders is the same as for black. They, however, differ from black by burning very slowly, even under considerable pressure. This comparative slowness is caused by (1) the presence of a small amount of water even when air-dry; (2) the fact that the brown charcoal is practically very slightly altered cellulosic material, which before it can burn completely must undergo a little further resolution or charring at the expense of some heat from the portion of charge first ignited; and (3) the lower content of sulphur. An increase of a few per cent in the sulphur of black powder accelerates its rate of burning, and it may become almost a blasting powder. A decrease in sulphur has the reverse effect. It is really the sulphur vapour that in the early period of combustion spreads the flame through the charge.

Many other powders have been made or proposed in which nitrates or chlorates of the alkalis or of barium, &c., are the oxygen providers and substances as sugar, starch, and many other organic compounds as the combustible elements. Some of these compositions have found employment for blasting or even as sporting powders, but in most cases their objectionable properties of fouling, smoke and mode of exploding have prevented their use for military purposes. The adoption by the French government of the comparatively smokeless nitrocellulose explosive of Paul Vieille in 1887 practically put an end to the old forms of gunpowders. The first smokeless powder was made in 1865 by Colonel E. Schultze (*Ding. Pol. Jour.* 174, p. 323; 175, p. 453) by nitrating wood meal and adding potassium and barium nitrates. It is somewhat similar in composition to the E. C. sporting powder. F. Uchatius, in Austria, proposed a smokeless powder made from nitrated starch, but it was not adopted owing to its hygroscopic nature and also its tendency to detonate.

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A Short Account of Improvements in Gunpowder made by (London, 1818); Bunsen and Schiskoff, "On the Chemical Theory of Gunpowder," *Pogg. Ann.*, 1857, vol. cii.; General Rodman, *Experiments on Metal for Cannon, and Qualities of Cannon Powder* (Boston, 1861); Napoleon III., *Études sur le passé et l'avenir de l'artillerie*, vol. iii. (Paris, 1862); Von Karolyi, "On the Products of the Combustion of Gun Cotton and Gunpowder," *Phil. Mag.* (October 1863); Captain F. M. Smith, *Handbook of the Manufacture and Proof of Gunpowder at Waltham Abbey* (London, 1870); Noble and Abel, *Fired Gunpowder* (London, 1875, 1880); Noble, *Artillery and Explosives* (1906); H. W. L. Hime, *Gunpowder and Ammunition, their Origin and Progress* (1904); O. Guttmann, *The Manufacture of Explosives* (1895), *Monumenta pulveris pyrii* (1906); *Notes on Gunpowder and Gun Cotton*, published by order of the secretary of state for war (London, 1907). (See also EXPLOSIVES.)

(W. R. E. H.)

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1 These words were emended by some authors to read *luru mope can ubre*, the letters of which can be arranged to give *pulvere carbonum*.

2 This represents the composition of English powder at present, and no doubt it has remained the same for a longer time than the above date indicates.

3 Brown or coco-powder for large charges in guns. The charcoal is not burnt black but roasted until brown, and is made from some variety of straw, not wood.

GUNPOWDER PLOT, the name given to a conspiracy for blowing up King James I. and the parliament on the 5th of November 1605.

To understand clearly the nature and origin of the famous conspiracy, it is necessary to recall the political situation and the attitude of the Roman Catholics towards the government at the accession of James I. The Elizabethan administration had successfully defended its own existence and the Protestant faith against able and powerful antagonists, but this had not been accomplished without enforcing severe measures of repression and punishment upon those of the opposite faith. The beginning of a happier era, however, was expected with the opening of the new reign. The right of James to the crown could be more readily acknowledged by the Romanists than that of Elizabeth: Pope Clement VIII. appeared willing to meet the king half-way. James himself was by nature favourable to the Roman Catholics and had treated the Roman Catholic lords in Scotland with great leniency, in spite of their constant plots and rebellions. Writing to Cecil before his accession he maintained, "I am so far from any intention of persecution as I protest to God I reverence their church as our mother church, although clogged with many infirmities and corruptions, besides that I did ever hold persecution as one of the infallible notes of a false church." He declared to Northumberland, the kinsman and master of Thomas Percy, the conspirator, "as for the Catholics, I will neither persecute any that will be quiet and give but an outward obedience to the law, neither will I spare to advance any of them that will be of good service and worthily deserved." It is probable that these small but practical concessions would have satisfied the lay Roman Catholics and the secular priests, but they were very far from contenting the Jesuits, by whom the results of such leniency were especially feared: "What rigour of laws would not compass in so many years," wrote Henry Tichborne, the Jesuit, in 1598, "this liberty and lenity will effectuate in 20 days, to wit the disfurnishing of the seminaries, the disanimating of men to come and others to return, the expulsion of the society and confusion as in Germany, extinction of zeal and favour, disanimation of princes from the hot pursuit of the enterprise.... We shall be left as a prey to the wolves that will besides drive our greatest patron [the king of Spain] to stoop to a peace which will be the utter ruin of our edifice, this many years in building." Unfortunately, about this time the Jesuits, who thus thrived on political intrigue, and who were deeply implicated in treasonable correspondence with Spain, had obtained a complete ascendancy over the secular priests, who were for obeying the civil government as far as possible and keeping free from politics. The time, therefore, as far as the Roman Catholics themselves were concerned, was not a propitious one for introducing the moderate concessions which alone James had promised: James, too, on his side, found that religious toleration, though clearly sound in principle, was difficult in practice. During the first few months of the reign all went well. In July 1603 the fines for recusancy were remitted. In January 1604 peaceable Roman Catholics could live unmolested and "serve God according to their consciences without any danger." But James's expectations that the pope would prevent dangerous and seditious persons from entering the country were unfulfilled and the numbers of the Jesuits and the Roman Catholics greatly increased. Rumours of plots came to hand. Cecil, though like his master naturally in

favour of toleration, with his experience gained in the reign of Elizabeth, was alarmed at the policy pursued and its results, and great anxiety was aroused in the government and nation, which was in the end shared by the king. It was determined finally to return to the earlier policy of repression. On the 22nd of February 1604 a proclamation was issued banishing priests; on the 28th of November 1604, recusancy fines were demanded from 13 wealthy persons, and on the 10th of February 1605 the penal laws were ordered to be executed. The plot, however, could not have been occasioned by these measures, for it had been already conceived in the mind of Robert Catesby. It was aimed at the repeal of the whole Elizabethan legislation against the Roman Catholics and perhaps derived some impulse at first from the leniency lately shown by the administration, afterwards gaining support from the opposite cause, the return of the government to the policy of repression.

It was in May 1603 that Catesby told Percy, in reply to the latter's declaration of his intention to kill the king, that he was "thinking of a most sure way." Subsequently, about the 1st of November 1603, Catesby sent a message to his cousin Robert Winter at Huddington, near Worcester, to come to London, which the latter refused. On the arrival of a second urgent summons shortly afterwards he obeyed, and was then at a house at Lambeth, probably in January 1604, initiated by Catesby together with John Wright into the plot to blow up the parliament house. Before putting this plan into execution, however, it was decided to try a "quiet way"; and Winter was sent over to Flanders to obtain the good offices of Juan de Velasco, duke of Frias and constable of Castile, who had arrived there to conduct the negotiations for a peace between England and Spain, in order to obtain the repeal of the penal laws. Winter, having secured nothing but vain promises from the constable, returned to England about the end of April, bringing with him Guy Fawkes, a man devoted to the Roman Catholic cause and recommended for undertaking perilous adventures. Subsequently the three and Thomas Percy, who joined the conspiracy in May, met in a house behind St Clement's and, having taken an oath of secrecy together, heard Mass and received the Sacrament in an adjoining apartment from a priest stated by Fawkes to have been Father Gerard. Later several other persons were included in the plot, viz. Winter's brother Thomas, John Grant, Ambrose Rokewood, Robert Keyes, Sir Everard Digby, Francis Tresham, a cousin of Catesby and Thomas Bates Catesby's servant, all, with the exception of the last, being men of good family and all Roman Catholics. Father Greenway and Father Garnet, the Jesuits, were both cognisant of the plot (see Garnet, Henry). On the 24th of May 1604 a house was hired in Percy's name adjoining the House of Lords, from the cellar of which they proposed to work a mine. They began on the 11th of December 1604, and by about March had got half-way through the wall. They then discovered that a vault immediately under the House of Lords was available. This was at once hired by Percy, and 36 barrels of gunpowder, amounting to about 1 ton and 12 cwt., were brought in and concealed under coal and faggots. The preparations being completed in May the conspirators separated. Fawkes was despatched to Flanders, where he imparted the plot to Hugh Owen, a zealous Romanist intriguer. Sir Edmund Baynham was sent on a mission to Rome to be at hand when the news came to gain over the pope to the cause of the successful conspirators. An understanding was arrived at with several officers levied for the service of the archduke, that they should return at once to England when occasion arose of defending the Roman Catholic cause. A great hunting match was organized at Danchurch in Warwickshire by Digby, to which large numbers of the Roman Catholic gentry were invited, who were to join the plot after the successful accomplishment of the explosion of the 5th of November, the day fixed for the opening of parliament, and get possession of the princess Elizabeth, then residing in the neighbourhood; while Percy was to seize the infant prince Charles and bring him on horseback to their meeting-place. Guy Fawkes himself was to take ship immediately for Flanders, spread the news on the continent and get supporters. The conspirators imagined that a terrorized and helpless government would readily agree to all their demands. Hitherto the secret had been well kept and the preparations had been completed with extraordinary success and without a single drawback; but a very serious difficulty now confronted the conspirators as the time for action arrived, and disturbed their consciences. The feelings of ordinary humanity shrunk from the destruction of so many persons guiltless of any offence. But in addition, among the peers to be assassinated were included many Roman Catholics and some lords nearly connected in kinship or friendship with the plotters themselves. Several appeals, however, made to Catesby to allow warning to be given to certain individuals were firmly rejected.

On the 26th of October Lord Monteagle, a brother-in-law of Francis Tresham, who had formerly been closely connected with some of the other conspirators and had engaged in Romanist plots against the government, but who had given his support to the new king, unexpectedly ordered supper to be prepared at his house at Haxton, from which he had been absent for more than a year. While at supper about 6 o'clock an anonymous letter was brought by an unknown messenger which, having glanced at, he handed to Ward, a gentleman of his service and an intimate friend of Winter, the conspirator, to be read aloud. The celebrated

letter ran as follows:—

> "My lord, out of the love I bear to some of your friends, I have a care for your preservation. Therefore I would advise you, as you tender your life, to devise some excuse to shift of your attendance of this Parliament, for God and man hath concurred to punish the wickedness of this time. And think not slightly of this advertisement, but retire yourself into your country, where you may expect the event in safety, for though there be no appearance of any stir, yet I say they shall receive a terrible blow the Parliament, and yet they shall not see who hurts them. This counsel is not to be contemned, because it may do you good and can do you no harm, for the danger is past as soon as you have burnt the letter: and I hope God will give you the grace to make good use of it, to whose holy protection I commend you."

The authorship of the letter has never been disclosed or proved, but all evidence seems to point to Tresham, and to the probability that he had some days before warned Monteagle and agreed with him as to the best means of making known the plot and preventing its execution, and at the same time of giving the conspirators time to escape (see Tresham, Francis).

Monteagle at once started for Whitehall, found Salisbury and other ministers about to sit down to supper, and showed the letter, whereupon it was decided to search the cellar under the House of Lords before the meeting of parliament, but not too soon, so that the plot might be ripe and be fully disclosed. Meanwhile Ward, on the 27th of October, as had evidently been intended, informed Winter that the plot was known, and on the 28th Winter informed Catesby and begged him to give up the whole project. Catesby, however, after some hesitation, finding from Fawkes that nothing had been touched in the cellar, and prevailed upon by Percy, determined to stand firm, hoping that the government had put no credence in Monteagle's letter, and Fawkes returned to the cellar to keep guard as before. On the 4th the king, having been shown the letter, ordered the earl of Suffolk, as lord chamberlain, to examine the buildings. He was accompanied by Monteagle. On arriving at the cellar, the door was opened to him by Fawkes. Seeing the enormous piles of faggots he asked the name of their owner, to which Fawkes replied that they belonged to Percy. His name immediately aroused suspicions, and accordingly it was ordered that a further search should be made by Thomas Knyvett, a Westminster magistrate who, coming with his men at night, discovered the gunpowder and arrested Fawkes on the threshold.

The opinion that the whole plot was the work of Salisbury, that he acted as an *agent provocateur* and lured on his victims to destruction, repeated by some contemporary and later writers and recently formulated and urged with great ability, has no solid foundation. Nor is it even probable that he was aware of its existence till he received Monteagle's letter. Even after its reception complete belief was not placed in the warning. A search was made only to make sure that nothing was wrong and guided only by Monteagle's letter, while no attempt was made to seize the conspirators. The steps taken by Salisbury after the discovery of the gunpowder do not show the possession of any information of the plot or of the persons who were its chief agents outside Fawkes's first statement, and his knowledge is seen to develop according to the successive disclosures and confessions of the latter. Thus on the 7th of November he had no knowledge of the *mine*, and it is only after Fawkes's examination by torture on the 9th, when the names of the conspirators were drawn from him, that the government was able to classify them according to their guilt and extent of their participation. The inquiry was not conducted by Salisbury alone, but by several commissioners, some of whom were Roman Catholics, and many rivals and secret enemies. To conceal his intrigue from all these would have been impossible, and that he should have put himself in their power to such an extent is highly improbable. Again, the plan agreed upon for disclosing the plot was especially designed to allow the conspirators to escape, and therefore scarcely a method which would have been arranged with Salisbury. Not one of the conspirators, even when all hope of saving life was gone, made any accusation against Salisbury or the government and all died expressing contrition for their crime. Lastly Salisbury had no conceivable motive in concocting a plot of this description. His political power and position in the new reign had been already secured and by very different methods. He was now at the height of his influence, having been created Viscount Cranborne in August 1604 and earl of Salisbury in May 1605; and James had already, more than 16 months before the discovery of the plot, consented to return to the repressive measures against the Romanists. The success with which the conspirators concealed their plot from Salisbury's spies is indeed astonishing, but is probably explained by its very audacity and by the absence of incriminating correspondence, the medium through which the minister chiefly obtained his knowledge of the plans of his enemies.

On the arrest of Fawkes the other conspirators, except Tresham, fled in parties by different ways, rejoining each other in Warwickshire, as had been agreed in case the plot had been successful. Catesby, who with some others had covered the distance of 80 m. between London and his mother's house at Ashby St Legers in eight hours, informed his friends in

Warwickshire, who had been awaiting the issue of the plot, of its failure, but succeeded in persuading Sir Everard Digby, by an unscrupulous falsehood, to further implicate himself in his hopeless cause by assuring him that both James and Salisbury were dead; and, according to Father Garnet, this was not the first time that Catesby had been guilty of lies in order to draw men into the plot. He pushed on the same day with his companions in the direction of Wales, where, it was hoped, they would be joined by bands of insurgents. They arrived at Huddington at 2 in the afternoon. On the morning of the 7th the band, numbering about 36 persons, confessed and heard Mass, and then rode away to Holbeche, 2 m. from Stourbridge, in Staffordshire, the house of Stephen Littleton, who had been present at the hunting at Danchurch (see Digby, Everard), where they arrived at 10 o'clock at night, having on their way broken into Lord Windsor's house at Hewell Grange and taken all the armour they found there. Their case was now desperate. None had joined them: "Not one came to take our part," said Sir Everard Digby, "though we had expected so many." They were being followed by the sheriff and all the forces of the county. All spurned them from their doors when they applied for succour. One by one their followers fled from the house in which the last scene was to be played out. They now began to feel themselves abandoned not only by man but by God; for an explosion of some of their gunpowder, on the morning of the 8th, by which Catesby and some others were scorched, struck terror into their hearts as a judgment from heaven. The assurance of innocence and of a just cause which till now had alone supported them was taken away. The greatness of their crime, its true nature, now struck home to them, and the few moments which remained to them of life were spent in prayer and in repentance. The supreme hour had now arrived. About 11 o'clock the sheriff and his men came up and immediately began firing into the house. Catesby, Percy and the two Wrights were killed, Winter and Rokewood wounded and taken prisoners with the men who still adhered to them. In all eight of the conspirators, including the two Winters, Digby, Fawkes, Rokewood, Keyes and Bates, were executed, while Tresham died in the Tower. Of the priests involved, Garnet was tried and executed, while Greenway and Gerard succeeded in escaping.

So ended the strange and famous Gunpowder Plot. However atrocious its conception and its aims, it is impossible not to feel, together with horror for the deed, some pity and admiration for the guilty persons who took part in it. "Theirs was a crime which it would never have entered into the heart of any man to commit who was not raised above the lowness of the ordinary criminal." They sinned not against the light but in the dark. They erred from ignorance, from a perverted moral sense rather than from any mean or selfish motive, and exhibited extraordinary courage and self-sacrifice in the pursuit of what seemed to them the cause of God and of their country. Their punishment was terrible. Not only had they risked and lost all in the attempt and drawn upon themselves the frightful vengeance of the state, but they saw themselves the means of injuring irretrievably the cause for which they felt such devotion. Nothing could have been more disastrous to the cause of the Roman Catholics than their crime. The laws against them were immediately increased in severity, and the gradual advance towards religious toleration was put back for centuries. In addition a new, increased and long-enduring hostility was aroused in the country against the adherents of the old faith, not unnatural in the circumstances, but unjust and undiscriminating, because while some of the Jesuits were no doubt implicated, the secular priests and Roman Catholic laity as a whole had taken no part in the conspiracy.

Bibliography.—The recent controversy concerning the nature and origin of the plot can be followed in *What was the Gunpowder Plot?* by John Gerard, S.J. (1897); *What Gunpowder Plot was*, by S. R. Gardiner (a rejoinder) (1897); *The Gunpowder Plot ... in reply to Professor Gardiner*, by John Gerard, S.J. (1897); *Thomas Winter's Confession and the Gunpowder Plot*, by John Gerard, S.J. (with facsimiles of his writing) (1898); *Eng. Hist. Rev.* iii. 510 and xii. 791; *Edinburgh Review*, clxxxv. 183; *Athenaeum* 1897, ii. 149, 785, 855; 1898, i. 23, ii. 352, 420; *Academy*, vol. 52 p. 84; *The Nation*, vol. 65 p. 400. A considerable portion of the controversy centres round the question of the authenticity of Thomas Winter's confession, the MS. of which is at Hatfield, supported by Professor Gardiner, but denied by Father Gerard principally on account of the document having been signed "Winter" instead of "Wintour," the latter apparently being the conspirator's usual style of signature. The document was deposited by the 3rd Marquess of Salisbury for inspection at the Record Office, and was pronounced by two experts, one from the British Museum and another from the Record Office, to be undoubtedly genuine. The cause of the variation in the signature still remains unexplained, but ceases to have therefore any great historical importance. The bibliography of the contemporary controversy is given in the article on Henry Garnet in the *Dictionary of National Biography* and in *The Gunpowder Plot* by David Jardine (1857), the latter work still remaining the principal authority on the subject; add to these Gardiner's *Hist. of England*, i., where an excellent account is given; *History of the Jesuits in England*, by Father Ethelred Taunton (1901); Father Gerard's *Narrative in Condition of the Catholics under James I.* (1872), and Father Greenway's Narrative in *Troubles of our Catholic Forefathers*, 1st series (1872), interesting as contemporary accounts, but not to be taken as complete or infallible authorities, of the same

nature being *Historia Provinciae Anglicanae Societatis Jesu*, by Henry More, S.J. (1660), pp. 309 et seq.; also History of Great Britain, by John Speed (1611), pp. 839 et seq.; *Archaeologia*, xii. 200, xxviii. 422, xxix. 80; *Harleian Miscellany* (1809), iii. 119-135, or *Somers Tracts* (1809), ii. 97-117; M. A. Tierney's ed. of *Dodd's Church History*, vol. iv. (1841); *Treason and Plot*, by Martin Hume (1901); *Notes and Queries*, 7 ser. vi., 8 ser. iv. 408, 497, v. 55, xii. 505, 9 ser. xi. 115; *Add. MSS. Brit. Mus.* 6178; *State Trials*, ii.; *Calendar of State Pap. Dom.* (1603-1610), and the official account, *A True and Perfect Relation of the Whole Proceedings against the late most Barbarous Traitors* (1606), a neither true nor complete narrative however, now superseded as an authority, reprinted as *The Gunpowder Treason ...* with additions in 1679 by Thomas Barlow, bishop of Lincoln. A large number of letters and papers in the State Paper Office relating to the plot were collected in one volume in 1819, called the *Gunpowder Plot Book*; these are noted in their proper place in the printed calendars of State Papers, Domestic Series; see also articles on Fawkes, Guy; Tresham, Francis; Monteagle, William Parker, 4th Baron; Percy, Thomas; Catesby, Robert; Garnet, Henry; Digby, Sir Everard.

(P. C. Y.)

GUN-ROOM, a ship cabin occupied by the officers below the rank of lieutenant, but who are not warrant officers of the class of the boatswain, gunner or carpenter. In the wooden sailing ships it was on the lower deck, and was originally the quarters of the gunner.

GUNTER, EDMUND (1581-1626), English mathematician, of Welsh extraction, was born in Hertfordshire in 1581. He was educated at Westminster school, and in 1599 was elected a student of Christ Church, Oxford. He took orders, became a preacher in 1614, and in 1615 proceeded to the degree of bachelor in divinity. Mathematics, however, which had been his favourite study in youth, continued to engross his attention, and on the 6th of March 1619 he was appointed professor of astronomy in Gresham College, London. This post he held till his death on the 10th of December 1626. With Gunter's name are associated several useful inventions, descriptions of which are given in his treatises on the *Sector, Cross-staff, Bow, Quadrant and other Instruments*. He contrived his sector about the year 1606, and wrote a description of it in Latin, but it was more than sixteen years afterwards before he allowed the book to appear in English. In 1620 he published his *Canon triangulorum* (see Logarithms). There is reason to believe that Gunter was the first to discover (in 1622 or 1625) that the magnetic needle does not retain the same declination in the same place at all times. By desire of James I. he published in 1624 *The Description and Use of His Majestie's Dials in Whitehall Garden*, the only one of his works which has not been reprinted. He introduced the words cosine and cotangent, and he suggested to Henry Briggs, his friend and colleague, the use of the arithmetical complement (see Brigg's *Arithmetica Logarithmica*, cap. xv.). His practical inventions are briefly noticed below:

Gunter's Chain, the chain in common use for surveying, is 22 yds. long and is divided into 100 links. Its usefulness arises from its decimal or centesimal division, and the fact that 10 square chains make an acre.

Gunter's Line, a logarithmic line, usually laid down upon scales, sectors, &c. It is also called *the line of lines* and *the line of numbers*, being only the logarithms graduated upon a ruler, which therefore serves to solve problems instrumentally in the same manner as logarithms do arithmetically.

Gunter's Quadrant, an instrument made of wood, brass or other substance, containing a kind of stereographic projection of the sphere on the plane of the equinoctial, the eye being supposed to be placed in one of the poles, so that the tropic, ecliptic, and horizon form the arcs of circles, but the hour circles are other curves, drawn by means of several altitudes of the sun for some particular latitude every year. This instrument is used to find the hour of the day, the sun's azimuth, &c., and other common problems of the sphere or globe, and also to take the altitude of an object in degrees.

Gunter's Scale (generally called by seamen the *Gunter*) is a large plane scale, usually 2 ft. long by about 1½ in. broad, and engraved with various lines of numbers. On one side are placed the natural lines (as the line of chords, the line of sines, tangents, rhumbs, &c.), and on

the other side the corresponding artificial or logarithmic ones. By means of this instrument questions in navigation, trigonometry, &c., are solved with the aid of a pair of compasses.

GÜNTHER, JOHANN CHRISTIAN (1695-1723), German poet, was born at Striegau in Lower Silesia on the 8th of April 1695. After attending the gymnasium at Schweidnitz, he was sent in 1715 by his father, a country doctor, to study medicine at Wittenberg; but he was idle and dissipated, had no taste for the profession chosen for him, and came to a complete rupture with his family. In 1717 he went to Leipzig, where he was befriended by J. B. Mencke (1674-1732), who recognized his genius; and there he published a poem on the peace of Passarowitz (concluded between the German emperor and the Porte in 1718) which acquired him reputation. A recommendation from Mencke to Frederick Augustus II. of Saxony, king of Poland, proved worse than useless, as Günther appeared at the audience drunk. From that time he led an unsettled and dissipated life, sinking ever deeper into the slough of misery, until he died at Jena on the 15th of March 1723, when only in his 28th year. Goethe pronounces Günther to have been a poet in the fullest sense of the term. His lyric poems as a whole give evidence of deep and lively sensibility, fine imagination, clever wit, and a true ear for melody and rhythm; but an air of cynicism is more or less present in most of them, and dull or vulgar witticisms are not infrequently found side by side with the purest inspirations of his genius.

Günther's collected poems were published in four volumes (Breslau, 1723-1735). They are also included in vol. vi. of Tittmann's *Deutsche Dichter des 17ten Jahrh.* (Leipzig, 1874), and vol. xxxviii. of Kürschner's *Deutsche Nationalliteratur* (1883). A pretended autobiography of Günther appeared at Schweidnitz in 1732, and a life of him by Siebrand at Leipzig in 1738. See Hoffmann von Fallersleben, *J. Ch. Günther* (Breslau, 1833); O. Roquette, *Leben und Dichten J. Ch. Günthers* (Stuttgart, 1860); M. Kalbeck, *Neue Beiträge zur Biographie des Dichters C. Günther* (Breslau, 1879).

GÜNTHER OF SCHWARZBURG (1304-1349), German king, was a descendant of the counts of Schwarzburg and the younger son of Henry VII., count of Blankenburg. He distinguished himself as a soldier, and rendered good service to the emperor Louis IV., on whose death in 1347 he was offered the German throne, after it had been refused by Edward III., king of England. He was elected German king at Frankfort on the 30th of January 1349 by four of the electors, who were partisans of the house of Wittelsbach and opponents of Charles of Luxemburg, afterwards the emperor Charles IV. Charles, however, won over many of Günther's adherents, defeated him at Eltville, and Günther, who was now seriously ill, renounced his claims for the sum of 20,000 marks of silver. He died three weeks afterwards at Frankfort, and was buried in the cathedral of that city, where a statue was erected to his memory in 1352.

See Graf L. Ütterodt zu Scharffenberg, *Günther, Graf von Schwarzburg, erwählter deutscher König* (Leipzig, 1862); and K. Janson, *Das Königtum Günthers von Schwarzburg* (Leipzig, 1880).

GUNTRAM, or GONTRAN (561-592), king of Burgundy, was one of the sons of Clotaire I. On the death of his father (561) he and his three brothers divided the Frankish realm between them, Guntram receiving as his share the valleys of the Saône and Rhone, together with Berry and the town of Orleans, which he made his capital. On the death of Charibert (567), he further obtained the *civitates* of Saintes, Angoulême and Périgueux. During the civil war which broke out between the kings of Neustria and Austrasia, his policy was to try to maintain a state of equilibrium. After the assassination of Sigebert (575), he took the youthful Childebert II. under his protection, and, thanks to his assistance against the intrigues of the great lords,

the latter was able to maintain his position in Austrasia. After the death of Chilperic (584) he protected the young Clotaire II. in the same way, and prevented Childebert from seizing his dominions. His course was rendered easier by the fact that his own sons had died; consequently, having an inheritance at his disposal, he was able to offer it to whichever of his nephews he wished. The danger to the Frankish realm caused by the expedition of Gundobald (585), and the anxiety which was caused him by the revolts of the great lords in Austrasia finally decided him in favour of Childebert. He adopted him as his son, and recognized him as his heir at the treaty of Andelot (587); he also helped him to crush the great lords, especially Ursion and Berthefried, who were conquered in la Woëvre. From this time on he ceased to play a prominent part in the affairs of Austrasia. He died in 592, and Childebert received his inheritance without opposition. Gregory of Tours is very indulgent to Guntram, who showed himself on occasions generous towards the church; he almost always calls him "good king Guntram," and in his writings are to be found such phrases as "good king Guntram took as his servant a concubine Veneranda" (iv. 25); but Guntram was really no better than the other kings of his age; he was cruel and licentious, putting his *cubicularius* Condo to death, for instance, because he was suspected of having killed a buffalo in the Vosges. He was moreover a coward, and went in such constant terror of assassination that he always surrounded himself with a regular bodyguard.

See Krusch, "Zur Chronologie der merowingischen Könige," in the *Forschungen zur deutschen Geschichte*, xxii. 451-490; Ulysse Chevalier, *Bio-bibliographie* (2nd ed.), s.v. "Guntram."

(C. Pf.)

GUNTUR, a town and district of British India, in the Madras presidency. The town (pop. in 1901, 30,833) has a station on the Bellary-Bezwada branch of the Southern Mahratta railway. It is situated east of the Kondavid hills, and is very healthy. It appears to have been founded in the 18th century by the French. At the time of the cession of the Circars to the English in 1765, Guntur was specially exempted during the life of Basalat Jang, whose personal *jagir* it was. In 1788 it came into British possession, the cession being finally confirmed in 1823. It has an important trade in cotton, with presses and ginning factories. There is a second-grade college supported by the American Lutheran Mission. Until 1859, Guntur was the headquarters of a district of the same name, and in 1904 a new District of Guntur was constituted, covering territory which till then had been divided between Kistna and Nellore. Area, 5733 sq. m. The population on this area in 1901 was 1,490,635. The district is bounded on the E. and N. by the river Kistna; in the W. a considerable part of the boundary is formed by the Gundlakamma river. The greater part consists of a fertile plain irrigated by canals from the Kistna, and producing cotton, rice and other crops.

GUPTA, an empire and dynasty of northern India, which lasted from about A.D. 320 to 480. The dynasty was founded by Chandragupta I., who must not be confounded with his famous predecessor Chandragupta Maurya. He gave his name to the Gupta era, which continued in use for several centuries, dating from the 26th of February, A.D. 320. Chandragupta was succeeded by Samudragupta (*c.* A.D. 326-375), one of the greatest of Indian kings, who conquered nearly the whole of India, and whose alliances extended from the Oxus to Ceylon; but his name was at one time entirely lost to history, and has only been recovered of recent years from coins and inscriptions. His empire rivalled that of Asoka, extending from the Hugli on the east to the Jumna and Chambal on the west, and from the foot of the Himalayas on the north to the Nerbudda on the south. His son Chandragupta II. (*c.* A.D. 375-413) was also known as Vikra-Maditya (*q.v.*), and seems to have been the original of the mythical Hindu king of that name. About 388 he conquered the Saka satrap of Surashtra (Kathiawar) and penetrated to the Arabian Sea. His administration is described in the work of Fa-hien, the earliest Chinese pilgrim, who visited India in A.D. 405-411. Pataliputra was the capital of the dynasty, but Ajodhya seems to have been sometimes used by both Samudragupta and Chandragupta II. as the headquarters of government. The Gupta dynasty appears to have fostered a revival of Brahmanism at the expense of Buddhism, and to have given an impulse to art and literature. The golden age of the empire lasted from A.D. 330 to 455, beginning to decline after the latter

date. When Skandagupta came to the throne in 455, India was threatened with an irruption of the White Huns, on whom he inflicted a severe defeat, thus saving his kingdom for a time; but about 470 the White Huns (see EPHTHALITES) returned to the attack, and the empire was gradually destroyed by their repeated inroads. When Skandagupta died about 480, the Gupta empire came to an end, but the dynasty continued to rule in the eastern provinces for several generations. The last known prince of the imperial line of Guptas was Kamaragupta II. (*c.* 535), after whom it passed "by an obscure transition" into a dynasty of eleven Gupta princes, known as "the later Guptas of Magadha," who seem for the most part to have been merely local rulers of Magadha. One of them, however, Adityasena, after the death of the paramount sovereign in 648, asserted his independence. The last known Gupta king was Jivitagupta II., who reigned early in the 8th century. About the middle of the century Magadha passed under the sway of the Pal kings of Bengal.

See J. F. Fleet, *Gupta Inscriptions* (1888); and Vincent A. Smith, *The Early History of India* (2nd ed., Oxford, 1908), pp. 264-295.

GURA, EUGEN (1842-1906), German singer, was born near Saatz in Bohemia, and educated at first for the career of a painter at Vienna and Munich; but later, developing a fine baritone voice, he took up singing and studied it at the Munich Conservatorium. In 1865 he made his début at the Munich opera, and in the following years he gained the highest reputation in Germany, being engaged principally at Leipzig till 1876 and then at Hamburg till 1883. He sang in 1876 in the *Ring* at Bayreuth, and was famous for his Wagnerian rôles; and his Hans Sachs in *Meistersinger*, as performed in London in 1882, was magnificent. In later years he showed the perfection of art in his singing of German *Lieder*. He died in Bavaria on the 26th of August 1906.

GURDASPUR, a town and district of British India, in the Lahore division of the Punjab. The town had a population in 1901 of 5764. It has a fort (now containing a Brahman monastery) which was famous for the siege it sustained in 1712 from the Moguls. The Sikh leader, Banda, was only reduced by starvation, when he and his men were tortured to death after capitulating.

The DISTRICT comprises an area of 1889 sq. m. It is bounded on the N. by the native states of Kashmir and Chamba, on the E. by Kangra district and the river Beas, on the S.W. by Amritsar district, and on the W. by Sialkot, and occupies the submontane portion of the Bari Doab, or tract between the Beas and the Ravi. An intrusive spur of the British dominions runs northward into the lower Himalayan ranges, to include the mountain sanatorium of Dalhousie, 7687 ft. above sea-level. This station, which has a large fluctuating population during the warmer months, crowns the most westerly shoulder of a magnificent snowy range, the Dhaoladhar, between which and the plain two minor ranges intervene. Below the hills stretches a picturesque and undulating plateau covered with abundant timber, made green by a copious rainfall, and watered by the streams of the Bari Doab, which, diverted by dams and embankments, now empty their waters into the Beas directly, in order that their channels may not interfere with the Bari Doab canal. The district contains several large *jhils* or swampy lakes, and is famous for its snipe-shooting. It is historically important in connexion with the rise of the Sikh confederacy. The whole of the Punjab was then distributed among the Sikh chiefs who triumphed over the imperial governors. In the course of a few years, however, the maharaja Ranjit Singh acquired all the territory which those chiefs had held. Pathankot and the neighbouring villages in the plain, together with the whole hill portion of the district, formed part of the area ceded by the Sikhs to the British after the first Sikh war in 1846. In 1862, after receiving one or two additions, the district was brought into its present shape. In 1901 the population was 940,334, showing a slight decrease, compared with an increase of 15% in the previous decade. A branch of the North-Western railway runs through the district. The largest town and chief commercial centre is Batala. There are important woollen mills at Dhariwal, and besides their products the district exports cotton, sugar, grain and oil-seeds.

GURGAON, a town and district of British India, in the Delhi division of the Punjab. The town (pop. in 1901, 4765) is the headquarters of the district, but is otherwise unimportant. The district has an area of 1984 sq. m. It is bounded on the N. by Rohtak, on the W. and S.W. by portions of the Alwar, Nabha and Jind native states, on the S. by the Muttra district of the United Provinces, on the E. by the river Jumna and on the N.E. by Delhi. It comprises the southernmost corner of the Punjab province, stretching away from the level plain towards the hills of Rajputana. Two low rocky ranges enter its borders from the south and run northward in a bare and unshaded mass toward the plain country. East of the western ridge the valley is wide and open, extending to the banks of the Jumna. To the west lies the subdivision of Rewari, consisting of a sandy plain dotted with isolated hills. Numerous torrents carry off the drainage from the upland ranges, and the most important among them empty themselves at last into the Najafgarh *jhil*. This swampy lake lies to the east of the civil station of Gurgaon, and stretches long arms into the neighbouring districts of Delhi and Rohtak. Salt is manufactured in wells at several villages. The mineral products are iron ore, copper ore, plumbago and ochre.

In 1803 Gurgaon district passed into the hands of the British after Lord Lake's conquests. On the outbreak of the Mutiny in May 1857, the nawab of Farukhnagar, the principal feudatory of the district, rose in rebellion. The Meos and many Rajput families followed his example. A faithful native officer preserved the public buildings and records at Rewari from destruction; but with this exception, British authority became extinguished for a time throughout Gurgaon. After the fall of the rebel capital, a force marched into the district and either captured or dispersed the leaders of rebellion. The territory of the nawab was confiscated on account of his participation in the Mutiny. Civil administration was resumed under orders from the Punjab government, to which province the district was formally annexed on the final pacification of the country. The population in 1901 was 746,208, showing an increase of 11% in the decade. The largest town and chief trade centre is Rewari. The district is now traversed by several lines of railway, and irrigation is provided by the Agra canal. The chief trade is in cereals, but hardware is also exported.

GURKHA (pronounced *góorka*; from Sans. *gāu*, a cow, and *raks*, to protect), the ruling Hindu race in Nepal (*q.v.*). The Gurkhas, or Gurkhalis, claim descent from the rajas of Chitor in Rajputana. When driven out of their own country by the Mahommedan invasion, they took refuge in the hilly districts about Kumaon, whence they gradually invaded the country to the eastward as far as Gurkha, Noakote and ultimately to the valley of Nepal and even Sikkim. They were stopped by the English in an attempt to push south, and the treaty of Segauli, which ended the Gurkha War of 1814, definitely limited their territorial growth. The Gurkhas of the present day remain Hindus by religion, but show in their appearance a strong admixture of Mongolian blood. They make splendid infantry soldiers, and by agreement with their government about 20,000 have been recruited for the Gurkha regiments of the Indian army. As a rule they are bold, enduring, faithful, frank, independent and self-reliant. They despise other Orientals, but admire and fraternize with Europeans, whose tastes in sport and war they share. They strongly resemble the Japanese, but are of a sturdier build. Their national weapon is the *kukri*, a heavy curved knife, which they use for every possible purpose.

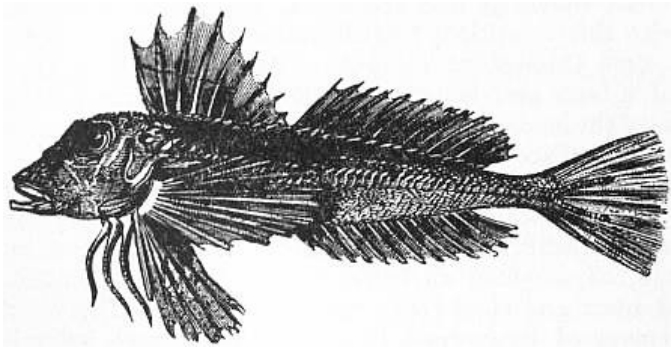
See Capt. Eden Vansittart, *Notes on the Gurkhas* (1898); and P. D. Bonarjee, *The Fighting Races of India* (1899).

GURNALL, WILLIAM (1617-1679), English author, was born in 1617 at King's Lynn, Norfolk. He was educated at the free grammar school of his native town, and in 1631 was nominated to the Lynn scholarship in Emmanuel College, Cambridge, where he graduated B.A. in 1635 and M.A. in 1639. He was made rector of Lavenham in Suffolk in 1644; and before he received that appointment he seems to have officiated, perhaps as curate, at Sudbury. At the Restoration he signed the declaration required by the Act of Uniformity, and on this account he was the subject of a libellous attack, published in 1665, entitled *Covenant-Renouncers Desperate Apostates*. He died on the 12th of October 1679. Gurnall is known by his *Christian in Complete Armour*, published in three volumes, dated 1655, 1658 and 1662. It consists of a

series of sermons on the latter portion of the 6th chapter of Ephesians, and is described as a "magazine from whence the Christian is furnished with spiritual arms for the battle, helped on with his armour, and taught the use of his weapon; together with the happy issue of the whole war." The work is more practical than theological; and its quaint fancy, graphic and pointed style, and its fervent religious tone render it still popular with some readers.

See also *An Inquiry into the Life of the Rev. W. Gurnall*, by H. M'Keon (1830), and a biographical introduction by Bishop Ryle to the *Christian in Complete Armour* (1865).

GURNARD (*Trigla*), a genus of fishes forming a group of the family of "mailed cheeks" (*Triglidae*), and easily recognized by three detached finger-like appendages in front of the pectoral fins, and by their large, angular, bony head, the sides of which are protected by strong, hard and rough bones. The pectoral appendages are provided with strong nerves, and serve not only as organs of locomotion when the fish moves on the bottom, but also as organs of touch, by which it detects small animals on which it feeds. Gurnards are coast-fishes, generally distributed over the tropical and temperate areas; of the forty species known six occur on the coast of Great Britain, viz. the red gurnard (*T. pini*), the streaked gurnard (*T. lineata*), the sapphirine gurnard (*T. hirundo*), the grey gurnard (*T. gurnardus*), the piper (*T. lyra*) and the long-finned gurnard (*T. obscura* or *T. lucerna*). Although never found very far from the coast, gurnards descend to depths of several hundred fathoms; and as they are bottom-fish they are caught chiefly by means of the trawl. Not rarely, however, they may be seen floating on the surface of the water, with their broad, finely coloured pectoral fins spread out like fans. In very young fishes, which abound in certain localities on the coast in the months of August and September, the pectorals are comparatively much longer than in the adult, extending to the end of the body; they are beautifully coloured and kept expanded, the little fishes looking like butterflies. When caught and taken out of the water, gurnards emit a grunting noise, which is produced by the vibrations of a diaphragm situated transversely across the cavity of the bladder and perforated in the centre. This grunting noise gave rise to the name "gurnard," which is probably an adaptation or variation of the Fr. *grognard*, grumbler, cf. the Fr. *grondin*, gurnard, from *gronder*, and Ger. *Knurrfisch*. Their flesh is very white, firm and wholesome.



Trigla pleuracanthica.

GURNEY, the name of a philanthropic English family of bankers and merchants, direct descendants of Hugh de Gournay, lord of Gournay, one of the Norman noblemen who accompanied William the Conqueror to England. Large grants of land were made to Hugh de Gournay in Norfolk and Suffolk, and Norwich has since that time been the headquarters of the family, the majority of whom were Quakers. Here in 1770 the brothers John and Henry Gurney founded a banking-house, the business passing in 1779 to Henry's son, Bartlett Gurney. On the death of Bartlett Gurney in 1802 the bank became the property of his three cousins, of whom John Gurney (1750-1809) was the most remarkable. One of his daughters was Elizabeth Fry; another married Sir Thomas Fowell Buxton. Of his sons one was Joseph John Gurney (1788-1847), a well-known philanthropist of the day; another, Samuel Gurney (1786-1856) assumed on

his father's death the control of the Norwich bank. Samuel Gurney also took over about the same time the control of the London bill-broking business of Richardson, Overend & Company, in which he was already a partner. This business had been founded in 1800 by Thomas Richardson, clerk to a London bill-discounter, and John Overend, chief clerk in the bank of Smith, Payne & Company at Nottingham, the Gurneys supplying the capital. At that time bill-discounting was carried on in a spasmodic fashion by the ordinary merchant in addition to his regular business, but Richardson considered that there was room for a London house which should devote itself entirely to the trade in bills. This, at that time, novel idea proved an instant success. The title of the firm was subsequently changed to Overend, Gurney & Company, and for forty years it was the greatest discounting-house in the world. During the financial crisis of 1825 Overend, Gurney & Company were able to make short loans to many other bankers. The house indeed became known as "the bankers' banker," and secured many of the previous clients of the Bank of England. Samuel Gurney died in 1856. He was a man of very charitable disposition, and during the latter years of his life charitable and philanthropic undertakings almost monopolized his attention. In 1865 the business of Overend, Gurney & Company, which had come under less competent control, was converted into a joint stock company, but in 1866 the firm suspended payment with liabilities amounting to eleven millions sterling.

GURNEY, EDMUND (1847-1888), English psychologist, was born at Hersham, near Walton-on-Thames, on the 23rd of March 1847. He was educated at Blackheath and at Trinity College, Cambridge, where he took a high place in the classical tripos and obtained a fellowship. His work for the schools was done, says his friend F. W. H. Myers, "in the intervals of his practice on the piano." Dissatisfied with his own executive skill as a musician, he wrote *The Power of Sound* (1880), an essay on the philosophy of music. He then studied medicine with no intention of practising, devoting himself to physics, chemistry and physiology. In 1880 he passed the second M.B. Cambridge examination in the science of the healing profession. These studies, and his great logical powers and patience in the investigation of evidence, he devoted to that outlying field of psychology which is called "Psychical Research." He asked whether, as universal tradition declares, there is an unexplored region of human faculty transcending the normal limitations of sensible knowledge. That there is such a region it was part of the system of Hegel to declare, and the subject had been metaphysically treated by Hartmann, Schopenhauer, Du Prel, Hamilton and others, as the philosophy of the Unconscious or Subconscious. But Gurney's purpose was to approach the subject by observation and experiment, especially in the hypnotic field, whereas vague and ill-attested anecdotes had hitherto been the staple of the evidence of metaphysicians. The tendency of his mind was to investigate whatever facts may give a colour of truth to the ancient belief in the persistence of the conscious human personality after the death of the body. Like Joseph Glanvill's, the natural bent of Gurney's mind was sceptical. Both thought the current and traditional reports of supernormal occurrences suggestive and worth investigating by the ordinary methods of scientific observation, and inquisition into evidence at first hand. But the method of Gurney was, of course, much more strict than that of the author of *Sadducismus Triumphatus*, and it included hypnotic and other experiments unknown to Glanvill. Gurney began at what he later saw was the wrong end by studying, with Myers, the "séances" of professed spiritualistic "mediums" (1874-1878). Little but detection of imposture came of this, but an impression was left that the subject ought not to be abandoned. In 1882 the Society for Psychical Research was founded. (See Psychical Research.) Paid mediums were discarded, at least for the time, and experiments were made in "thought-transference" and hypnotism. Personal evidence as to uninduced hallucinations was also collected. The first results are embodied in the volumes of *Phantasms of the Living*, a vast collection (Podmore, Myers and Gurney), and in Gurney's remarkable essay, *Hallucinations*. The chief consequence was to furnish evidence for the process called "telepathy," involving the provisional hypothesis that one human mind can affect another through no recognized channel of sense. The fact was supposed to be established by the experiments chronicled in the *Proceedings of the Society for Psychical Research*, and it was argued that similar experiences occurred spontaneously, as, for example, in the many recorded instances of "deathbed wraiths" among civilized and savage races. (Tylor, *Primitive Culture*, i. chapter xi., especially pp. 449-450, 1873. Lang, *Making of Religion*, pp. 120-124, 1898.) The dying man is supposed to convey the hallucination of his presence as one living person experimentally conveys his thought to another, by "thought-transference." Gurney's hypnotic experiments, marked by great exactness, patience and ingenuity, were undertaken in 1885-1888. Their tendency was, in Myers's words, "to prove—so far as any one

operator's experience in this protean subject can be held to prove anything—that there is sometimes, in the induction of hypnotic phenomena, some agency at work which is neither ordinary nervous stimulation (monotonous or sudden) nor suggestion conveyed by any ordinary channel to the subject's mind." These results, if accepted, of course corroborate the idea of telepathy. (See Gurney, "Hypnotism and Telepathy," *Proceedings S. P. R.* vol. iv.) Experiments by MM. Gibert, Janet, Richet, Héricourt and others are cited as tending in the same direction. Other experiments dealt with "the relation of the memory in the hypnotic state to the memory in another hypnotic state, and of both to the normal or waking memory." The result of Gurney's labours, cut short by his early death, was to raise and strengthen the presumption that there exists an unexplored region of human faculty which ought not to be neglected by science as if the belief in it were a mere survival of savage superstition. Rather, it appears to have furnished the experiences which, misinterpreted, are expressed in traditional beliefs. That Gurney was credulous and easily imposed upon those who knew him, and knew his penetrating humour, cannot admit; nor is the theory likely to be maintained by those whom bias does not prevent from studying with care his writings. In controversy "he delighted in replying with easy courtesy to attacks envenomed with that *odium plus quam theologicum* which the very allusion to a ghost or the human soul seems in some philosophers to inspire." In discussion of themes unpopular and obscure Gurney displayed the highest tact, patience, good temper, humour and acuteness. There never was a more disinterested student. In addition to his work on music and his psychological writings, he was the author of *Tertium Quid* (1887), a collection of essays, on the whole a protest against one-sided ideas and methods of discussion. He died at Brighton on 23rd June 1888, from the effects of an overdose of narcotic medicine.

(A. L.)

GURWOOD, JOHN (1790-1845), British soldier, began his career in a merchant's office, but soon obtained an ensigncy in the 52nd (1808). With his regiment he served in the "Light Division" of Wellington's army throughout the earlier Peninsular campaigns, and at Ciudad Rodrigo (19th Jan. 1812) he led one of the forlorn hopes and was severely wounded. For his gallant conduct on this occasion Wellington presented Gurwood with the sword of the French governor of Ciudad Rodrigo. A little later, transferring to the 9th Light Dragoons, he was made brigade-major to the Guards' cavalry which had just arrived in the Peninsula. In the latter part of the war he served as brigade-major to Lambert's brigade of the sixth infantry division, and was present at the various actions in which that division played a conspicuous part—the Nivelle, the Nive, Orthes and Toulouse. At Waterloo Captain Gurwood was for the third time severely wounded. In the first twelve years of the peace he was promoted up to the grade of lieut.-colonel, and in 1841 became brevet-colonel. He was for many years the duke of Wellington's private secretary, and was entrusted by him with the collection and editing of the *Wellington Despatches*, which occupied Gurwood from 1837 to the end of his life. This work is a monument of industrious skill, and earned its author a Civil List Pension of £200. But overwork and the effects of his wounds had broken his health, and he committed suicide on Christmas day 1845. He was a C.B. and deputy-lieutenant of the Tower.

GUSLA, or Gusli, an ancient stringed instrument still in use among the Slavonic races. The modern Servian gusla is a kind of tanbur (see Pandura), consisting of a round, concave body covered with a parchment soundboard; there is but one horse-hair string, and the peg for tuning it is inserted in oriental fashion in the back of the head. The gusla is played with a primitive bow called *goudalo*. The *gouslars* or blind bards of Servia and Croatia use it to accompany their chants. C. G. Anton[1] mentions an instrument of that name in the shape of a half-moon strung with eighteen strings in use among the Tatars. Prosper Merimée[2] has taken the *gusla* as the title for a book of Servian poems, which are supposed to have been collected by him among the peasants, but which are thought to have been inspired by the *Viaggio in Dalmazia* of Albarto Fortis.

Among the Russians, the gusli is an instrument of a different type, a kind of psaltery having five or more strings stretched across a flat, shallow sound-chest in the shape of a wing. In the

gusli the strings, of graduated length, are attached to little nails or pins at one end, and at the other they are wound over a rod having screw attachments for increasing and slackening the tension. There is no bridge to determine the vibrating length of the strings. The body of the instrument is shaped roughly like the tail of the grand piano, following the line of the strings; the longest being at the left of the instrument. Matthew Guthrie gives an illustration of the gusli.[3]

(K. S.)

1 *Erste Linien eines Versuchs über den Ursprung der alten Slaven* (Leipzig, 1783-1789), p. 145.

2 *La Guzla, ou choix de poésies lyriques recueillies dans la Dalmatie, la Bosnie, la Croatie, &c.* (Paris, 1827).

3 *Dissertations sur les antiquités de Russie* (St Petersburg, 1795), pl. ii. No. 9, p. 31.

GUSTAVUS I. ERIKSSON (1496-1560), king of Sweden, was born at his mother's estate at Lindholm on Ascension Day 1496. He came of a family which had shone conspicuously in 15th-century politics, though it generally took the anti-national side. His father, Erik Johansson of Rydboholm, "a merry and jocose gentleman," but, like all the Swedish Vasas, liable to sudden fierce gusts of temper, was one of the senators who voted for the deposition of Archbishop Trolle, at the *riksdag* of 1517 (see Sweden, *History*), for which act of patriotism he lost his head. Gustavus's mother, Cecilia Månsdåtter, was closely connected by marriage with the great Sture family. Gustavus's youthful experiences impressed him with a life-long distrust of everything Danish. In his eighteenth year he was sent to the court of his cousin Sten Sture. At the battle of Brännkyrka, when Sture defeated Christian II. of Denmark, the young Gustavus 734 bore the governor's standard, and in the same year (1518) he was delivered with five other noble youths as a hostage to King Christian, who treacherously carried him prisoner to Denmark. He was detained for twelve months in the island fortress of Kalö, on the east coast of Jutland, but contrived to escape to Lübeck in September 1519. There he found an asylum till the 20th of May 1520, when he chartered a ship to Kalmar, one of the few Swedish fortresses which held out against Christian II.

It was while hunting near Lake Mälar that the news of the Stockholm massacre was brought to him by a peasant fresh from the capital, who told him, at the same time, that a price had been set upon his head. In his extremity, Gustavus saw only one way of deliverance, an appeal for help to the sturdy yeomen of the dales. How the dalesmen set Gustavus on the throne and how he and they finally drove the Danes out of Sweden (1521-1523) is elsewhere recorded (see Sweden: *History*). But his worst troubles only began after his coronation on the 6th of June 1523. The financial position of the crown was the most important of all the problems demanding solution, for upon that everything else depended. By releasing his country from the tyranny of Denmark, Gustavus had made the free independent development of Sweden a possibility. It was for him to realize that possibility. First of all, order had to be evolved from the chaos in which Sweden had been plunged by the disruption of the Union; and the shortest, perhaps the only, way thereto was to restore the royal authority, which had been in abeyance during ninety years. But an effective reforming monarchy must stand upon a sound financial basis; and the usual revenues of the crown, always inadequate, were so diminished that they did not cover half the daily expenses of government. New taxes could only be imposed with extreme caution, while the country was still bleeding from the wounds of a long war. And men were wanted even more than money. The lack of capable, trustworthy administrators in Sweden was grievous. The whole burden of government weighed exclusively on the shoulders of the new king, a young man of seven and twenty. Half his time was taken up in travelling from one end of the kingdom to the other, and doing purely clerical work for want of competent assistance. We can form some idea of his difficulties when we learn that, in 1533, he could not send an ambassador to Lübeck because not a single man in his council, except himself, knew German. It was this lack of native talent which compelled Gustavus frequently to employ the services of foreign adventurers like Berent von Mehlen, John von Hoja, Konrad von Pyhy and others.

It was not the least of Gustavus's many anxieties that he had constantly to be on the watch lest a formidable democratic rival should encroach on his prerogative. That rival was the Swedish peasantry. He succeeded indeed in putting down the four formidable rebellions which convulsed the realm from 1525 to 1542, but the consequent strain upon his resources was very damaging, and more than once he was on the point of abdicating and emigrating, out of sheer

weariness. Moreover he was in constant fear of the Danes. Necessity compelled him indeed (1534-1536) to take part in *Grevens fejde* (Counts' War) (see Denmark, *History*), as the ally of Christian III., but his exaggerated distrust of the Danes was invincible. "We advise and exhort you," he wrote to the governor of Kalmar, "to put no hope or trust in the Danes, or in their sweet scribbling, inasmuch as they mean nothing at all by it except how best they may deceive and betray us Swedes." Such instructions were not calculated to promote confidence between Swedish and Danish negotiators. A fresh cause of dispute was generated in 1548, when Christian III.'s daughter was wedded to Duke Augustus of Saxony. On that occasion, apparently by way of protest against the decree of the diet of Vesterås (15th of January 1544), declaring the Swedish crown hereditary in Gustavus's family, the Danish king caused to be quartered on his daughter's shield not only the three Danish lions and the Norwegian lion with the axe of St Olaf, but also "the three crowns" of Sweden. Gustavus, naturally suspicious, was much perturbed by the innovation, and warned all his border officials to be watchful and prepare for the worst. In 1557 he even wrote to the Danish king protesting against the placing of "the three crowns" in the royal Danish seal beneath the arms of Denmark. Christian III. replied that "the three crowns" signified not Sweden in especial, but the three Scandinavian kingdoms, and that their insertion in the Danish shield was only a reminiscence of the union of Kalmar. But Gustavus was not satisfied, and this was the beginning of "the three crowns" dispute which did so much damage to both kingdoms.

The events which led to the rupture of Gustavus with the Holy See are set forth in the proper place (see Sweden: *History*). Here it need only be added that it was a purely political act, as Gustavus, personally, had no strong dogmatic leanings either way. He not unnaturally expressed his amazement when that very juvenile reformer Olavus Petri confidently informed him that the pope was antichrist. He consulted the older and graver Laurentius Andreae, who told him how "Doctor Martinus had clipped the wings of the pope, the cardinals and the big bishops," which could not fail to be pleasing intelligence to a monarch who was never an admirer of episcopacy, while the rich revenues of the church, accumulated in the course of centuries, were a tempting object to the impecunious ruler of an impoverished people. Subsequently, when the Protestant hierarchy was forcibly established in Sweden, matters were much complicated by the absolutist tendencies of Gustavus. The incessant labour, the constant anxiety, which were the daily portion of Gustavus Vasa during the seven and thirty years of his reign, told at last even upon his magnificent constitution. In the spring of 1560, conscious of an ominous decline of his powers, Gustavus summoned his last diet, to give an account of his stewardship. On the 16th of June 1560 the assembly met at Stockholm. Ten days later, supported by his sons, Gustavus greeted the estates in the great hall of the palace, when he took a retrospect of his reign, reminding them of the misery of the kingdom during the union and its deliverance from "that unkind tyrant, King Christian." Four days later the diet passed a resolution confirming the hereditary right of Gustavus's son, Prince Eric, to the throne. The old king's last anxieties were now over and he could die in peace. He expired on the 29th of September 1560.

Gustavus was thrice married. His first wife, Catherine, daughter of Magnus I., duke of Saxe-Lauenburg, bore him in 1533 his eldest son Eric. This union was neither long nor happy, but the blame for its infelicity is generally attributed to the lady, whose abnormal character was reflected and accentuated in her unhappy son. Much more fortunate was Gustavus's second marriage, a year after the death of his first consort, with his own countrywoman, Margaret Lejonhufvud, who bore him five sons and five daughters, of whom three sons, John, Magnus and Charles, and one daughter, Cecilia, survived their childhood. Queen Margaret died in 1551; and a twelvemonth later Gustavus wedded her niece, Catharine Stenbock, a handsome girl of sixteen, who survived him more than sixty years.

Gustavus's outward appearance in the prime of life is thus described by a contemporary: "He was of the middle height, with a round head, light yellow hair, a fine long beard, sharp eyes, a ruddy countenance ... and a body as fitly and well proportioned as any painter could have painted it. He was of a sanguine-choleric temperament, and when untroubled and unvexed, a bright and cheerful gentleman, easy to get on with, and however many people happened to be in the same room with him, he was never at a loss for an answer to every one of them." Learned he was not, but he had naturally bright and clear understanding, an unusually good memory, and a marvellous capacity for taking pains. He was also very devout, and his morals were irreproachable. On the other hand, Gustavus had his full share of the family failings of irritability and suspiciousness, the latter quality becoming almost morbid under the pressure of adverse circumstances. His energy too not infrequently degenerated into violence, and when crossed he was apt to be tyrannical.

See A. Alberg, *Gustavus Vasa and his Times* (London, 1882); R. N. Bain, *Scandinavia*, chaps. iii. and v. (Cambridge, 1905); P. B. Watson, *The Swedish Revolution under Gustavus Vasa* (London, 1889); O. Sjögren, *Gustaf Vasa* (Stockholm, 1896); C. M. Butler, *The Reformation in*

Sweden (New York, 1883); *Sveriges Historia* (Stockholm, 1877-1881); J. Weidling, *Schwedische Geschichte im Zeitalter der Reformation* (Gotha, 1882).

(R. N. B.)

GUSTAVUS II. ADOLPHUS (1594-1632), king of Sweden, the eldest son of Charles IX. and of Christina, daughter of Adolphus, duke of Holstein-Gottorp, was born at Stockholm castle on the 9th of December 1594. From the first he was carefully nurtured to be the future prop of Protestantism by his austere parents. Gustavus was well grounded in the classics, and his linguistic accomplishments were extraordinary. He may be said to have grown up with two mother-tongues, Swedish and German; at twelve he had mastered Latin, Italian and Dutch; and he learnt subsequently to express himself in Spanish, Russian and Polish. But his practical father took care that he should grow up a prince, not a pedant. So early as his ninth year he was introduced to public life; at thirteen he received petitions and conversed officially with the foreign ministers; at fifteen he administered his duchy of Vestmanland and opened the Örebro diet with a speech from the throne; indeed from 1610 he may be regarded as his father's co-regent. In all martial and chivalrous accomplishments he was already an adept; and when, a year later, he succeeded to supreme power, his superior ability was as uncontested as it was incontestable.

The first act of the young king was to terminate the fratricidal struggle with Denmark by the peace of Knäred (28th of January 1613). Simultaneously, another war, also an heritage from Charles IX., had been proceeding in the far distant regions round lakes Ilmen, Peipus and Ladoga, with Great Novgorod as its centre. It was not, however, like the Danish War, a national danger, but a political speculation meant to be remunerative and compensatory, and was concluded very advantageously for Sweden by the peace of Stolbova on the 27th of February 1617 (see SWEDEN: *History*). By this peace Gustavus succeeded in excluding Muscovy from the Baltic. "I hope to God," he declared to the Stockholm diet in 1617, when he announced the conclusion of peace, "that the Russians will feel it a bit difficult to skip over *that* little brook." The war with Poland which Gustavus resumed in 1621 was a much more difficult affair. It began with an attack upon Riga as the first step towards conquering Livonia. Riga was invested on the 13th of August and surrendered on the 15th of September; on the 3rd of October Mitau was occupied; but so great were the ravages of sickness during the campaign that the Swedish army had to be reinforced by no fewer than 10,000 men. A truce was thereupon concluded and hostilities were suspended till the summer of 1625, in the course of which Gustavus took Kokenhusen and invaded Lithuania. In January 1626 he attacked the Poles at Walhof and scattered the whole of their army after slaying a fifth part of it. This victory, remarkable besides as Gustavus's first pitched battle, completed the conquest of Livonia. As, however, it became every year more difficult to support an army in the Dvina district, Gustavus now resolved to transfer the war to the Prussian provinces of Poland with a view to securing the control of the Vistula, as he had already secured the control of the Dvina. At the end of 1626, the Swedish fleet, with 14,000 men on board, anchored in front of the chain of sand-dunes which separates the Frische-Haff from the Baltic. Pillau, the only Baltic port then accessible to ships of war, was at once occupied, and Königsberg shortly afterwards was scared into an unconditional neutrality. July was passed in conquering the bishopric of Ermeland. The surrender of Elbing and Marienburg placed Gustavus in possession of the fertile and easily defensible delta of the Vistula, which he treated as a permanent conquest, making Axel Oxenstjerna its first governor-general. Communications between Danzig and the sea were cut off by the erection of the first of Gustavus's famous entrenched camps at Dirschau. From the end of August 1626 the city was blockaded, and in the meantime Polish irregulars, under the capable Stanislaus Koniecpolski, began to harass the Swedes. But the object of the campaign, a convenient basis of operations, was won; and in October the king departed to Sweden to get reinforcements. He returned in May 1627 with 7000 men, which raised his forces to 14,000, against which Koniecpolski could only oppose 9000. But his superior strategy frustrated all the efforts of the Swedish king, who in the course of the year was twice dangerously wounded and so disabled that he could never wear armour again. Gustavus had made extensive preparations for the ensuing campaign and took the field with 32,000 men. But once again, though far outnumbered, and unsupported by his own government, the Polish grand-hetman proved more than a match for Gustavus, who, on the 10th of September, broke up his camp and returned to Prussia; the whole autumn campaign had proved a failure and cost him 5000 men. During the ensuing campaign of 1629 Gustavus had to contend against the combined forces of Koniecpolski and 10,000 of Wallenstein's mercenaries. The Polish commander now showed the Swedes what he could do with adequate

forces. At Stuhm, on the 29th of June, he defeated Gustavus, who lost most of his artillery and narrowly escaped capture. The result of the campaign was the conclusion of the six years' truce of Altmark, which was very advantageous to Sweden.

And now Gustavus turned his attention to Germany. The motives which induced the Swedish king to intervene directly in the Thirty Years' War are told us by himself in his correspondence with Oxenstjerna. Here he says plainly that it was the fear lest the emperor should acquire the Baltic ports and proceed to build up a sea-power dangerous to Scandinavia. For the same reason, the king rejected the chancellor's alternative of waging a simply defensive war against the emperor by means of the fleet, with Stralsund as his base. He was convinced by the experience of Christian IV. of Denmark that the enemies' harbours could be wrested from them only by a successful offensive war on land; and, while quite alive to the risks of such an enterprise in the face of two large armies, Tilly's and Wallenstein's, each of them larger than his own, he argued that the vast extent of territory and the numerous garrisons which the enemy was obliged to maintain, more than neutralized his numerical superiority. Merely to blockade all the German ports with the Swedish fleet was equally impossible. The Swedish fleet was too weak for that; it would be safer to take and fortify the pick of them. In Germany itself, if he once got the upper hand, he would not find himself without resources. It is no enthusiastic crusader, but an anxious and farseeing if somewhat speculative statesman who thus opens his mind to us. No doubt religious considerations largely influenced Gustavus. He had the deepest sympathy for his fellow-Protestants in Germany; he regarded them as God's peculiar people, himself as their divinely appointed deliverer. But his first duty was to Sweden; and, naturally and rightly, he viewed the whole business from a predominantly Swedish point of view. Lutherans and Calvinists were to be delivered from a "soul-crushing tyranny"; but they were to be delivered by a foreign if friendly power; and that power claimed as her reward the hegemony of Protestant Europe and all the political privileges belonging to that exalted position.

On the 19th of May 1630 Gustavus solemnly took leave of the estates of the realm assembled at Stockholm. He appeared before them holding in his arms his only child and heiress, the little princess Christina, then in her fourth year, and tenderly committed her to the care of his loyal and devoted people. Then he solemnly took the estates to witness, as he stood there "in the sight of the Almighty," that he had begun hostilities "out of no lust for war, as many will certainly devise and imagine," but in self-defence and to deliver his fellow-Christians from oppression. On the 7th of June 1630 the Swedish fleet set sail, and two days after midsummer day, the whole army, 16,000 strong, was disembarked at Peenemünde. Gustavus's plan was to take possession of the mouths of the Oder Haff, and, resting upon Stralsund in the west and Prussia in the east, penetrate into Germany. In those days rivers were what railways now are, the great military routes; and Gustavus's German war was a war waged along river lines. The opening campaign was to be fought along the line of the Oder. Stettin, the capital of Pomerania, and the key of the Oder line, was occupied and converted into a first-class fortress. He then proceeded to clear Pomerania of the piebald imperial host composed of every nationality under heaven, and officered by Italians, Irishmen, Czechs, Croats, Danes, Spaniards and Walloons. Gustavus's army has often been described by German historians as an army of foreign invaders; in reality it was far more truly Teutonic than the official defenders of Germany at that period. Gustavus's political difficulties (see Sweden: *History*) chained him to his camp for the remainder of the year. But the dismissal of Wallenstein and the declaration in Gustavus's favour of Magdeburg, the greatest city in the Lower Saxon Circle, and strategically the strongest fortress of North Germany, encouraged him to advance boldly. But first, honour as well as expediency moved him to attempt to relieve Magdeburg, now closely invested by the imperialists, especially as his hands had now been considerably strengthened by a definite alliance with France (treaty of Bärwalde, 13th of January 1631). Magdeburg, therefore, became the focus of the whole campaign of 1631; but the obstructive timidity of the electors of Brandenburg and Saxony threw insuperable obstacles in his way, and, on the very day when John George I. of Saxony closed his gates against Gustavus the most populous and prosperous city in North Germany became a heap of smoking ruins (20th of May). Gustavus, still too weak to meet the foe, entrenched himself at Werben, at the confluence of the Havel and Elbe. Only on the 12th of September did the elector of Saxony, alarmed for the safety of his own states, now invaded by the emperor, place himself absolutely at the disposal of Gustavus; and, five days later, at the head of the combined Swedish-Saxon army, though the Swedes did all the fighting, Gustavus routed Tilly at the famous battle of Breitenfeld, north of Leipzig.

The question now was: In what way should Gustavus utilize his advantage? Should he invade the Austrian crown lands, and dictate peace to Ferdinand II. at the gates of Vienna? Or should he pursue Tilly westwards and crush the league at its own hearth and home? Oxenstjerna was the first alternative, but Gustavus decided in favour of the second. His decision has been greatly blamed. More than one modern historian has argued that if Gustavus had done in 1631

what Napoleon did in 1805 and 1809, there would have been a fifteen instead of a thirty years' war. But it should be borne in mind that, in the days of Gustavus, Vienna was by no means so essential to the existence of the Habsburg monarchy as it was in the days of Napoleon; and even Gustavus could not allow so dangerous an opponent as Tilly time to recover himself. Accordingly, he set out for the Rhine, taking Marienberg and Frankfort on his way, and on the 20th of December entered Mainz, where he remained throughout the winter of 1631-1632. At the beginning of 1632, in order to bring about the general peace he so earnestly desired, he proposed to take the field with an overwhelming numerical majority. The signal for Gustavus to break up from the Rhine was the sudden advance of Tilly from behind the Danube. Gustavus pursued Tilly into Bavaria, forced the passage of the Danube at Donauwörth and the passage of the Lech, in the face of Tilly's strongly entrenched camp at Rain, and pursued the flying foe to the fortress of Ingolstadt where Tilly died of his wounds a fortnight later. Gustavus then liberated and garrisoned the long-oppressed Protestant cities of Augsburg and Ulm, and in May occupied Munich. The same week Wallenstein chased John George from Prague and manœuvred the Saxons out of Bohemia. Then, armed as he was with plenipotentiary power, he offered the elector of Saxony peace on his own terms. Gustavus suddenly saw himself exposed to extreme peril. If Tilly had made John George such an offer as Wallenstein was now empowered to make, the elector would never have become Gustavus's ally; would he remain Gustavus's ally now? Hastily quitting his quarters in Upper Swabia, Gustavus hastened towards Nuremberg on his way to Saxony, but finding that Wallenstein and Maximilian of Bavaria had united their forces, he abandoned the attempt to reach Saxony, and both armies confronted each other at Nuremberg which furnished Gustavus with a point of support of the first order. He quickly converted the town into an entrenched and fortified camp. Wallenstein followed the king's example, and entrenched himself on the western bank of the Regnitz in a camp twelve English miles in circumference. His object was to pin Gustavus fast to Nuremberg and cut off his retreat northwards. Throughout July and August the two armies faced each other immovably. On the 24th of August, after an unsuccessful attempt to storm Alte Veste, the key of Wallenstein's position, the Swedish host retired southwards.

Towards the end of October, Wallenstein, after devastating Saxony, was preparing to go into winter quarters at Lützen, when the king surprised him as he was crossing the Rippach (1st of November) and a rearguard action favourable to the Swedes ensued. Indeed, but for nightfall, Wallenstein's scattered forces might have been routed. During the night, however, Wallenstein re-collected his host for a decisive action, and at daybreak on the 6th of November, while an autumn mist still lay over the field, the battle began. It was obviously Gustavus's plan to drive Wallenstein away from the Leipzig road, north of which he had posted himself, and thus, in case of success, to isolate, and subsequently, with the aid of the Saxons in the Elbe fortresses, annihilate him. The king, on the Swedish right wing, succeeded in driving the enemy from the trenches and capturing his cannon. What happened after that is mere conjecture, for a thick mist now obscured the autumn sun, and the battle became a colossal mêlée the details of which are indistinguishable. It was in the midst of that awful obscurity that Gustavus met his death—how or where is not absolutely certain; but it would seem that he lost his way in the darkness while leading the Småland horse to the assistance of his infantry, and was despatched as he lay severely wounded on the ground by a hostile horseman.

By his wife, Marie Eleonora, a sister of the elector of Brandenburg, whom he married in 1620, Gustavus Adolphus had one daughter, Christina, who succeeded him on the throne of Sweden.

See *Sveriges Historia* (Stockholm, 1877, 81), vol. iv.; A. Oxenstjerna, *Skrifter och Brefvexling* (Stockholm, 1900, &c.); G. Björlen, *Gustaf Adolf* (Stockholm, 1890); R. N. Bain, *Scandinavia* (Cambridge, 1905); C. R. L. Fletcher, *Gustavus Adolphus* (London, 1892); J. L. Stevens, *History of Gustavus Adolphus* (London, 1885); J. Mankell, *Om Gustaf II. Adolfs politik* (Stockholm, 1881); E. Bluemel, *Gustav Adolf, König von Schweden* (Eisleben, 1894); A. Rydfors, *De diplomatiska förbindelserna mellan Sverige och England 1624-1630* (Upsala, 1890).

(R. N. B.)

GUSTAVUS III. (1746-1792), king of Sweden, was the eldest son of Adolphus Frederick, king of Sweden, and Louisa Ulrica of Prussia, sister of Frederick the Great, and was born on the 24th of January 1746. Gustavus was educated under the care of two governors who were amongst the most eminent Swedish statesmen of the day, Carl Gustaf Tessin and Carl Scheffer; but he owed most perhaps to the poet and historian Olof von Dalin. The interference of the state with his education, when he was quite a child, was, however, doubly harmful, as

his parents taught him to despise the preceptors imposed upon him by the diet, and the atmosphere of intrigue and duplicity in which he grew up made him precociously experienced in the art of dissimulation. But even his most hostile teachers were amazed by the brilliance of his natural gifts, and, while still a boy, he possessed that charm of manner which was to make him so fascinating and so dangerous in later life, coupled with the strong dramatic instinct which won for him his honourable place in Swedish literature. On the whole, Gustavus cannot be said to have been well educated, but he read very widely; there was scarce a French author of his day with whose works he was not intimately acquainted; while his enthusiasm for the new French ideas of enlightenment was as sincere as, if more critical than, his mother's. On the 4th of November 1766, Gustavus married Sophia Magdalena, daughter of Frederick V. of Denmark. The match was an unhappy one, owing partly to incompatibility of temper, but still more to the mischievous interference of the jealous queen-mother.

Gustavus first intervened actively in politics in 1768, at the time of his father's interregnum, when he compelled the dominant Cap faction to summon an extraordinary diet from which he hoped for the reform of the constitution in a monarchical direction. But the victorious Hats refused to redeem the pledges which they had given before the elections. "That we should have lost the constitutional battle does not distress us so much," wrote Gustavus, in the bitterness of his heart; "but what does dismay me is to see my poor nation so sunk in corruption as to place its own felicity in absolute anarchy." From the 4th of February to the 25th of March 1771, Gustavus was at Paris, where he carried both the court and the city by storm. The poets and the philosophers paid him enthusiastic homage, and all the distinguished women of the day testified to his superlative merits. With many of them he maintained a lifelong correspondence. But his visit to the French capital was no mere pleasure trip; it was also a political mission. Confidential agents from the Swedish court had already prepared the way for him, and the duc de Choiseul, weary of Swedish anarchy, had resolved to discuss with him the best method of bringing about a revolution in Sweden. Before he departed, the French government undertook to pay the outstanding subsidies to Sweden unconditionally, at the rate of one and a half million livres annually; and the comte de Vergennes, one of the great names of French diplomacy, was transferred from Constantinople to Stockholm. On his way home Gustavus paid a short visit to his uncle, Frederick the Great, at Potsdam. Frederick bluntly informed his nephew that, in concert with Russia and Denmark, he had guaranteed the integrity of the existing Swedish constitution, and significantly advised the young monarch to play the part of mediator and abstain from violence.

On his return to Sweden Gustavus made a sincere and earnest attempt to mediate between the Hats and Caps who were ruining the country between them (see Sweden: *History*). On the 21st of June 1771 he opened his first parliament in a speech which awakened strange and deep emotions in all who heard it. It was the first time for more than a century that a Swedish king had addressed a Swedish diet from the throne in its native tongue. The orator laid especial stress on the necessity of the sacrifice of all party animosities to the common weal, and volunteered, as "the first citizen of a free people," to be the mediator between the contending factions. A composition committee was actually formed, but it proved illusory from the first, the patriotism of neither of the factions being equal to the puniest act of self-denial. The subsequent attempts of the dominant Caps still further to limit the prerogative, and reduce Gustavus to the condition of a *roi fainéant*, induced him at last to consider the possibility of a revolution. Of its necessity there could be no doubt. Under the sway of the Cap faction, Sweden, already the vassal, could not fail to become the prey of Russia. She was on the point of being absorbed in that northern system, the invention of the Russian vice-chancellor, Count Nikita Panin, which that patient statesman had made it the ambition of his life to realize. Only a swift and sudden *coup d'état* could save the independence of a country isolated from the rest of Europe by a hostile league. At this juncture Gustavus was approached by Jakob Magnus Sprengtporten, a Finnish nobleman of determined character, who had incurred the enmity of the Caps, with the project of a revolution. He undertook to seize the fortress of Sveaborg by a *coup de main*, and, Finland once secured, Sprengtporten proposed to embark for Sweden, meet the king and his friends near Stockholm, and surprise the capital by a night attack, when the estates were to be forced, at the point of the bayonet, to accept a new constitution from the untrammelled king. The plotters were at this juncture reinforced by an ex-ranger from Scania (Skåne), Johan Kristoffer Toll, also a victim of Cap oppression. Toll proposed that a second revolt should break out in the province of Scania, to confuse the government still more, and undertook personally to secure the southern fortress of Kristianstad. After some debate, it was finally arranged that, a few days after the Finnish revolt had begun, Kristianstad should openly declare against the government. Prince Charles, the eldest of the king's brothers, was thereupon hastily to mobilize the garrisons of all the southern fortresses, for the ostensible purpose of crushing the revolt at Kristianstad; but on arriving before the fortress he was to make common cause with the rebels, and march upon the capital from the south, while Sprengtporten attacked it simultaneously from the east. On

the 6th of August 1772 Toll succeeded, by sheer bluff, in winning the fortress of Kristianstad. On the 16th Sprengtporten succeeded in surprising Sveaborg. But contrary winds prevented him from crossing to Stockholm, and in the meanwhile events had occurred which made his presence there unnecessary.

On the 16th of August the Cap leader, Ture Rudbeck, arrived at Stockholm with the news of the insurrection in the south, and Gustavus found himself isolated in the midst of enemies. Sprengtporten lay weather-bound in Finland, Toll was five hundred miles away, the Hat leaders were in hiding. Gustavus thereupon resolved to strike the decisive blow without waiting for the arrival of Sprengtporten. He acted with military promptitude. On the evening of the 18th all the officers whom he thought he could trust received secret instructions to assemble in the great square facing the arsenal on the following morning. At ten o'clock on the 19th Gustavus mounted his horse and rode straight to the arsenal. On the way his adherents joined him in little groups, as if by accident, so that by the time he reached his destination he had about two hundred officers in his suite. After parade he reconducted them to the guard-room of the palace and unfolded his plans to them. He then dictated a new oath of allegiance, and every one signed it without hesitation. It absolved them from their allegiance to the estates, and bound them solely to obey their lawful king, Gustavus III. Meanwhile the senate and the governor-general, Rudbeck, had been arrested and the fleet secured. Then Gustavus made a tour of the city and was everywhere received by enthusiastic crowds, who hailed him as a deliverer. On the evening of the 20th heralds perambulated the streets proclaiming that the estates were to meet in the Rikssaal on the following day; every deputy absenting himself would be regarded as the enemy of his country and his king. On the 21st, a few moments after the estates had assembled, the king in full regalia appeared, and taking his seat on the throne, delivered that famous philippic, one of the masterpieces of Swedish oratory, in which he reproached the estates for their unpatriotic venality and licence in the past. A new constitution was recited by the estates and accepted by them unanimously. The diet was then dissolved.

Gustavus was inspired by a burning enthusiasm for the greatness and welfare of Sweden, and worked in the same reformatory direction as the other contemporary sovereigns of the "age of enlightenment." He took an active part in every department of business, but relied far more on extra-official counsellors of his own choosing than upon the senate. The effort to remedy the frightful corruption which had been fostered by the Hats and Caps engaged a considerable share of his time and he even found it necessary to put the whole of a supreme court of justice (*Göta Hofrätt*) on its trial. Measures were also taken to reform the administration and the whole course of judicial procedure, and torture as an instrument of legal investigation was abolished. In 1774 an ordinance providing for the liberty of the press was even issued. The national defences were at the same time developed on a "Great Power" scale, and the navy was so enlarged as to become one of the most formidable in Europe. The dilapidated finances were set in good order by the "currency realization ordinance" of 1777. Gustavus also introduced new national economic principles. In 1775 free trade in corn was promoted and a number of oppressive export-tolls were abolished. The poor law was also amended, absolute religious liberty was proclaimed, and he even succeeded in inventing and popularizing a national costume which was in general use from 1778 till his death. His one great economic blunder was the attempt to make the sale of spirits a government monopoly, which was an obvious infringement upon the privileges of the estates. His foreign policy, on the other hand, was at first both wise and wary. Thus, when the king summoned the estates to assemble at Stockholm on the 3rd of September 1778, he could give a brilliant account of his six years' stewardship. Never was a parliament more obsequious or a king more gracious. "There was no room for a single No during the whole session." Yet, short as the session was, it was quite long enough to open the eyes of the deputies to the fact that their political supremacy had departed. They had changed places with the king. He was now indeed their sovereign lord; and, for all his gentleness, the jealousy with which he guarded, the vigour with which he enforced the prerogative, plainly showed that he meant to remain so. Even the few who were patriotic enough to acquiesce in the change by no means liked it. The diet of 1778 had been obsequious; the diet of 1786 was mutinous. The consequence was that nearly all the royal propositions were either rejected outright or so modified that Gustavus himself withdrew them.

The diet of 1786 marks a turning-point in Gustavus's history. Henceforth we observe a determination on his part to rule without a parliament; a passage, cautious and gradual, yet unflinching, from semi-constitutionalism to semi-absolutism. His opportunity came in 1788, when the political complications arising out of his war with Catherine II. of Russia enabled him by the Act of Unity and Security (on the 17th of February 1789) to override the opposition of the rebellious and grossly unpatriotic gentry, and, with the approbation of the three lower estates, establish a new and revolutionary constitution, in which, though the estates still held the power of the purse, the royal authority largely predominated. Throughout 1789 and 1790

Gustavus, in the national interests, gallantly conducted the unequal struggle with Russia, finally winning in the Svensksund (9th-10th July) the most glorious naval victory ever gained by the Swedish arms, the Russians losing one-third of their fleet and 7000 men. A month later, on the 14th of August 1790, peace was signed between Russia and Sweden at Värälä. Only eight months before, Catherine had haughtily declared that “the odious and revolting aggression” of the king of Sweden would be “forgiven” only if he “testified his repentance” by agreeing to a peace granting a general and unlimited amnesty to all his rebels, and consenting to a guarantee by the Swedish diet (“as it would be imprudent to confide in his good faith alone”) for the observance of peace in the future. The peace of Värälä saved Sweden from any such humiliating concession, and in October 1791 Gustavus took the bold but by no means imprudent step of concluding an eight years’ defensive alliance with the empress, who thereby bound herself to pay her new ally annual subsidies amounting to 300,000 roubles.

Gustavus now aimed at forming a league of princes against the Jacobins, and every other consideration was subordinated thereto. His profound knowledge of popular assemblies enabled him, alone among contemporary sovereigns, accurately to gauge from the first the scope and bearing of the French Revolution. But he was hampered by poverty and the jealousy of the other European Powers, and, after showing once more his unrivalled mastery over masses of men at the brief Gefle diet (22nd of January-24th of February 1792), he fell a victim to a widespread aristocratic conspiracy. Shot in the back by Anckarström at a midnight masquerade at the Stockholm opera-house, on the 16th of March 1792, he expired on the 29th.

Although he may be charged with many foibles and extravagances, Gustavus III. was indisputably one of the greatest sovereigns of the 18th century. Unfortunately his genius never had full scope, and his opportunity came too late. Gustavus was, moreover, a most distinguished author. He may be said to have created the Swedish theatre, and some of the best acting dramas in the literature are by his hand. His historical essays, notably the famous anonymous eulogy on Torstenson crowned by the Academy, are full of feeling and exquisite in style,—his letters to his friends are delightful. Every branch of literature and art interested him, every poet and artist of his day found in him a most liberal and sympathetic protector.

See R. N. Bain, *Gustavus III. and his Contemporaries* (London, 1904); E. G. Geijer, *Konung Gustaf III.’s efterlemnade papper* (Upsala, 1843-1845); C. T. Odhner, *Sveriges politiska historia under Konung Gustaf III.’s regering* (Stockholm, 1885-1896); B. von Beskow, *Om Gustaf III. såsom Konung och människa* (Stockholm, 1860-1861); O. Levertin, *Gustaf III. som dramatisk författare* (Stockholm, 1894); *Gustaf III.’s bref till G. M. Armfelt* (Fr.) (Stockholm, 1883); Y. K. Grot, *Catharine II. and Gustavus III.* (Russ.) (St Petersburg, 1884).

(R. N. B.)

GUSTAVUS IV. (1778-1837), king of Sweden, the son of Gustavus III. and Queen Sophia Magdalena, was born at Stockholm on the 1st of November 1778. Carefully educated under the direction of Nils von Rosenstein, he grew up serious and conscientious. In August 1796 his uncle the regent Charles, duke of Sudermania, visited St Petersburg for the purpose of arranging a marriage between the young king and Catherine II.’s granddaughter, the grand-duchess Alexandra. The betrothal was actually fixed for the 22nd of September, when the whole arrangement foundered on the obstinate refusal of Gustavus to allow his destined bride liberty of worship according to the rites of the Greek Orthodox Church—a rebuff which undoubtedly accelerated the death of the Russian empress. Nobody seems to have even suspected at the time that serious mental derangement lay at the root of Gustavus’s abnormal piety. On the contrary, there were many who prematurely congratulated themselves on the fact that Sweden had now no disturbing genius, but an economical, God-fearing, commonplace monarch to deal with. Gustavus’s prompt dismissal of the generally detested Gustaf Reuterholm added still further to his popularity. On the 31st of October 1797 Gustavus married Frederica Dorothea, daughter of Charles Frederick, grand-duke of Baden, a marriage which might have led to a war with Russia but for the fanatical hatred of the French republic shared by the emperor Paul and Gustavus IV., which served as a bond of union between them. Indeed the king’s horror of Jacobinism was morbid in its intensity, and drove him to adopt all sorts of reactionary measures and to postpone his coronation for some years, so as to avoid calling together a diet; but the disorder of the finances, caused partly by the continental war and partly by the almost total failure of the crops in 1798 and 1799, compelled him to summon the estates to Norrköping in March 1800, and on the 3rd of April Gustavus was crowned. The notable change which now took place in Sweden’s foreign policy and its fatal consequences to

the country are elsewhere set forth (see Sweden, *History*). By the end of 1808 it was obvious to every thinking Swede that the king was insane. His violence had alienated his most faithful supporters, while his obstinate incompetence paralysed the national efforts. To remove a madman by force was the one remaining expedient; and this was successfully accomplished by a conspiracy of officers of the western army, headed by Adlersparre, the Anckarsvärds, and Adlercreutz, who marched rapidly from Skåne to Stockholm. On the 13th of March 1809 seven of the conspirators broke into the royal apartments in the palace unannounced, seized the king, and conducted him to the château of Gripsholm; Duke Charles was easily persuaded to accept the leadership of a provisional government, which was proclaimed the same day; and a diet, hastily summoned, solemnly approved of the revolution. On the 29th of March Gustavus, in order to save the crown for his son, voluntarily abdicated; but on the 10th of May the estates, dominated by the army, declared that not merely Gustavus but his whole family had forfeited the throne. On the 5th of June the duke regent was proclaimed king under the title of Charles XIII., after accepting the new liberal constitution, which was ratified by the diet the same day. In December Gustavus and his family were transported to Germany. Gustavus now assumed the title of count of Gottorp, but subsequently called himself Colonel Gustafsson, under which pseudonym he wrote most of his works. He led, separated from his family, an erratic life for some years; was divorced from his consort in 1812; and finally settled at St Gall in Switzerland in great loneliness and indigence. He died on the 7th of February 1837, and, at the suggestion of King Oscar II. his body was brought to Sweden and interred in the Riddarholmskyrka. From him descend both the Baden and the Oldenburg princely houses on the female side.

See H. G. Trolle-Wachtmeister, *Anteckningar och minnen* (Stockholm, 1889); B. von Beskow, *Lefnadsminnen* (Stockholm, 1870); K. V. Key-Åberg, *De diplomatiska förbindelserna mellan Sverige och Storbrittannien under Gustaf IV.'s Krig emot Napoléon* (Upsala, 1890); Colonel Gustafsson, *La Journée du treize mars*, &c. (St Gall, 1835); *Memorial des Obersten Gustafsson* (Leipzig, 1829).

(R. N. B.)

GUSTAVUS V. (1858-), king of Sweden, son of Oscar II., king of Sweden and Norway, and Queen Sophia Wilhelmina, was born at Drottningholm on the 16th of June 1858. He 739
entered the army, and was, like his father, a great traveller. As crown prince he held the title of duke of Wärmland. He married in 1881 Victoria (b. 1862), daughter of Frederick William Louis, grand duke of Baden, and of Louise, princess of Prussia. The duchess of Baden was the granddaughter of Sophia, princess of Sweden, and the marriage of the crown prince thus effected a union between the Bernadotte dynasty and the ancient Swedish royal house of Vasa. During the absence or illness of his father Gustavus repeatedly acted as regent, and was therefore already thoroughly versed in public affairs when he succeeded to the Swedish throne on the 8th of December 1907, the crown of Norway having been separated from that of Sweden in 1905. He took as his motto "With the people for the Fatherland."

The crown prince, Oscar Frederick William Gustavus Adolphus, duke of Scania (b. 1882), married in 1905 Princess Margaret of Connaught (b. 1882), niece of King Edward VII. A son was born to them at Stockholm on the 22nd of April 1906, and another son in the following year. The king's two younger sons were William, duke of Sudermania (b. 1884), and Eric, duke of Westmanland (b. 1889).

GUSTAVUS ADOLPHUS UNION (Gustav-Adolf-Stiftung, Gustav-Adolf-Verein, Evangelischer Verein der Gustav-Adolf-Stiftung), a society formed of members of the Evangelical Protestant churches of Germany, which has for its object the aid of feeble sister churches, especially in Roman Catholic countries. The project of forming such a society was first broached in connexion with the bicentennial celebration of the battle of Lützen on the 6th of November 1832; a proposal to collect funds for a monument to Gustavus Adolphus having been agreed to, it was suggested by Superintendent Grossmann that the best memorial to the great champion of Protestantism would be the formation of a union for propagating his ideas. For some years the society was limited in its area and its operations, being practically confined to Leipzig and

Dresden, but at the Reformation festival in 1841 it received a new impulse through the energy and eloquence of Karl Zimmermann (1803-1877), court preacher at Darmstadt, and in 1843 a general meeting was held at Frankfort-on-the-Main, where no fewer than twenty-nine branch associations belonging to all parts of Germany except Bavaria and Austria were represented. The want of a positive creed tended to make many of the stricter Protestant churchmen doubtful of the usefulness of the union, and the stricter Lutherans have always held aloof from it. On the other hand, its negative attitude in relation to Roman Catholicism secured for it the sympathy of the masses. At a general convention held in Berlin in September 1846 a keen dispute arose about the admission of the Königsberg delegate, Julius Rupp (1809-1884), who in 1845 had been deprived for publicly repudiating the Athanasian Creed and became one of the founders of the "Free Congregations"; and at one time it seemed likely that the society would be completely broken up. Amid the political revolutions of the year 1848 the whole movement fell into stagnation; but in 1849 another general convention (the seventh), held at Breslau, showed that, although the society had lost both in membership and income, it was still possessed of considerable vitality. From that date the Gustav-Adolf-Verein has been more definitely "evangelical" in its tone than formerly; and under the direction of Karl Zimmermann it greatly increased both in numbers and in wealth. It has built over 2000 churches and assisted with some two million pounds over 5000 different communities. Apart from its influence in maintaining Protestantism in hostile areas, there can be no doubt that the union has had a great effect in helping the various Protestant churches of Germany to realize the number and importance of their common interests.

See K. Zimmermann, *Geschichte des Gustav-Adolf-Vereins* (Darmstadt, 1877).

GÜSTROW, a town of Germany, in the grand duchy of Mecklenburg-Schwerin, on the Nebel and the railway from Lübeck to Stettin, 20 m. S. of Rostock. Pop. (1875), 10,923; (1905) 17,163. The principal buildings are the castle, erected in the middle of the 16th century and now used as a workhouse; the cathedral, dating from the 13th century and restored in 1868, containing many fine monuments and possessing a square tower 100 ft. high; the Pfarrkirche, with fine altar-paintings; the town hall (Rathaus), dating from the 16th century; the music hall, and the theatre. Among the educational establishments are the ducal gymnasium, which possesses a library of 15,000 volumes, a modern and a commercial school. The town is one of the most prosperous in the duchy, and has machine works, foundries, tanneries, sawmills, breweries, distilleries, and manufactories of tobacco, glue, candles and soap. There is also a considerable trade in wool, corn, wood, butter and cattle, and an annual cattle show and horse races are held.

Güstrow, capital of the Mecklenburg duchy of that name, or of the Wend district, was a place of some importance as early as the 12th century, and in 1219 it became the residence of Henry Borwin II., prince of Mecklenburg, from whom it received Schwerin privileges. From 1316 to 1436 the town was the residence of the princes of the Wends, and from 1556 to 1695 of the dukes of Mecklenburg-Güstrow. In 1628 it was occupied by the imperial troops, and Wallenstein resided in it during part of the years 1628 and 1629.

GUTENBERG, JOHANN (*c.* 1398-1468), German printer, is supposed to have been born *c.* 1398-1399 at Mainz of well-to-do parents, his father being Friele zum Gensfleisch and his mother Elsgen Wyrich (or, from her birthplace, zu Gutenberg, the name he adopted). He is assumed to be mentioned under the name of "Henchen" in a copy of a document of 1420, and again in a document of *c.* 1427-1428, but it is not stated where he then resided. On January 16, 1430, his mother arranged with the city of Mainz about an annuity belonging to him; but when, in the same year, some families who had been expelled a few years before were permitted to return to Mainz, Gutenberg appears not to have availed himself of the privilege, as he is described in the act of reconciliation (dated March 28) as "not being in Mainz." It is therefore assumed that the family had taken refuge in Strassburg, where Gutenberg was residing later. There he is said to have been in 1434, and to have seized and imprisoned the town clerk of Mainz for a debt due to him by the corporation of that city, releasing him, however, at the representations of the mayor and councillors of Strassburg, and relinquishing

at the same time all claims to the money (310 Rhenish guilders = about 2400 mark).[1] Between 1436 and 1439 certain documents represent him as having been engaged there in some experiments requiring money, with Andreas Dritzehn, a fellow-citizen, who became not only security for him but his partner to carry out Gutenberg's plan for polishing stones and the manufacture of looking-glasses, for which a lucrative sale was expected at the approaching pilgrimage of 1440 (subsequently postponed, according to the documents, although there is no evidence for this postponement) to Aix-la-Chapelle. Money was lent for this purpose by two other friends. In 1438 another partnership was arranged between Gutenberg, Andreas Dritzehn, and Andreas and Anton Heilmann, and that this had in view the art of printing has been inferred from the word "drucken" used by one of the witnesses in the law proceedings which soon after followed. An action was brought, after the death of Dritzehn, by his two brothers to force Gutenberg to accept them as partners in their brother's place, but the decision was in favour of the latter. In 1441 Gutenberg became surety to the St Thomas Chapter at Strassburg for Johann Karle, who borrowed 100 guilders (about £16) from the chapter, and on November 17, 1442, he himself borrowed 80 livres through Martin Brechter (or Brehter) from the same chapter. Of his whereabouts from the 12th of March 1444 (when he paid a tax at Strassburg) to the 17th of October 1448 nothing certain is known. But on the latter date we find him at Mainz, borrowing 150 gold guilders of his kinsman, Arnold Gelthus, against an annual interest of 7½ gold guilders. We do not know whether the interest on this debt has ever been paid, but the debt itself appears never to have been paid off, as the contract of this loan was renewed (*vidimused*) on August 23, 1503, for other parties. It is supposed that soon afterwards Gutenberg must have been able to show some convincing results of his work, for it appears that about 1450 Johann Fust (*q.v.*) advanced him 800 guilders to promote it, on no security except that of "tools" still to be made. Fust seems also to have undertaken to advance him 300 guilders a year for expenses, wages, house-rent, parchment, paper, ink, &c., but he does not appear to have ever done so. If at any time they disagreed, Gutenberg was to return the 800 guilders, and the "tools" were to cease to be security. It is not known to what purpose Gutenberg devoted the money advanced to him. In the minutes of the law-suit of 1455 he himself says that he had to make his "tools" with it. But he is presumed to have begun a large folio Latin Bible, and to have printed during its progress some smaller books[2] and likewise the Letter of Indulgence (granted on the 12th of April 1451 by Pope Nicholas V. in aid of John II., king of Cyprus, against the Turks), of 31 lines, having the earliest printed date 1454, of which several copies are preserved in various European libraries. A copy of the 1455 issue of the same Indulgence is in the Rylands Library at Manchester (from the Althorp Library).

It is not known whether any books were printed while this partnership between Gutenberg and Fust lasted. Trithemius (*Ann. Hirsaug.* ii. 421) says they first printed, from wooden blocks, a vocabulary called *Catholicon*, which cannot have been the *Catholicon* of Johannes de Janua, a folio of 748 pages in two columns of 66 lines each, printed in 1460, but was perhaps a small glossary now lost.[3] The Latin *Bible of 42 lines*, a folio of 1282 printed pages, in two columns with spaces left for illuminated initials (so called because each column contains 42 lines, and also known as the *Mazarin Bible*, because the first copy described was found in the library of Cardinal Mazarin), was finished before the 15th of August 1456;[4] German bibliographers now claim this Bible for Gutenberg, but, according to bibliographical rules, it must be ascribed to Peter Schöffer, perhaps in partnership with Fust. It is in smaller type than the *Bible of 36 lines*, which latter is called either (*a*) the *Bamberg Bible*, because nearly all the known copies were found in the neighbourhood of Bamberg, or (*b*) *Schelhorn's Bible*, because J. G. Schelhorn was the first who described it in 1760, or (*c*) *Pfister's Bible*, because its printing is ascribed to Albrecht Pfister of Bamberg, who used the same type for several small German books, the chief of which is Boner's *Edelstein* (1461, 4to), 88 leaves, with 85 woodcuts, a book of fables in German rhyme. Some bibliographers believe this 36-line Bible to have been begun, if not entirely printed, by Gutenberg during his partnership with Fust, as its type occurs in the 31-line Letters of Indulgence of 1454, was used for the 27-line Donatus (of 1451?), and, finally, when found in Pfister's possession in 1461, appears to be old and worn, except the additional letters k, w, z required for German, which are clear and sharp like the types used in the Bible. Again, others profess to prove (Dziatzko, *Gutenberg's früheste Druckerpraxis*) that B^{36} was a reprint of B^{42}.

Gutenberg's work, whatever it may have been, was not a commercial success, and in 1452 Fust had to come forward with another 800 guilders to prevent a collapse. But some time before November 1455 the latter demanded repayment of his advances (see the Helmasperger Notarial Document of November 6, 1455, in Dziatzko's *Beiträge zur Gutenbergfrage*, Berlin, 1889), and took legal proceedings against Gutenberg. We do not know the end of these proceedings, but if Gutenberg had prepared any printing materials it would seem that he was compelled to yield up the whole of them to Fust; that the latter removed them to his own

house at Mainz, and there, with the assistance of Peter Schöffer, issued various books until the sack of the city in 1462 by Adolphus II. caused a suspension of printing for three years, to be resumed again in 1465.

We have no Information as to Gutenberg's activity, and very little of his whereabouts, after his separation from Fust. In a document dated June 21, 1457, he appears as witness on behalf of one of his relatives, which shows that he was then still at Mainz. Entries in the registers of the St Thomas Church at Strassburg make it clear that the annual interest on the money which Gutenberg on the 17th of November 1442 (see above) had borrowed from the chapter of that church was regularly paid till the 11th of November 1457, either by himself or by his surety, Martin Brechter. But the payment due on the latter date appears to have been delayed, as an entry in the register of that year shows that the chapter had incurred expenses in taking steps to have both Gutenberg and Brechter arrested. This time the difficulties seem to have been removed, but on and after the 11th of November 1458 Gutenberg and Brechter remained in default. The chapter made various efforts, all recorded in their registers, to get their money, but in vain. Every year they recorded the arrears with the expenses to which they were put in their efforts to arrest the defaulters, till at last in 1474 (six years after Gutenberg's death) their names are no longer mentioned.

Meantime Gutenberg appears to have been *printing*, as we learn from a document dated February 26, 1468, that a syndic of Mainz, Dr Conrad Homery (who had formerly been in the service of the elector Count Diether of Ysenburg), had at one time supplied him, not with money, but with some formes, types, tools, implements and other things belonging to printing, which Gutenberg had left after his death, and which had, and still, belonged to him (Homery); this material had come into the hands of Adolf, the archbishop of Mainz, who handed or sent it back to Homery, the latter undertaking to use it in no other town but Mainz, nor to sell it to any person except a citizen of Mainz, even if a stranger should offer him a higher price for the things. This material has never yet been identified, so that we do not know what types Gutenberg may have had at his disposal; they could hardly have included the types of the *Catholicon* of 1460, as is suggested, this work being probably executed by Heinrich Bechtermünze (d. 1467), who afterwards removed to Eltville, or perhaps by Peter Schöffer, who, about 1470, advertises the book as his property (see K. Burger, *Buchhändler-Anzeigen*). It is uncertain whether Gutenberg remained in Mainz or removed to the neighbouring town of Eltville, where he may have been engaged for a while with the brothers Bechtermünze, who printed there for some time with the types of the 1460 *Catholicon*. On the 17th of January 1465 he accepted the post of salaried courtier from the archbishop Adolf, and in this capacity received annually a suit of livery together with a fixed allowance of corn and wine. Gutenberg seems to have died at Mainz at the beginning of 1468, and was, according to tradition, buried in the Franciscan church in that city. His relative Arnold Gelthus erected a monument to his memory near his supposed grave, and forty years afterwards Ivo Wittig set up a memorial tablet at the legal college at Mainz. No books bearing the name of Gutenberg as printer are known, nor is any genuine portrait of him known, those appearing upon medals, statues or engraved plates being all fictitious.

In 1898 the firm of L. Rosenthal, at Munich, acquired a *Missale speciale* on paper, which Otto Hupp, in two treatises published in 1898 and 1902, asserts to have been printed by Gutenberg about 1450, seven years before the 1457 Psalter. Various German bibliographers, however, think that it could not have been printed before 1480, and, judging from the facsimiles published by Hupp, this date seems to be approximately correct.

On the 24th of June 1900 the five-hundredth anniversary of Gutenberg's birth was celebrated in several German cities, notably in Mainz and Leipzig, and most of the recent literature on the invention of printing dates from that time.

So we may note that in 1902 a vellum fragment of an Astronomical Kalendar was discovered by the librarian of Wiesbaden, Dr G. Zedler (*Die älteste Gutenbergtype*, Mainz, 1902), apparently printed in the 36-line Bible type, and as the position of the sun, moon and other planets described in this document suits the years 1429, 1448 and 1467, he ascribes the printing of this Kalendar to the year 1447. A paper fragment of a poem in German, entitled *Weltgericht*, said to be printed in the 36-line Bible type, appears to have come into the possession of Herr Eduard Beck at Mainz in 1892, and was presented by him in 1903 to the Gutenberg Museum in that city. Zedler published a facsimile of it in 1904 (for the *Gutenberg Gesellschaft*), with a description, in which he places it before the 1447 *Kalendar*, c. 1444-1447. Moreover, fragments of two editions of Donatus different from that of 1451 (?) have recently been found; see Schwenke in *Centralbl. für Bibliothekwesen* (1908).

The recent literature upon Gutenberg's life and work and early printing in general includes the following: A. von der Linde, *Geschichte und Erdichtung* (Stuttgart, 1878); *id. Geschichte der Buchdruckerkunst* (Berlin, 1886); J. H. Hessels, *Gutenberg, Was he the Inventor of*

Printing? (London, 1882); *id. Haarlem, the Birthplace of Printing, not Mentz* (London, 1886); O. Hartwig, *Festschrift zum fünfhundertjährigen Geburtstag von Johann Gutenberg* (Leipzig, 1900), which includes various treatises by Schenk zu Schweinsberg, K. Schorbach, &c.; P. Schwenke, *Untersuchungen zur Geschichte des ersten Buchdrucks* (Berlin, 1900); A. Börckel, *Gutenberg, sein Leben*, &c. (Giessen, 1897); *id. Gutenberg und seine berühmten Nachfolger im ersten Jahrhundert der Typographie* (Frankfort, 1900); F. Schneider, *Mainz und seine Drucker* (1900); G. Zedler, *Gutenberg-Forschungen* (Leipzig, 1901); J. H. Hessels, *The so-called Gutenberg Documents* (London, 1910). For other works on the subject see TYPOGRAPHY.

(J. H. H.)

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1 It is difficult to know which of the Gutenberg documents can be trusted and which not. Schorbach, in his recent biography of Gutenberg, accepts and describes 27 of them (*Festschrift*, 1900, p. 163 sqq.), 17 of which are known only from (not always accurate) copies or transcripts. Under ordinary circumstances history might be based on them. But it is certain that some so-called Gutenberg documents, not included in the above 27, are forgeries. Fr. J. Bodmann (1754-1820), for many years professor and librarian at Mainz, forged at least two; one (dated July 20, 1459) he even provided with four forged seals; the other (dated Strassburg, March 24, 1424) purported to be an autograph letter of Gutenberg to a fictitious sister of his named Bertha. Of these two documents French and German texts were published about 1800-1802; the forger lived for twenty years afterwards but never undeceived the public. He enriched the Gutenberg literature with other fabrications. In fact Bodmann had trained himself for counterfeiting MSS. and documents; he openly boasted of his abilities in this respect, and used them, sometimes to amuse his friends who were searching for Gutenberg documents, sometimes for himself to fill up gaps in Gutenberg's life. (For two or three more specimens of his capacities see A. Wyss in *Zeitschr. für Altert. u. Gesch. Schlesiens*, xv. 9 sqq.) To one of his friends (Professor Gotthelf Fischer, who preceded him as librarian of Mainz) one or two other fabrications may be ascribed. There are, moreover, serious misgivings as to documents said to have been *discovered* about 1740 (when the citizens of Strassburg claimed the honour of the invention for their city) by Jacob Wencker (the then archivist of Strassburg) and J. D. Schoepflin (professor and canon of St Thomas's at Strassburg). For instance, of the above document of 1434 no original has ever come to light; while the draft of the transaction, alleged to have been written at the time in a register of contracts, and to have been found about 1740 by Wencker, has also disappeared with the register itself. The document (now only known from a copy said to have been taken by Wencker from the draft) is upheld as genuine by Schorbach, who favours an invention of printing at Strassburg, but Bockenheimer, though supporting Gutenberg and Mainz, declares it to be a fiction (*Gutenberg-Feier*, Mainz, 1900, pp. 24-33). Again, suspicions are justified with respect to the documents recording Gutenberg's lawsuit of 1439 at Strassburg. Bockenheimer explains at great length (*l.c.* pp. 41-72) that they are forgeries. He even explains (*ibid.* pp. 97-107) that the so-called Helmasperger document of November 6, 1455, may be a fabrication of the Faust von Aschaffenburg family, who endeavoured to claim Johann Fust as their ancestor. There are also (1) a fragment of a fictitious "press," said to have been constructed by Gutenberg in 1441, and to have been discovered (!) at Mainz in 1856; (2) a forged imprint with the date 1458 in a copy of Pope Gregory's *Dialogues*, really printed at Strassburg about 1470; (3) a forged rubric in a copy of the *Tractatus de celebratione missarum*, from which it would appear that Johann Gutenberg and Johann Nummeister had presented it on June 19, 1463, to the Carthusian monastery near Mainz: (4) four forged copies of the Indulgence of 1455, in the Culemann Collection in the Kästner Museum at Hanover, &c. (see further, Hessels, "The so-called Gutenberg Documents," in *The Library*, 1909).

2 Among these were perhaps (1) one or two editions of the work of Donatus, *De octo partibus orationis*, 27 lines to a page, of one of which two leaves, now in the Paris National Library, were discovered at Mainz in the original binding of an account book, one of them having, but in a later hand, the year 1451 (?); (2) the *Turk-Kalendar* for 1455 (preserved in the Hof-Bibliothek at Munich); (3) the *Cisianus* (preserved in the Cambridge Univ. Libr.), and perhaps others now lost.

3 Ulric Zell states, in the Cologne Chronicle of 1499, that Gutenberg and Fust printed a Bible in large type like that used in missals. It has been said that this description applies to the 42-line Bible, as its type is as large as that of most missals printed before 1500, and that the size now called missal type (double pica) was not used in missals until late in the 16th century. This is no doubt true of the smaller missals printed before 1500, some of which are in even smaller type than the 42-line Bible. But many of the large folio missals, as that printed at Mainz by Peter Schöffer in 1483, the Carthusian missal printed at Spires by Peter Drach about 1490, and the Dominican missal printed by Andrea de Torresanis at Venice in 1496, are in as large type as the 36-line Bible. Peter Schöffer (1425-1502) of Gernsheim, between Mainz and Mannheim, who was a copyist in Paris in 1449, and whom Fust called his servant (*famulus*), is said by Trithemius to have discovered an easier way of founding characters, whence Lambinet and others concluded that Schöffer invented the punch. Schöffer himself, in the colophon of the Psalter of 1457, a work which some suppose to have been planned and partly printed by Gutenberg, claims only the mode of printing rubrics and coloured capitals.

4 The Leipzig copy of this Bible (which formerly belonged to Herr Klemm of Dresden) has at the end the MS. year 1453 in old Arabic numerals. But certain circumstances connected with this date make it look very suspicious.

GÜTERSLOH, a town of Germany, in the Prussian province of Westphalia, 11 m. S.W. from Bielefeld by the railway to Dortmund. Pop. (1905), 7375. It is a seat of silk and cotton industries, and has a large trade in Westphalian hams and sausages. Printing, brewing and distilling are also carried on, and the town is famous for its rye-bread (*Pumpernickel*). Gütersloh has two Evangelical churches, a Roman Catholic church, a synagogue, a school and other educational establishments.

See Eickhoff, *Geschichte der Stadt und Gemeinde Gütersloh* (Gütersloh, 1904).

GUTHRIE, SIR JAMES (1859-), Scottish painter, and one of the leaders of the so-called Glasgow school of painters, was born at Greenock. Though in his youth he was influenced by John Pettie in London, and subsequently studied in Paris, his style, which is remarkable for grasp of character, breadth and spontaneity, is due to the lessons taught him by observation of nature, and to the example of Crawhall, by which he benefited in Lincolnshire in the early ’eighties of the last century. In his early works, such as “The Gipsy Fires are Burning, for Daylight is Past and Gone” (1882), and the “Funeral Service in the Highlands,” he favoured a thick impasto, but with growing experience he used his colour with greater economy and reticence. Subsequently he devoted himself almost exclusively to portraiture. Sir James Guthrie, like so many of the Glasgow artists, achieved his first successes on the Continent, but soon found recognition in his native country. He was elected associate of the Royal Scottish Academy in 1888, and full member in 1892, succeeded Sir George Reid as president of the Royal Scottish Academy in 1902, and was knighted in 1903. His painting “Schoolmates” is at the Ghent Gallery. Among his most successful portraits are those of his mother, Mr R. Garroway, Major Hotchkiss, Mrs Fergus, Professor Jack, and Mrs Watson.

GUTHRIE, THOMAS (1803-1873), Scottish divine, was born at Brechin, Forfarshire, on the 12th of July 1803. He entered the university of Edinburgh at the early age of twelve, and continued to attend classes there for more than ten years. On the 2nd of February 1825 the presbytery of Brechin licensed him as a preacher in connexion with the Church of Scotland, and in 1826 he was in Paris studying natural philosophy, chemistry, and comparative anatomy. For two years he acted as manager of his father’s bank, and in 1830 was inducted to his first charge, Arbirlot, in Forfarshire, where he adopted a vivid dramatic style of preaching adapted to his congregation of peasants, farmers and weavers. In 1837 he became the colleague of John Sym in the pastorate of Old Greyfriars, Edinburgh, and at once attracted notice as a great pulpit orator. Towards the close of 1840 he became minister of St John’s church, Victoria Street, Edinburgh. He declined invitations both from London and from India. He was an enthusiastic supporter of the movement which led to the Disruption of 1843; and his name is thenceforth associated with the Free Church, for which he collected £116,000 from July 1845 to June 1846 to provide manses for the seceding ministers. In 1844 he became a teetotaller. In 1847 he began the greatest work of his life by the publication of his first “Plea for Ragged Schools.” This pamphlet elicited a beautiful and sympathetic letter from Lord Jeffrey. A Ragged School was opened on the Castle Hill, which has been the parent of many similar institutions elsewhere, though Guthrie’s relation to the movement is best described as that of an apostle rather than a founder. He insisted on bringing up all the children in his school as Protestants; and he thus made his schools proselytizing as well as educational institutions. This interference with religious liberty led to some controversy; and ultimately those who differed from Guthrie founded the United Industrial School, giving combined secular and separate religious instruction. In April 1847 the degree of D.D. was conferred on Guthrie by the university of Edinburgh; and in 1850 William Hanna (1808-1882), the biographer and son-in-law of Thomas Chalmers, was inducted as his colleague in Free St John’s Church.

In 1850 Guthrie published *A Plea on behalf of Drunkards and against Drunkenness*, which

was followed by *The Gospel in Ezekiel* (1855); *The City: its Sins and Sorrows* (1857); *Christ and the Inheritance of the Saints* (1858); *Seedtime and Harvest of Ragged Schools* (1860), consisting of his three *Pleas for Ragged Schools*. These works had an enormous sale, and portions of them were translated into French and Dutch. His advocacy of temperance had much to do with securing the passing of the Forbes Mackenzie Act, which secured Sunday closing and shortened hours of sale for Scotland. Mr Gladstone specially quoted him in support of the Light Wines Bill (1860). In 1862 he was moderator of the Free Church General Assembly; but he seldom took a prominent part in the business of the church courts. His remarkable oratorical talents, rich humour, genuine pathos and inimitable power of story-telling, enabled him to do good service to the total abstinence movement. He was one of the vice-presidents of the Evangelical Alliance. In 1864, his health being seriously impaired, he resigned public work as pastor of Free St John's (May 17), although his nominal connexion with the congregation ceased only with his death. Guthrie had occasionally contributed papers to *Good Words*, and, about the time of his retirement from the ministry, he became first editor of the *Sunday Magazine*, himself contributing several series of papers which were afterwards published separately. In 1865 he was presented with £5000 as a mark of appreciation from the public. His closing years were spent mostly in retirement; and after an illness of several months' duration he died at St Leonards-on-Sea on the 24th of February 1873.

In addition to the books mentioned above he published a number of books which had a remarkable circulation in England and America, such as *Speaking to the Heart* (1862); *The Way to Life* (1862); *Man and the Gospel* (1865); *The Angel's Song* (1865); *The Parables* (1866); *Our Father's Business* (1867); *Out of Harness* (1867); *Early Piety* (1868); *Studies of Character from the Old Testament* (1868-1870); *Sundays Abroad* (1871).

See *Autobiography of Thomas Guthrie, D.D., and Memoir*, by his sons (2 vols., London, 1874-1875).

GUTHRIE, THOMAS ANSTEY (1856-), known by the pseudonym of F. Anstey, English novelist, was born in Kensington, London, on the 8th of August 1856. He was educated at King's College, London, and at Trinity Hall, Cambridge, and was called to the bar in 1880. But the popular success of his story *Vice-Versa* (1882) with its topsy-turvy substitution of a father for his schoolboy son, at once made his reputation as a humorist of an original type. He published in 1883 a serious novel, *The Giant's Robe*; but, in spite of its excellence, he discovered (and again in 1889 with *The Pariah*) that it was not as a serious novelist but as a humorist that the public insisted on regarding him. As such his reputation was further confirmed by *The Black Poodle* (1884), *The Tinted Venus* (1885), *A Fallen Idol* (1886), and other works. He became an important member of the staff of *Punch*, in which his "Voces populi" and his humorous parodies of a reciter's stock-piece ("Burglar Bill," &c.) represent his best work. In 1901 his successful farce *The Man from Blankley's*, based on a story which originally appeared in *Punch*, was first produced at the Prince of Wales's Theatre, in London.

GUTHRIE, the capital of Oklahoma, U.S.A., and the county-seat of Logan county, extending on both sides of Cottonwood creek, and lying one mile south of the Cimarron river. Pop. (1890) 5333, (1900) 10,006, (1907) 11,652 (2871 negroes); (1910) 11,654. It is served by the Atchison, Topeka & Santa Fé, the Chicago, Rock Island & Pacific, the Missouri, Kansas & Texas, the Fort Smith & Western, and the St Louis, El Reno & Western railways. The city is situated about 940 ft. above the sea, in a prairie region devoted largely to stock-raising and the cultivation of Indian corn, wheat, cotton and various fruits, particularly peaches. Guthrie is one of the headquarters of the Federal courts in the state, the other being Muskogee. The principal public buildings at Guthrie are the state Capitol, the Federal building, the City hall, the Carnegie library, the Methodist hospital and a large Masonic temple. Among the schools are St Joseph's Academy and a state school for the deaf and dumb. Guthrie has a considerable trade with the surrounding country and has cotton gins, a cotton compress, and foundries and machine shops; among its manufactures are cotton-seed oil, cotton goods, flour, cereals, lumber, cigars, brooms and furniture. The total value of the factory product in 1905 was $1,200,662. The municipality owns and operates the waterworks. The city was founded in

1889, when Oklahoma was opened for settlement; in 1890 it was made the capital of the Territory, and in 1907 when Oklahoma was made a state, it became the state capital.

GUTHRUM (Godrum) (d. 890), king of East Anglia, first appears in the *English Annals* in the year 875, when he is mentioned as one of three Danish kings who went with the host to Cambridge. He was probably engaged in the campaigns of the next three years, and after Alfred's victory at Edington in 878, Guthrum met the king at Aller in Somersetshire and was baptized there under the name of Æthelstan. He stayed there for twelve days and was greatly honoured by his godfather Alfred. In 890 Guthrum-Æthelstan died: he is then spoken of as "se norðerna cyning" (probably) "the Norwegian king," referring to the ultimate origin of his family, and we are told that he was the first (Scandinavian) to settle East Anglia. Guthrum is perhaps to be identified with Gormr (= Guthrum) hinn heimski or hinn riki of the Scandinavian sagas, the foster-father of Hörðaknutr, the father of Gorm the old. There is a treaty known as the peace of Alfred and Guthrum.

GUTSCHMID, ALFRED, Baron von (1835-1887), German historian and Orientalist, was born on the 1st of July at Loschwitz (Dresden). After holding chairs at Kiel (1866), Königsberg (1873), and Jena (1876), he was finally appointed professor of history at Tübingen, where he died on the 2nd of March 1887. He devoted himself to the study of Eastern language and history in its pre-Greek and Hellenistic periods and contributed largely to the literature of the subject.

Works.—*Über die Fragmente des Pompeius Trogus* (supplementary vol. of *Jahrbücher für klass. Phil.*, 1857); *Die makedonische Anagraphe* (1864); *Beiträge zur Gesch. des alten Orients* (Leipzig, 1858); *Neue Beiträge zur Gesch. des alt. Or.*, vol. i., *Die Assyriologie in Deutschland* (Leipzig, 1876); *Die Glaubwürdigkeit der armenischen Gesch. des Moses von Khoren* (1877); *Untersuchungen über die syrische Epitome des eusebischen Canones* (1886); *Untersuch. über die Gesch. des Königreichs Osraëne* (1887); *Gesch. Irans* (Alexander the Great to the fall of the Arsacidae) (Tübingen, 1887). He wrote on Persia and Phoenicia in the 9th edition of the Ency. Brit. A collection of minor works entitled *Kleine Schriften* was published by F. Rühl at Leipzig (1889-1894, 5 vols.), with complete list of his writings. See article by Rühl in *Allgemeine deutsche Biographie*, xlix. (1904).

GUTS-MUTHS, JOHANN CHRISTOPH FRIEDRICH (1759-1839), German teacher and the principal founder of the German school system of gymnastics, was born at Quedlinburg on the 9th of August 1759. He was educated at the gymnasium of his native town and at Halle University; and in 1785 he went to Schnepfenthal, where he taught geography and gymnastics. His method of teaching gymnastics was expounded by him in various handbooks; and it was chiefly through them that gymnastics very soon came to occupy such an important position in the school system of Germany. He also did much to introduce a better method of instruction in geography. He died on the 21st of May 1839.

His principal works are *Gymnastik für die Jugend* (1793); *Spiele zur Übung und Erholung des Körpers und Geistes für die Jugend* (1796); *Turnbuch* (1817); *Handbuch der Geographie* (1810); and a number of books constituting a *Bibliothek für Pädagogik, Schulwesen, und die gesammte pädagogische Literatur Deutschlands*. He also contributed to the *Vollständiges Handbuch der neuesten Erdbeschreibung*, and along with Jacobi published *Deutsches Land und deutsches Volk*, the first part, *Deutsches Land*, being written by him.

GUTTA (Latin for “drop”), an architectural term given to the small frusta of conical or cylindrical form carved below the triglyph and under the regula of the entablature of the Doric Order. They are sometimes known as “trunnels,” a corruption of “tree-nail,” and resemble the wooden pins which in framed timber work or in joinery are employed to fasten together the pieces of wood; these are supposed to be derived from the original timber construction of the Doric temple, in which the pins, driven through the regula, secured the latter to the taenia, and, according to C. Chipiez and F. A. Choisy, passed through the taenia to hold the triglyphs in place. In the earliest examples of the Doric Order at Corinth and Selinus, the guttae are completely isolated from the architrave, and in Temple C. at Selinus the guttae are 3 or 4 in. in front of it, as if to enable the pin to be driven in more easily. In later examples they are partly attached to the architrave. Similar guttae are carved under the mutules of the Doric cornice, representing the pins driven through the mutules to secure the rafters. In the temples at Bassae, Paestum and Selinus, instances have been found where the guttae had been carved separately and sunk into holes cut in the soffit of the mutules and the regula. Their constant employment in the Doric temples suggests that, although originally of constructive origin, they were subsequently employed as decorative features.

GUTTA PERCHA, the name applied to the evaporated milky fluid or latex furnished by several trees chiefly found in the islands of the Malay Archipelago. The name is derived from two Malay words, *getah* meaning gum, and *pertja* being the name of the tree—probably a Bassia—from which the gum was (erroneously) supposed to be obtained.

Botanical Origin and Distribution.—The actual tree is known to the Malays as taban, and the product as *getah taban*. The best gutta percha of Malaya is chiefly derived from two trees, and is known as *getah taban merah* (red) or *getah taban sutra* (silky). The trees in question, which belong to the natural order Sapotaceae, have now been definitely identified, the first as *Dichopsis gutta* (Bentham and Hooker), otherwise *Isonandra gutta* (Hooker) or *Palaquium gutta* (Burck), and the second as *Dichopsis oblongifolia* (Burck). Allied trees of the same genus and of the same natural order yield similar but usually inferior products. Among them may be mentioned species of *Payena* (*getah soondie*).

Gutta percha trees often attain a height of 70 to 100 ft. and the trunk has a diameter of from 2 to 3 ft. They are stated to be mature when about thirty years old. The leaves of *Dichopsis*, which are obovate-lanceolate, with a distinct pointed apex, occur in clusters at the end of the branches, and are bright green and smooth on the upper surface but on the lower surface are yellowish-brown and covered with silky hairs. The leaves are usually about 6 in. long and about 2 in. wide at the centre. The flowers are white, and the seeds are contained in an ovoid berry about 1 in. long.

The geographical distribution of the gutta percha tree is almost entirely confined to the Malay Peninsula and its immediate neighbourhood. It includes a region within 6 degrees north and south of the equator and 93°-119° longitude, where the temperature ranges from 66° to 90° F. and the atmosphere is exceedingly moist. The trees may be grown from seeds or from cuttings. Some planting has taken place in Malaya, but little has so far been done to acclimatize the plant in other regions. Recent information seems to point to the possibility of growing the tree in Ceylon and on the west coast of Africa.

Preparation of Gutta Percha.—The gutta is furnished by the greyish milky fluid known as the latex, which is chiefly secreted in cylindrical vessels or cells situated in the cortex, that is, between the bark and the wood (or cambium). Latex also occurs in the leaves of the tree to the extent of about 9% of the dried leaves, and this may be removed from the powdered leaves by the use of appropriate solvents, but the process is not practicable commercially. The latex flows slowly where an incision is made through the bark, but not nearly so freely, even in the rainy season, as the india-rubber latex. On this account the Malays usually fell the tree in order to collect the latex, which is done by chopping off the branches and removing circles of the bark, forming cylindrical channels about an inch wide at various points about a foot apart down the trunk. The latex exudes and fills these channels, from which it is removed and converted into gutta by boiling in open vessels over wood fires. The work is usually carried on in the wet season when the latex is more fluid and more abundant. Sometimes when the latex is thick water is added to it before boiling.

The best results are said to be obtained from mature trees about thirty years old, which furnish about 2 to 3 lb of gutta. Older trees do not appear to yield larger amounts of gutta,

whilst younger trees are said to furnish less and of inferior quality. The trees have been so extensively felled for the gutta that there has been a great diminution in the total number during recent years, which has not been compensated for by the new plantations which have been established.

Uses of Gutta Percha.—The Chinese and Malays appear to have been acquainted with the characteristic property of gutta percha of softening in warm water and of regaining its hardness when cold, but this plastic property seems to have been only utilized for ornamental purposes, the construction of walking-sticks and of knife handles and whips, &c.

The brothers Tradescant brought samples of the curious material to Europe about the middle of the 17th century. It was then regarded as a form of wood, to which the name of "mazer" wood was given on account of its employment in making mazers or goblets. A description of it is given in a book published by John Tradescant in 1656 entitled *Musaeum Tradescantianum or a Collection of Rarities preserved at South Lambeth near London*. Many of the curiosities collected from all parts of the world by the Tradescants subsequently formed the nucleus of the Ashmolean Museum at Oxford which was opened in 1683, but the specimen of "mazer wood" no longer exists.

In 1843 samples of the material were sent to London by Dr William Montgomerie of Singapore, and were exhibited at the Society of Arts, and in the same year Dr José d'Almeida sent samples to the Royal Asiatic Society. Gutta percha was also exhibited at the Great Exhibition of 1851.

Dr Montgomerie's communication to the Society of Arts led to many experiments being made with the material. Casts of medals were successfully produced, and Sir William Siemens, in conjunction with Werner von Siemens, then made the first experiments with the material as an insulating covering for cable and telegraph wires, which led to the discovery of its important applications in this connexion and to a considerable commercial demand for the substance.

The value of gutta percha depends chiefly on its quality, that is its richness in true gutta and freedom from resin and other impurities which interfere with its physical characters, and especially its insulating power or inability to conduct electricity.

The chief use of gutta percha is now for electrical purposes. Other minor uses are in dentistry and as a means of taking impressions of medals, &c. It has also found application in the preparation of belting for machinery, as well as for the construction of the handles of knives and surgical instruments, whilst the inferior qualities are used for waterproofing.

Commercial Production.—The amount of gutta percha exported through Singapore from British and Dutch possessions in the East is subject to considerable fluctuation, depending chiefly on the demand for cable and telegraph construction. In 1886 the total export from Singapore was 40,411 cwt., of which Great Britain took 31,666 cwt.; in 1896 the export was 51,982 cwt. of which 29,722 cwt. came to Great Britain; while in 1905, 42,088 cwt. were exported (19,517 cwt. to Great Britain). It has to be remembered that the official returns include not only gutta percha of various grades of quality but also other inferior products sold under the name of gutta percha, some of which are referred to below under the head of substitutes. The value of gutta percha cannot therefore be correctly gauged from the value of the imports. In the ten years 1896-1906 the best qualities of gutta percha fetched from 4s. to about 7s. per ℔. Gutta percha, however, is used for few and special purposes, and there is no free market, the price being chiefly a matter of arrangement between the chief producers and consumers.

Characters and Properties.—Gutta percha appears in commerce in the form of blocks or cakes of a dirty greyish appearance, often exhibiting a reddish tinge, and just soft enough to be indented by the nail. It is subject to considerable adulteration, various materials, such as cocoa-nut oil, being added by the Malays to improve its appearance. The solid, which is fibrous in texture, hard and inelastic but not brittle at ordinary temperature, becomes plastic when immersed in hot water or if otherwise raised to a temperature of about 65°-66° C. in the case of gutta of the first quality, the temperature of softening being dependent on the quality of the gutta employed. In this condition it can be drawn out into threads, but is still inelastic. On cooling again the gutta resumes its hardness without becoming brittle. In this respect gutta percha differs from india-rubber or caoutchouc, which does not become plastic and unlike gutta percha is elastic. This property of softening on heating and solidifying when cooled again, without change in its original properties, enables gutta percha to be worked into various forms, rolled into sheets or drawn into ropes. The specific gravity of the best gutta percha lies between 0.96 and 1. Gutta percha is not dissolved by most liquids, although some remove resinous constituents; the best solvents are oil of turpentine, coal-tar oil, carbon bisulphide and chloroform, and light petroleum when hot. Gutta percha is not affected by alkaline

solutions or by dilute acids. Strong sulphuric acid chars it when warm, and nitric acid effects complete oxidation.

When exposed to air and light, gutta percha rapidly deteriorates, oxygen being absorbed, producing a brittle resinous material.

Chemical Composition.—Chemically, gutta percha is not a single substance but a mixture of several constituents. As the proportions of these constituents in the crude material are not constant, the properties of gutta percha are subject to variation. For electrical purposes it should have a high insulating power and dielectric strength and a low inductive capacity; the possession of these properties is influenced by the resinous constituents present.

The principal constituent of the crude material is the pure gutta, a hydrocarbon of the empirical formula $C_{10}H_{16}$. It is therefore isomeric with the hydrocarbon of caoutchouc and with that of oil of turpentine. Accompanying this are at least two oxygenated resinous constituents —albane $C_{10}H_{16}O$ and fluavil $C_{20}H_{32}O$—which can be separated from the pure gutta by the use of solvents. Pure gutta is not dissolved by ether and light petroleum in the cold, whereas the resinous constituents are removed by these liquids. The true gutta exhibits in an enhanced degree the valuable properties of gutta percha, and the commercial value of the raw material is frequently determined by ascertaining the proportion of true gutta present, the higher the proportion of this the more valuable is the gutta percha. The following are the results of analyses of gutta percha from trees of the genus *Dichopsis* or *Palaquium*:—

		Gutta per cent.	Resin per cent.
Dichopsis (or Palaquium)	oblongifolia	88.8	11.2
” ” ”	gutta	82.0	18.0
” ” ”	polyantha	49.3	50.7
” ” ”	pustulata	47.8	52.2
” ” ”	Maingayi	24.4	75.6

The hydrocarbon of gutta percha, gutta, is closely related in chemical constitution to caoutchouc. When distilled at a high temperature both are resolved into a mixture of two simpler hydrocarbons, isoprene (C_5H_8) and caoutchoucine or dipentene ($C_{10}H_{16}$), and the latter by further heating can be resolved into isoprene, a hydrocarbon of known constitution which has been produced synthetically and spontaneously reverts to caoutchouc. The precise relationship of isoprene to gutta has not been ascertained, but recently Harries has further elucidated the connexion between gutta and caoutchouc by showing that under the action of ozone both break up into laevulinic aldehyde and hydrogen peroxide, but differ in the proportions of these products they furnish. The two materials must therefore be regarded as very closely related in chemical constitution. Like caoutchouc, gutta percha is able to combine with sulphur, and this vulcanized product has found some commercial applications.

Manufacture of Gutta Percha.—Among the earliest patents taken out for the manufacture of gutta percha were those of Charles Hancock, the first of which is dated 1843.

Before being used for technical purposes the raw gutta percha is cleaned by machinery whilst in the plastic state. The chopped or sliced material is washed by mechanical means in hot water and forced through a sieve or strainer of fine wire gauze to remove dirt. It is then kneaded or “masticated” by machinery to remove the enclosed water, and is finally transferred whilst still hot and plastic to the rolling-machine, from which it emerges in sheets of different thickness. Sometimes chemical treatment of the crude gutta percha is resorted to for the purpose of removing the resinous constituents by the action of alkaline solutions or of light petroleum.

Substitutes for Gutta Percha.—For some purposes natural and artificial substitutes for gutta percha have been employed. The similar products furnished by other plants than those which yield gutta percha are among the more important of the natural substitutes, of which the material known as “balata” or “Surinam gutta percha,” is the most valuable. This is derived from a tree, *Mimusops balata* (bullet tree), belonging to the same natural order as gutta percha trees, viz. Sapotaceae. It is a large tree, growing to a height of 80 to 100 ft. or more, which occurs in the West Indies, in South America, and is especially abundant in Dutch and British Guiana. The latex which furnishes balata is secreted in the cortex between the bark and wood of the tree. As the latex flows freely the trees are tapped by making incisions in the same fashion as in india-rubber trees, and the balata is obtained by evaporating the milky fluid. Crude balata varies in composition. It usually contains nearly equal proportions of resin and true gutta. The latter appears to be identical with the chief constituent of gutta percha. The properties of balata correspond with its composition, and it may therefore be classed as an inferior gutta percha. Balata fetches from 1s. 6d. to 2s. 8d. per lb.

Among the inferior substitutes for gutta percha may be mentioned the evaporated latices

derived from *Butyrospermum Parkii* (shea-butter tree of West Africa or karite of the Sudan), *Calotropis gigantea* (Madar tree of India), and *Dyera costulata* of Malaya and Borneo, which furnishes the material known as "Pontianac." All these contain a small amount of gutta-like material associated with large quantities of resinous and other constituents. They fetch only a few pence per lb, and are utilized for waterproofing purposes.

Various artificial substitutes for gutta percha have been invented chiefly for use as insulating materials. These often consist of mixtures of bitumen with linseed and other oils, resins, &c., in some cases incorporated with inferior grades of gutta percha.

For further information respecting gutta percha, and for figures of the trees, the following works may be consulted: Jumelle, *Les Plantes à caoutchouc et à gutta* (Paris, Challamel, 1903); Obach, "Cantor Lectures on Gutta Percha," *Journal of the Society of Arts*, 1898.

(W. R. D.)

GUTTER (O. Fr. *goutiere*, mod. *gouttière*, from Lat. *gutta*, drop), in architecture, a horizontal channel or trough contrived to carry away the water from a flat or sloping roof to its discharge down a vertical pipe or through a spout or gargoyle; more specifically, but loosely, the similar channel at the side of a street, below the pavement. In Greek and Roman temples the cymatium of the cornice was the gutter, and the water was discharged through the mouths of lions, whose heads were carved on the same. Sometimes the cymatium was not carried along the flanks of a temple, in which case the rain fell off the lower edge of the roof tiles. In medieval work the gutter rested partly on the top of the wall and partly on corbel tables, and the water was discharged through gargoyles. Sometimes, however, a parapet or pierced balustrade was carried on the corbel table enclosing the gutter. In buildings of a more ordinary class the parapet is only a continuation of the wall below, and the gutter is set back and carried in a trough resting on the lower end of the roof timbers. The safest course is to have an eaves gutter which projects more or less in front of the wall and is secured to and carried by the rafters of the roof. In Renaissance architecture generally the pierced balustrade of the Gothic and transition work was replaced by a balustrade with vertical balusters. In France a compromise was effected, whereby instead of the horizontal coping of the ordinary balustrade a richly carved cresting was employed, of which the earliest example is in the first court of the Louvre by Pierre Lescot. This exists throughout the French Renaissance, and it is one of its chief characteristic features.

GUTZKOW, KARL FERDINAND (1811-1878), German novelist and dramatist, was born on the 17th of March 1811 at Berlin, where his father held a clerkship in the war office. After leaving school he studied theology and philosophy at the university of his native town, and while still a student, began his literary career by the publication in 1831 of a periodical entitled *Forum der Journalliteratur*. This brought him to the notice of Wolfgang Menzel, who invited him to Stuttgart to assist in the editorship of the *Literaturblatt*. At the same time he continued his university studies at Jena, Heidelberg and Munich. In 1832 he published anonymously at Hamburg *Briefe eines Narren an eine Närrin*, and in 1833 appeared at Stuttgart *Maha-Guru, Geschichte eines Gottes*, a fantastic and satirical romance. In 1835 he went to Frankfort, where he founded the *Deutsche Revue*. In the same year appeared *Wally, die Zweiflerin*, from the publication of which may be said to date the school of writers who, from their opposition to the literary, social and religious traditions of romanticism, received the name of "Young Germany." The work was directed specially against the institution of marriage and the belief in revelation; and whatever interest it might have attracted from its own merits was enhanced by the action of the German federal diet, which condemned Gutzkow to three months' imprisonment, decreed the suppression of all he had written or might yet write, and prohibited him from exercising the functions of editor within the German confederation. During his term of imprisonment at Mannheim, Gutzkow employed himself in the composition of his treatise *Zur Philosophie der Geschichte* (1836). On obtaining his freedom he returned to Frankfort, whence he went in 1837 to Hamburg. Here he inaugurated a new epoch of his literary activity by bringing out his tragedy *Richard Savage* (1839), which immediately made the round of all the German theatres. Of his numerous other plays the

majority are now neglected; but a few have obtained an established place in the repertory of the German theatre—especially the comedies *Zopf und Schwert* (1844), *Das Urbild des Tartüffe* (1847), *Der Königsleutnant* (1849) and the blank verse tragedy, *Uriel Acosta* (1847). In 1847 Gutzkow went to Dresden, where he succeeded Tieck as literary adviser to the court theatre. Meanwhile he had not neglected the novel. *Seraphine* (1838) was followed by *Blasedow und seine Söhne*, a satire on the educational theories of the time. Between 1850 and 1852 appeared *Die Ritter vom Geiste*, which may be regarded as the starting-point for the modern German social novel. *Der Zauberer von Rom* is a powerful study of Roman Catholic life in southern Germany. The success of *Die Ritter vom Geiste* suggested to Gutzkow the establishment of a journal on the model of Dickens' *Household Words*, entitled *Unterhaltungen am häuslichen Herd*, which first appeared in 1852 and was continued till 1862. In 1864 he had an epileptic fit, and his productions show henceforth decided traces of failing powers. To this period belong the historical novels *Hohenschwangau* (1868) and *Fritz Ellrodt* (1872), *Lebensbilder* (1870-1872), consisting of autobiographic sketches, and *Die Söhne Pestalozzis* (1870), the plot of which is founded on the story of Kaspar Hauser. On account of a return of his nervous malady, Gutzkow in 1873 made a journey to Italy, and on his return took up his residence in the country near Heidelberg, whence he removed to Frankfort-on-Main, dying there on the 16th of December 1878. With the exception of one or two of his comedies, Gutzkow's writings have fallen into neglect. But he exerted a powerful influence on the opinions of modern Germany; and his works will always be of interest as the mirror in which the intellectual and social struggles of his time are best reflected.

An edition of Gutzkow's collected works appeared at Jena (1873-1876, new ed., 1879). E. Wolff has published critical editions of Gutzkow's *Meisterdramen* (1892) and *Wally die Zweiflerin* (1905). His more important novels have been frequently reprinted. For Gutzkow's life see his various autobiographical writings such as *Aus der Knabenzeit* (1852), *Rückblicke auf mein Leben* (1876), &c. For an estimate of his life and work see J. Proelss, *Das junge Deutschland* (1892); also H. H. Houben, *Studien über die Dramen Gutzkows* (1898) and *Gutzkow-Funde* (1901).

GÜTZLAFF, KARL FRIEDRICH AUGUST (1803-1851), German missionary to China, was born at Pyritz in Pomerania on the 8th of July 1803. When still apprenticed to a saddler in Stettin, he made known his missionary inclinations to the king of Prussia, through whom he went to the Pädagogium at Halle, and afterwards to the mission institute of Jänike in Berlin. In 1826, under the auspices of the Netherlands Missionary Society, he went to Java, where he was able to learn Chinese. Leaving the society in 1828, he went to Singapore, and in August of the same year removed to Bangkok, where he translated the Bible into Siamese. In 1829 he married an English lady, who aided him in the preparation of a dictionary of Cochin Chinese, but she died in August 1831 before its completion. Shortly after her death he sailed to Macao in China, where, and subsequently at Hong Kong, he worked at a translation of the Bible into Chinese, published a Chinese monthly magazine, and wrote in Chinese various books on subjects of useful knowledge. In 1834 he published at London a *Journal of Three Voyages along the Coast of China in 1831, 1832 and 1833*. He was appointed in 1835 joint Chinese secretary to the English commission, and during the opium war of 1840-42 and the negotiations connected with the peace that followed he rendered valuable service by his knowledge of the country and people. The Chinese authorities refusing to permit foreigners to penetrate into the interior, Gützlaff in 1844 founded an institute for training native missionaries, which was so successful that during the first four years as many as forty-eight Chinese were sent out from it to work among their fellow-countrymen. He died at Hong Kong on the 9th of August 1851.

Gützlaff also wrote *A Sketch of Chinese History, Ancient and Modern* (London, 1834), and a similar work published in German at Stuttgart in 1847; China Opened (1838); and the *Life of Taow-Kwang* (1851; German edition published at Leipzig in 1852). A complete collection of his Chinese writings is contained in the library at Munich.

GUY OF WARWICK, English hero of romance. Guy, son of Siward or Seguard of

Wallingford, by his prowess in foreign wars wins in marriage Félice (the Phyllis of the well-known ballad), daughter and heiress of Roalt, earl of Warwick. Soon after his marriage he is seized with remorse for the violence of his past life, and, by way of penance, leaves his wife and fortune to make a pilgrimage to the Holy Land. After years of absence he returns in time to deliver Winchester for King Æthelstan from the invading northern kings, Anelaph (Anlaf or Olaf) and Gonelaph, by slaying in single fight their champion the giant Colbrand. Local tradition fixes the duel at Hyde Mead near Winchester. Making his way to Warwick he becomes one of his wife's bedesmen, and presently retires to a hermitage in Arden, only revealing his identity at the approach of death. The versions of the Middle English romance of Guy which we possess are adaptations from the French, and are cast in the form of a *roman d'aventures*, opening with a long recital of Guy's wars in Lombardy, Germany and Constantinople, and embellished with fights with dragons and surprising feats of arms. The kernel of the tradition evidently lies in the fight with Colbrand, which represents, or at least is symbolic[1] of an historical fact. The religious side of the legend finds parallels in the stories of St Eustachius and St Alexius,[2] and makes it probable that the Guy-legend, as we have it, has passed through monastic hands. Tradition seems to be at fault in putting Guy's adventures under Æthelstan. The Anlaf of the story is probably Olaf Tryggvason, who, with Sweyn of Denmark, harried the southern counties of England in 993 and pitched his winter quarters in Southampton. Winchester was saved, however, not by the valour of an English champion, but by the payment of money. This Olaf was not unnaturally confused with Anlaf Cuaran or Havelok (*i.e.*).

The name Guy (perhaps a Norman form of A. S. *wig* = war) may be fairly connected with the family of Wigod, lord of Wallingford under Edward the Confessor, and a Filicia, who belongs to the 12th century and was perhaps the Norman poet's patroness, occurs in the pedigree of the Ardens, descended from Thurkill of Warwick and his son Siward. Guy's Cliffe, near Warwick, where in the 14th century Richard de Beauchamp, earl of Warwick, erected a chantry, with a statue of the hero, does not correspond with the site of the hermitage as described in the romance. The bulk of the legend is obviously fiction, even though it may be vaguely connected with the family history of the Ardens and the Wallingford family, but it was accepted as authentic fact in the chronicle of Pierre de Langtoft (Peter of Langtoft) written at the end of the 13th century. The adventures of Reynbrun, son of Guy, and his tutor Heraud of Arden, who had also educated Guy, have much in common with his father's history, and form an interpolation sometimes treated as a separate romance. There is a certain connexion between Guy and Count Guido of Tours (fl. 800), and Alcuin's advice to the count is transferred to the English hero in the *Speculum Gy of Warewyke* (*c.* 1327), edited for the Early English Text Society by G. L. Morrill, 1898.

The French romance (Brit. Mus. Harl. MS. 3775) has not been printed, but is described by Émile Littré in *Hist. litt. de la France* (xxii., 841-851, 1852). A French prose version was printed in Paris, 1525, and subsequently (see G. Brunet, *Manuel du libraire*, *s.v.* "Guy de Warvich"); the English metrical romance exists in four versions, dating from the early 14th century; the text was edited by J. Zupitza (1875-1876) for the E.E.T.S. from Cambridge University Lib. Paper MS. Ff. 2, 38, and again (3 pts. 1883-1891, extra series, Nos. 42, 49, 59), from the Auchinleck and Caius College MSS. The popularity of the legend is shown by the numerous versions in English: *Guy of Warwick*, translated from the Latin of Girardus Cornubiensis (fl. 1350) into English verse by John Lydgate between 1442 and 1468; *Guy of Warwick*, a poem (written in 1617 and licensed, but not printed) by John Lane, the MS. of which (Brit. Mus.) contains a sonnet by John Milton, father of the poet; *The Famous Historie of Guy, Earl of Warwick* (*c.* 1607), by Samuel Rowlands; *The Booke of the Moste Victoryous Prince Guy of Warwicke* (William Copland, no date); other editions by J. Cawood and C. Bates; chapbooks and ballads of the 17th and 18th centuries: *The Tragical History, Admirable Achievements and Curious Events of Guy, Earl of Warwick*, a tragedy (1661) which may possibly be identical with a play on the subject Written by John Day and Thomas Dekker, and entered at Stationers' Hall on the 15th of January 1618/19; three verse fragments are printed by Hales and Furnivall in their edition of the Percy Folio MS. vol. ii.; an early French MS. is described by J. A. Herbert (*An Early MS. of Gui de Warwick*, London, 1905).

See also M. Weyrauch *Die mittelengl. Fassungen der Sage von Guy* (2 pts., Breslau, 1899 and 1901); J. Zupitza in *Silzungsber. d. phil.-hist. Kl. d. kgl. Akad. d. Wiss.* (vol. lxxiv., Vienna, 1874), and *Zur Literaturgeschichte des Guy von Warwick* (Vienna, 1873); a learned discussion of the whole subject by H. L. Ward, *Catalogue of Romances* (i. 471-501, 1883); and an article by S. L. Lee in the *Dictionary of National Biography*.

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1 Some writers have supposed that the fight with Colbrand symbolizes the victory of Brunanburh. Anelaph and Gonelaph would then represent the cousins Anlaf Sihtricson and Anlaf Godfreyson (see HAVELOK).

2 See the English legends in C. Horstmann, *Altenglische Legenden*, Neue Folge (Heilbronn, 1881).

GUY, THOMAS (1644-1724), founder of Guy's Hospital, London, was the son of a lighterman and coal-dealer at Southwark. After serving an apprenticeship of eight years with a bookseller, he in 1668 began business on his own account. He dealt largely in Bibles, which had for many years been poorly and incorrectly printed in England. These he at first imported from Holland, but subsequently obtained from the university of Oxford the privilege of printing. Thus, and by an extremely thrifty mode of life, and more particularly by investment in government securities, the subscription of these into the South Sea Company, and the subsequent sale of his stock in 1720, he became master of an immense fortune. He died unmarried on the 17th of December 1724. In 1707 he built three wards of St Thomas's Hospital, which institution he otherwise subsequently benefited; and at a cost of £18,793, 16s. he erected Guy's Hospital, leaving for its endowment £219,499; he also endowed Christ's Hospital with £400 a year, and in 1678 endowed almshouses at Tamworth, his mother's birthplace, which was represented by him in parliament from 1695 to 1707. The residue of his estate, which went to distant relatives, amounted to about £80,000.

See *A True Copy of the Last Will and Testament of Thomas Guy, Esq.* (London, 1725); J. Noorthouck, *A New Hist. of London*, bk. iii. ch. i. p. 684 (1773); Nichols, *Literary Anecdotes*, iii. 599 (1812); Charles Knight, *Shadows of the Old Booksellers*, pp. 3-23 (1865); and *A Biographical History of Guy's Hospital*, by S. Wilkes and G. T. Bettany (1892).

GUYON, JEANNE MARIE BOUVIER DE LA MOTHE (1648-1717), French quietist writer, was born at Montargis, where her family were persons of consequence, on the 13th of April 1648. If her somewhat hysterical autobiography may be trusted she was much neglected in her youth; most of her time was spent as a boarder in various convent schools. Here she went through all the religious experiences common to neurotic young women; these were turned in a definitely mystical direction by the duchesse de Béthune, daughter of the disgraced minister, Fouquet, who spent some years at Montargis after her father's fall. In 1664 Jeanne Marie was married to a rich invalid of the name of Guyon, many years her senior. Twelve years later he died, leaving his widow with three small children and a considerable fortune. All through her unhappy married life the mystical attraction had grown steadily in violence; it now attached itself to a certain Father Lacombe, a Barnabite monk of weak character and unstable intellect. In 1681 she left her family and joined him; for five years the two rambled about together in Savoy and the south-east of France, spreading their mystical ideas. At last they excited the suspicion of the authorities; in 1686 Lacombe was recalled to Paris, put under surveillance, and finally sent to the Bastille in the autumn of 1687. He was presently transferred to the castle of Lourdes, where he developed softening of the brain and died in 1715. Meanwhile Madame Guyon had been arrested in January 1688, and been shut up in a convent as a suspected heretic. Thence she was delivered in the following year by her old friend, the duchesse de Béthune, who had returned from exile to become a power in the devout court-circle presided over by Madame de Maintenon. Before long Madame Guyon herself was introduced into this pious assemblage. Its members were far from critical; they were intensely interested in religion; and even Madame Guyon's bitterest critics bear witness to her charm of manner, her imposing appearance, and the force and eloquence with which she explained her mystical ideas. So much was Madame de Maintenon impressed, that she often invited Madame Guyon to give lectures at her girls' school of St Cyr. But by far the greatest of her conquests was Fénelon, now a rising young director of consciences, much in favour with aristocratic ladies. Dissatisfied with the formalism of average Catholic piety, he was already thinking out a mystical theory of his own; and between 1689 and 1693 they corresponded regularly. But as soon as ugly reports about Lacombe began to spread, he broke off all connexion with her. Meanwhile the reports had reached the prudent ears of Madame de Maintenon. In May 1693 she asked Madame Guyon to go no more to St Cyr. In the hope of clearing her orthodoxy, Madame Guyon appealed to Bossuet, who decided that her books contained "much that was intolerable, alike in form and matter." To this judgment Madame Guyon submitted, promised to "dogmatize no more," and disappeared into the country (1693). In the next year she again petitioned for an inquiry, and was eventually sent, half as a prisoner, half as a penitent, to Bossuet's cathedral town of Meaux. Here she spent the first half of 1695; but in the summer she escaped without his leave, bearing with her a certificate of orthodoxy signed by him.

Bossuet regarded this flight as a gross act of disobedience; in the winter Madame Guyon was arrested and shut up in the Bastille. There she remained till 1703. In that year she was liberated, on condition she went to live on her son's estate near Blois, under the eye of a stern bishop. Here the rest of her life was spent in charitable and pious exercises; she died on the 9th of June 1717. During these latter years her retreat at Blois became a regular place of pilgrimage for admirers, foreign quite as often as French. Indeed, she is one of the many prophetesses whose fame has stood highest out of their own country. French critics of all schools of thought have generally reckoned her an hysterical degenerate; in England and Germany she has as often roused enthusiastic admiration.

AUTHORITIES.—*Vie de Madame Guyon, écrite par elle-même* (really a compilation made from various fragments) (3 vols., Paris, 1791). There is a life in English by T. C. Upham (New York, 1854); and an elaborate study by L. Guerrier (Paris, 1881). For a remarkable review of this latter work see Brunetière, *Nouvelles Études critiques*, vol. ii. The complete edition of Madame Guyon's works, including the autobiography and five volumes of letters, runs to forty volumes (1767-1791); the most important works are published separately, *Opuscules spirituels* (2 vols., Paris, 1790). They have been several times translated into English. See also the literature of the article on QUIETISM; and H. Delacroix, *Études sur le mysticisme* (Paris, 1908).

(ST C.)

GUYON, RICHARD DEBAUFRE (1803-1856), British soldier, general in the Hungarian revolutionary army and Turkish pasha, was born at Walcot, near Bath, in 1803. After receiving a military education in England and in Austria he entered the Hungarian hussars in 1823, in which he served until after his marriage with a daughter of Baron Spleny, a general officer in the imperial service. At the outbreak of the Hungarian War in 1848, he re-entered active service as an officer of the Hungarian Honvéds, and he won great distinction in the action of Sukoro (September 29, 1848) and the battle of Schwechat (October 30). He added to his reputation as a leader in various actions in the winter of 1848-1849, and after the battle of Kapolna was made a general officer. He served in important and sometimes independent commands to the end of the war, after which he escaped to Turkey. In 1852 he entered the service of the sultan. He was made a pasha and lieutenant-general without being required to change his faith, and rendered distinguished service in the campaign against the Russians in Asia Minor (1854-55). General Guyon died of cholera at Scutari on the 12th of October 1856.

See A. W. Kinglake, *The Patriot and the Hero General Guyon* (1856).

GUYOT, ARNOLD HENRY (1807-1884), Swiss-American geologist and geographer, was born at Boudevilliers, near Neuchâtel, Switzerland, on the 28th of September 1807. He studied at the college of Neuchâtel and in Germany, where he began a lifelong friendship with Louis Agassiz. He was professor of history and physical geography at the short-lived Neuchâtel "Academy" from 1839 to 1848, when he removed, at Agassiz's instance, to the United States, settling in Cambridge, Massachusetts. For several years he was a lecturer for the Massachusetts State Board of Education, and he was professor of geology and physical geography at Princeton from 1854 until his death there on the 8th of February 1884. He ranked high as a geologist and meteorologist. As early as 1838, he undertook, at Agassiz's suggestion, the study of glaciers, and was the first to announce, in a paper submitted to the Geological Society of France, certain important observations relating to glacial motion and structure. Among other things he noted the more rapid flow of the centre than of the sides, and the more rapid flow of the top than of the bottom of glaciers; described the laminated or "ribboned" structure of the glacial ice, and ascribed the movement of glaciers to a gradual molecular displacement rather than to a sliding of the ice mass as held by de Saussure. He subsequently collected important data concerning erratic boulders. His extensive meteorological observations in America led to the establishment of the United States Weather Bureau, and his *Meteorological and Physical Tables* (1852, revised ed. 1884) were long standard. His graded series of text-books and wall-maps were important aids in the extension and popularization of geological study in America. In addition to text-books, his principal publications were: *Earth and Man, Lectures on Comparative Physical Geography in its*

Relation to the History of Mankind (translated by Professor C. C. Felton, 1849); *A Memoir of Louis Agassiz* (1883); and *Creation, or the Biblical Cosmogony in the Light of Modern Science* (1884).

See James D. Dana's "Memoir" in the *Biographical Memoirs of the National Academy of Science*, vol. ii. (Washington, 1886).

GUYOT, YVES (1843-), French politician and economist, was born at Dinan on the 6th of September 1843. Educated at Rennes, he took up the profession of journalism, coming to Paris in 1867. He was for a short period editor-in-chief of *L'Indépendant du midi* of Nîmes, but joined the staff of *La Rappel* on its foundation, and worked subsequently on other journals. He took an active part in municipal life, and waged a keen campaign against the prefecture of police, for which he suffered six months' imprisonment. He entered the chamber of deputies in 1885 as representative of the first arrondissement of Paris and was *rapporteur général* of the budget of 1888. He became minister of public works under the premiership of P. E. Tirard in 1889, retaining his portfolio in the cabinet of C. L. de Freycinet until 1892. Although of strong liberal views, he lost his seat in the election of 1893 owing to his militant attitude against socialism. An uncompromising free-trader, he published *La Comédie protectionniste* (1905; Eng. trans. *The Comedy of Protection*); *La Science économique* (1st ed. 1881; 3rd ed. 1907); *La Prostitution* (1882); *La Tyrannie socialiste* (1893), all three translated into English; *Les Conflits du travail et leur solution* (1903); *La Démocratie individualiste* (1907).

GUYTON DE MORVEAU, LOUIS BERNARD, BARON (1737-1816), French chemist, was born on the 4th of January 1737, at Dijon, where his father was professor of civil law at the university. As a boy he showed remarkable aptitude for practical mechanics, but on leaving school he studied law in the university of Dijon, and in his twenty-fourth year became advocate-general in the parlement of Dijon. This office he held till 1782. Devoting his leisure to the study of chemistry, he published in 1772 his *Digressions académiques*, in which he set forth his views on phlogiston, crystallization, &c., and two years later he established in his native town courses of lectures on materia medica, mineralogy and chemistry. An essay on chemical nomenclature, which he published in the *Journal de physique* for May 1782, was ultimately developed with the aid of A. L. Lavoisier, C. L. Berthollet and A. F. Fourcroy, into the *Méthode d'une nomenclature chimique*, published in 1787, the principles of which were speedily adopted by chemists throughout Europe. Constantly in communication with the leaders of the Lavoisierian school, he soon became a convert to the anti-phlogistic doctrine; and he published his reasons in the first volume of the section "Chymie, Pharmacie et Metallurgie" of the *Encyclopédie méthodique* (1786), the chemical articles in which were written by him, as well as some of those in the second volume (1792). In 1794 he was appointed to superintend the construction of balloons for military purposes, being known as the author of some aeronautical experiments carried out at Dijon some ten years previously. In 1791 he became a member of the Legislative Assembly, and in the following year of the National Convention, to which he was re-elected in 1795, but he retired from political life in 1797. In 1798 he acted as provisional director of the Polytechnic School, in the foundation of which he took an active part, and from 1800 to 1814 he held the appointment of master of the mint. In 1811 he was made a baron of the French Empire. He died in Paris on the 2nd of January 1816.

Besides being a diligent contributor to the scientific periodicals of the day, Guyton wrote *Mémoire sur l'éducation publique* (1762); a satirical poem entitled *Le Rat iconoclaste, ou le Jésuite croqué* (1763); *Discours publics et éloges* (1775-1782); *Plaidoyers sur plusieurs questions de droit* (1785); and *Traité des moyens de désinfecter l'air* (1801), describing the disinfecting powers of chlorine, and of hydrochloric acid gas which he had successfully used at Dijon in 1773. With Hugues Maret (1726-1785) and Jean François Durande (d. 1794) he also published the *Élémens de chymie théorique et pratique* (1776-1777).

GUZMICS, IZIDÓR (1786-1839). Hungarian theologian, was born on the 7th of April 1786 at Vámos-Család, in the county of Sopron. At Sopron (Oedenburg) he was instructed in the art of poetry by Paul Horváth. In October 1805 he entered the Benedictine order, but left it in August of the following year, only again to assume the monastic garb on the 10th of November 1806. At the monastery of Pannonhegy he applied himself to the study of Greek under Farkas Tóth and in 1812 he was sent to Pesth to study theology. Here he read the best German and Hungarian authors, and took part in the editorship of the *Nemzeti* (National) *Plutarkus*, and in the translation of Johann Hübner's *Lexicon*. On obtaining the degree of doctor of divinity in 1816, he returned to Pannonhegy, where he devoted himself to dogmatic theology and literature, and contributed largely to Hungarian periodicals. The most important of his theological works are: *A kath. anyaszentegyháznak hitbeli tanitása* (The Doctrinal Teaching of the Holy Catholic Church), and *A kereszténveknek vallásbeli egyesülésökröl* (On Religious Unity among Christians), both published at Pesth in 1822; also a Latin treatise entitled *Theologia Christiana fundamentalis et theologia dogmatica* (4 vols., Györ, 1828-1829). His translation of Theocritus in hexameters was published in 1824. His versions of the *Oedipus* of Sophocles and of the *Iphigenia* of Euripides were rewarded by the Hungarian Academy, of which in 1838 he was elected honorary member. In 1832 he was appointed abbot of the wealthy Benedictine house at Bakonybél, a village in the county of Veszprém. There he built an asylum for 150 children, and founded a school of harmony and singing. He died on the 1st of September 1839.

GWADAR, a port on the Makran coast of Baluchistan, about 290 m. W. of Karachi. Pop. (1903), 4350. In the last half of the 18th century it was handed over by the khan of Kalat to the sultan of Muscat, who still exercises sovereignty over the port, together with about 300 sq. m. of the adjoining country. It is a place of call for the steamers of the British India Navigation Company.

GWALIOR, a native state of India, in the Central India agency, by far the largest of the numerous principalities comprised in that area. It is the dominion of the Sindhia family. The state consists of two well-defined parts which may roughly be called the northern and the southern. The former is a compact mass of territory, bounded N. and N.W. by the Chambal river, which separates it from the British districts of Agra and Etawah, and the native states of Dholpur, Karauli and Jaipur of Rajputana; E. by the British districts of Jalaun, Jhansi, Lalitpur and Saugor; S. by the states of Bhopal, Tonk, Khilchipur and Rajgarh; and W. by those of Jhalawar, Tonk and Kotah of Rajputana. The southern, or Malwa, portion is made up of detached or semi-detached districts, between which are interposed parts of other states, which again are mixed up with each other in bewildering intricacy. The two portions together have a total area of 25,041 sq. m. Pop. (1901), 2,933,001, showing a decrease of 13% in the decade.

The state may be naturally divided into plain, plateau and hilly country. The plain country extends from the Chambal river in the extreme southwards for about 80 m., with a maximum width from east to west of about 120 m. This plain, though broken in its southern portion by low hills, has generally an elevation of only a few hundred feet above sea-level. In the summer season the climate is very hot, the shade temperature rising frequently to 112° F., but in the winter months (from November to February inclusive) it is usually temperate and for short periods extremely cold. The average rainfall is 30 in., but the period 1891-1901 was a decade of low rainfall, and distress was caused by famine. South of this tract there is a gradual ascent to the Central India plateau, and at Sipri the general level is 1500 ft. above the sea. On this plateau lies the remainder of the state, with the exception of the small district of Amjhera in the extreme south. The elevation of this region gives it a moderate climate during the summer as compared with the plain country, while the winter is warmer and more equable. The average rainfall is 28 in. The remaining portion of the state, classed as hilly, comprises only the small district of Amjhera. This is known as the Bhil country, and lies among the Vindhya mountains with a mean elevation of about 1800 ft. The rainfall averages 23 in. In the two years 1899 and 1900 the monsoon was very weak, the result being a severe famine which caused

great mortality among the Bhil population. Of these three natural divisions the plateau possesses the most fertile soil, generally of the kind known as “black cotton,” but the low-lying plain has the densest population. The state is watered by numerous rivers. The Nerbudda, flowing west, forms the southern boundary. The greater part of the drainage is discharged into the Chambal, which forms the north-western and northern and eastern boundary. The Sind, with its tributaries the Kuwari, Asar and Sankh, flows through the northern division. The chief products are wheat, millets, pulses of various kinds, maize, rice, linseed and other oil-seeds; poppy, yielding the Malwa opium; sugar-cane, cotton, tobacco, indigo, garlic, turmeric and ginger. About 60% of the population are employed in agricultural and only 15% in industrial occupations, the great majority of the latter being home workers. There is a leather-factory at Morar; cotton-presses at Morena, Baghana and Ujjain; ginning factories at Agar, Nalkhera, Shajapur and Sonkach; and a cotton-mill at Ujjain. The cotton industry alone shows possibilities of considerable development, there being 55,000 persons engaged in it at the time of the census of 1901.

The population is composed of many elements, among which Brahmans and Rajputs are specially numerous. The prevailing religion is Hinduism, 84% of the people being Hindus and only 6% Mahommedans. The revenue of the state is about one million sterling; and large reserves have been accumulated, from which two millions were lent to the government of India in 1887, and later on another million for the construction of the Gwalior-Agra and Indore-Neemuch railways. The railways undertaken by the state are: (1) from Bina on the Indian Midland to Goona; (2) an extension of this line to Baran, opened in 1899; (3) from Bhopal to Ujjain; (4) two light railways, from Gwalior to Sipri and Gwalior to Bhind, which were opened by the viceroy in November 1899. On the same occasion the viceroy opened the Victoria College, founded to commemorate the Diamond Jubilee; and the Memorial Hospital, built in memory of the maharaja’s father. British currency has been introduced instead of Chandori rupees, which were much depreciated. The state maintains three regiments of Imperial Service cavalry, two battalions of infantry and a transport corps.

History.—The Sindhia family, the rulers of the Gwalior state, belong to the Mahratta nation and originally came from the neighbourhood of Poona. Their first appearance in Central India was early in the 18th century in the person of Ranoji (d. 1745), a scion of an impoverished branch of the family, who began his career as the peshwa’s slipper-carrier and rose by his military abilities to be commander of his bodyguard. In 1726, together with Malhar Rao Holkar, the founder of the house of Indore, he was authorized by the peshwa to collect tribute (*chauth*) in the Malwa districts. He established his headquarters at Ujjain, which thus became the first capital of Sindhia’s dominions.

Ranoji’s son and successor, Jayapa Sindhia, was killed at Nagaur in 1759, and was in his turn succeeded by his son Jankoji Sindhia. But the real founder of the state of Gwalior was Mahadji Sindhia, a natural son of Ranoji, who, after narrowly escaping with his life from the terrible slaughter of Panipat in 1761 (when Jankoji was killed), obtained with some difficulty from the peshwa a re-grant of his father’s possessions in Central India (1769). During the struggle which followed the death of Madhu Rao Peshwa in 1772 Mahadji seized every occasion for extending his power and possessions. In 1775, however, when Raghuba Peshwa threw himself on the protection of the British, the reverses which Mahadji encountered at their hands—Gwalior being taken by Major Popham in 1780—opened his eyes to their power. By the treaty of Salbai (1782) it was agreed that Mahadji should withdraw to Ujjain, and the British retire north of the Jumna. Mahadji, who undertook to open negotiations with the other belligerents, was recognized as an independent ruler, and a British resident was established at his court. Mahadji, aided by the British policy of neutrality, now set to work to establish his supremacy over Hindustan proper. Realizing the superiority of European methods of warfare, he availed himself of the services of a Savoyard soldier of fortune, Benoît de Boigne, whose genius for military organization and command in the field was mainly instrumental in establishing the Mahratta power. Mahadji’s disciplined troops made him invincible. In 1785 he re-established Shah Alam on the imperial throne at Delhi, and as his reward obtained for the peshwa the title of *vakil-ul-mutlak* or vicegerent of the empire, contenting himself with that of his deputy. In 1788 he took advantage of the cruelties practised by Ghulam Kadir on Shah Alam, to occupy Delhi, where he established himself as the protector of the aged emperor. Though nominally a deputy of the peshwa he was now ruler of a vast territory, including the greater part of Central India and Hindustan proper, while his lieutenants exacted tribute from the chiefs of Rajputana. There can be no doubt that he looked with apprehension on the growing power of the British; but he wisely avoided any serious collision with them.

Mahadji died in 1794, and was succeeded by his adopted son, Daulat Rao Sindhia, a grandson of his brother Tukoji. When, during the period of unrest that followed the deaths of the peshwa, Madhu Rao II., in 1795 and of Tukoji Holkar in 1797, the Mahratta leaders fought over the question of supremacy, the peshwa, Baji Rao II., the titular head of the Mahratta

confederation, fled from his capital and placed himself under British protection by the treaty of Bassein (December 31, 1802). This interposition of the British government was resented by the confederacy, and it brought on the Mahratta War of 1803. In the campaign that followed a combined Mahratta army, in which Daulat Rao's troops furnished the largest contingent, was defeated by General Arthur Wellesley at Assaye and Argaum in Central India; and Lord Lake routed Daulat Rao's European-trained battalions in Northern India at Agra, Aligarh and Laswari. Daulat Rao was then compelled to sign the treaty of Sarji Anjangaon (December 30, 1803), which stripped him of his territories between the Jumna and Ganges, the district of Broach in Gujarat and other lands in the south. By the same treaty he was deprived of the forts of Gwalior and Gohad; but these were restored by Lord Cornwallis in 1805, when the Chambal river was made the northern boundary of the state. By a treaty signed at Burhanpur in 1803 Daulat Rao further agreed to maintain a subsidiary force, to be paid out of the revenues of the territories ceded under the treaty of Sarji Anjangaon. When, however, in 1816 he was called upon to assist in the suppression of the Pindaris, though by the treaty of Gwalior (1817) he promised his co-operation, his conduct was so equivocal that in 1818 he was forced to sign a fresh treaty by which he ceded Ajmere and other lands.

Daulat Rao died without issue in 1827, and his widow, Baiza Bai (d. 1862), adopted Mukut Rao, a boy of eleven belonging to a distant branch of the family, who succeeded as Jankoji Rao Sindhia. His rule was weak; the state was distracted by interminable palace intrigues and military mutinies, and affairs went from bad to worse when, in 1843, Jankoji Rao, who left no heir, was succeeded by another boy, adopted by his widow, Tara Bai, under the name of Jayaji Rao Sindhia. The growth of turbulence and misrule now induced Lord Ellenborough to interpose, and a British force under Sir Hugh Gough advanced upon Gwalior (December 1843). The Mahratta troops were defeated simultaneously at Maharajpur and Punniar (December 29), with the result that the Gwalior government signed a treaty ceding territory with revenue sufficient for the maintenance of a contingent force to be stationed at the capital, and limiting the future strength of the Gwalior army, while a council of regency was appointed during the minority to act under the resident's advice. In 1857 the Gwalior contingent joined the mutineers; but the maharaja himself remained loyal to the British, and fled from his capital until the place was retaken and his authority restored by Sir Hugh Rose (Lord Strathnairn) on the 19th of June 1858. He was rewarded with the districts of Neemuch and Amjhera, but Gwalior fort was occupied by British troops and was only restored to his son in 1886 by Lord Dufferin. Jayaji Rao, who died in 1886, did much for the development of his state. He was created a G.C.S.I in 1861, and subsequently became a counsellor of the empress, a G.C.B. and C.I.E.

His son, the maharaja, Madhava Rao Sindhia, G.C.S.I., was born in 1877. During his minority the state was administered for eight years by a council of regency. He was entrusted with ruling powers in 1894, and in all respects continued the reforming policy of the council, while paying personal attention to every department, being a keen soldier, an energetic administrator, and fully alive to the responsibilities attaching to his position. He was created an honorary aide-de-camp to the king-emperor and an honorary colonel in the British army. He went to China as orderly officer to General Gaselee in 1901, and provided the expedition with a hospital ship at his own expense, while his Imperial Service Transport Corps proved a useful auxiliary to the British army in the Chitral and Tirah expeditions.

The City of Gwalior is 76 m. by rail S. of Agra, and had a population in 1901 of 119,433. This total includes the new town of Lashkar or "the Camp" which is the modern capital of the state and old Gwalior. The old town has a threefold interest: first as a very ancient seat of Jain worship; secondly for its example of palace architecture of the best Hindu period (1486-1516); and thirdly as an historic fortress. There are several remarkable Hindu temples within the fort. One, known as the *Sas Bahu*, is beautifully adorned with bas-reliefs. It was finished in A.D. 1093, and, though much dilapidated, still forms a most picturesque fragment. An older Jain temple has been used as a mosque. Another temple in the fortress of Gwalior is called the *Teli-Mandir*, or "Oilman's Temple." This building was originally dedicated to Vishnu, but afterwards converted to the worship of Siva. The most striking part of the Jain remains at Gwalior is a series of caves or rock-cut sculptures, excavated in the rock on all sides, and numbering nearly a hundred, great and small. Most of them are mere niches to contain statues, though some are cells that may have been originally intended for residences. One curious fact regarding them is that, according to inscriptions, they were all excavated within the short period of about thirty-three years, between 1441 and 1474. Some of the figures are of colossal size; one, for instance, is 57 ft. high, which is taller than any other in northern India.

The palace built by Man Singh (1486-1516) forms the most interesting example of early Hindu work of its class in India. Another palace of even greater extent was added to this in 1516; both Jehangír and Shah Jahan added palaces to these two—the whole making a group of

edifices unequalled for picturesqueness and interest by anything of their class in Central India. Among the apartments in the palace was the celebrated chamber, named the *Baradari*, supported on 12 columns, and 45 ft. square, with a stone roof, forming one of the most beautiful palace-halls in the world. It was, besides, singularly interesting from the expedients to which the Hindu architect was forced to resort to imitate the vaults of the Moslems. Of the buildings, however, which so excited the admiration of the emperor Baber, probably little now remains. The fort of Gwalior, within which the above buildings are situated, stands on an isolated rock. The face is perpendicular and where the rock is naturally less precipitous it has been scarped. Its greatest length from north-east to south-west is a mile and a half, and the greatest breadth 900 yds. The rock attains its maximum height of 342 ft. at the northern end. A rampart, accessible by a steep road, and farther up by huge steps cut out of the rock, surrounds the fort. The citadel stands at the north-eastern corner of the enclosure, and presents a very picturesque appearance. The old town of Gwalior, which is of considerable size, but irregularly built, and extremely dirty, lies at the eastern base of the rock. It contains the tomb of Mahommed Ghaus, erected during the early part of Akbar's reign. The fort of Gwalior was traditionally built by one Surya Sen, the raja of the neighbouring country. In 1196 Gwalior was captured by Mahommed Ghori; it then passed into the hands of several chiefs until in 1559 Akbar gained possession of it, and made it a state prison for captives of rank. On the dismemberment of the Delhi empire, Gwalior was seized by the Jat rana of Gohad. Subsequently it was garrisoned by Sindhia, from whom it was wrested in 1780 by the forces of the East India Company, and to whom it was finally restored by the British in 1886. The modern town contains the palace of the chief, a college, a high school, a girls' school, a service school to train officials, a law school, hospitals for men and for women, a museum, paper-mills, and a printing-press issuing a state gazette.

GWALIOR RESIDENCY, an administrative unit in the Central India agency, comprises Gwalior state and eleven smaller states and estates. Its total area is 17,825 sq. m., and its population in 1901 was 2,187,612. Of the area, 17,020 sq. m. belong to Gwalior State, and the agency also includes the small states of Raghugarh, Khaniadhana, Paron, Garha, Umri and Bhadaura, with the Chhabra *pargana* of Tonk.

GWEEDORE, a hamlet and tourist resort of Co. Donegal, Ireland, on the Londonderry & Lough Swilly & Letterkenny railway. The river Clady, running past the village from the Nacung Loughs, affords salmon and trout fishing. The fine surrounding scenery culminates to the east in the wild mountain Errigal (2466 ft.) at the upper end of the loughs. The place owes its popularity as a resort to Lord George Hill (d. 1879), who also laboured for the amelioration of the conditions of the peasantry on his estate, and combated the Rundale system of minute repartition of property. In 1889, during the troubles which arose out of evictions, Gweedore was the headquarters of the Irish constabulary, when District Inspector Martin was openly murdered on attempting to arrest a priest on his way to Mass.

GWILT, JOSEPH (1784-1863), English architect and writer, was the younger son of George Gwilt, architect surveyor to the county of Surrey, and was born at Southwark on the 11th of January 1784. He was educated at St Paul's school, and after a short course of instruction in his father's office was in 1801 admitted a student of the Royal Academy, where in the same year he gained the silver medal for his drawing of the tower and steeple of St Dunstan-in-the-East. In 1811 he published a *Treatise on the Equilibrium of Arches*, and in 1815 he was elected F.S.A. After a visit to Italy in 1816, he published in 1818 *Notitia architectonica italiana, or Concise Notices of the Buildings and Architects of Italy*. In 1825 he published an edition of Sir William Chambers's *Treatise on Civil Architecture*; and among his other principal contributions to the literature of his profession are a translation of the *Architecture of Vitruvius* (1826), a *Treatise on the Rudiments of Architecture, Practical and Theoretical* (1826), and his valuable *Encyclopaedia of Architecture* (1842), which was published with additions by Wyatt Papworth in 1867. In recognition of Gwilt's advocacy of the importance to architects of a knowledge of mathematics, he was in 1833 elected a member of the Royal Astronomical Society. He took a special interest in philology and music, and was the author of

Rudiments of the Anglo-Saxon Tongue (1829), and of the article “Music” in the *Encyclopaedia metropolitana*. His principal works as a practical architect were Markree Castle near Sligo in Ireland, and St Thomas’s church at Charlton in Kent. He died on the 14th of September 1863.

GWYN, NELL [Eleanor] (1650-1687), English actress, and mistress of Charles II., was born on the 2nd of February 1650/1, probably in an alley off Drury Lane, London, although Hereford also claims to have been her birthplace. Her father, Thomas Gwyn, appears to have been a broken-down soldier of a family of Welsh origin. Of her mother little is known save that she lived for some time with her daughter, and that in 1679 she was drowned, apparently when intoxicated, in a pond at Chelsea. Nell Gwyn, who sold oranges in the precincts of Drury Lane Theatre, passed, at the age of fifteen, to the boards, through the influence of the actor Charles Hart and of Robert Duncan or Dungan, an officer of the guards who had interest with the management. Her first recorded appearance on the stage was in 1665 as Cydaria, Montezuma’s daughter, in Dryden’s *Indian Emperor*, a serious part ill-suited to her. In the following year she was Lady Wealthy in the Hon. James Howard’s comedy *The English Monsieur*. Pepys was delighted with the playing of “pretty, witty Nell,” but when he saw her as Florimel in Dryden’s *Secret Love, or the Maiden Queen*, he wrote “so great a performance of a comical part was never, I believe, in the world before” and, “so done by Nell her merry part as cannot be better done in nature” (*Diary*, March 25, 1667). Her success brought her other leading rôles—Bellario, in Beaumont and Fletcher’s *Philaster*; Flora, in Rhodes’s *Flora’s Vagaries*; Samira, in Sir Robert Howard’s *Surprisal*; and she remained a member of the Drury Lane company until 1669, playing continuously save for a brief absence in the summer of 1667 when she lived at Epsom as the mistress of Lord Buckhurst, afterwards 6th earl of Dorset (*q.v.*). Her last appearance was as Almahide to the Almanzor of Hart, in Dryden’s *The Conquest of Granada* (1670), the production of which had been postponed some months for her return to the stage after the birth of her first son by the king.

As an actress Nell Gwyn was largely indebted to Dryden, who seems to have made a special study of her airy, irresponsible personality, and who kept her supplied with parts which suited her. She excelled in the delivery of the risky prologues and epilogues which were the fashion, and the poet wrote for her some specially daring examples. It was, however, as the mistress of Charles II. that she endeared herself to the public. Partly, no doubt, her popularity was due to the disgust inspired by her rival, Louise de Kéroualle, duchess of Portsmouth, and to the fact that, while the Frenchwoman was a Catholic, she was a Protestant. But very largely it was the result of exactly those personal qualities that appealed to the monarch himself. She was *piquante* rather than pretty, short of stature, and her chief beauty was her reddish-brown hair. She was illiterate, and with difficulty scrawled an awkward E. G. at the bottom of her letters, written for her by others. But her frank recklessness, her generosity, her invariable good temper, her ready wit, her infectious high spirits and amazing indiscretions appealed irresistibly to a generation which welcomed in her the living antithesis of Puritanism. “A true child of the London streets,” she never pretended to be superior to what she was, nor to interfere in matters outside the special sphere assigned her; she made no ministers, she appointed to no bishoprics, and for the high issues of international politics she had no concern. She never forgot her old friends, and, as far as is known, remained faithful to her royal lover from the beginning of their intimacy to his death, and, after his death, to his memory.

Of her two sons by the king, the elder was created Baron Hedington and earl of Burford and subsequently duke of St Albans; the younger, James, Lord Beauclerk, died in 1680, while still a boy. The king’s death-bed request to his brother, “Let not poor Nelly starve,” was faithfully carried out by James II., who paid her debts from the Secret Service fund, provided her with other moneys, and settled on her an estate with reversion to the duke of St Albans. But she did not long survive her lover’s death. She died in November 1687, and was buried on the 17th, according to her own request, in the church of St Martin-in-the-Fields, her funeral sermon being preached by the vicar, Thomas Tenison, afterwards archbishop of Canterbury, who said “much to her praise.” Tradition credits the foundation of Chelsea Hospital to her influence over the king.

See Peter Cunningham, *The Story of Nell Gwyn*, edited by Gordon Goodwin (1903); Waldron’s edition of John Downes’s *Roscius Anglicanus* (1789); Osmund Airy, *Charles II.* (1904); Pepys, *Diary*; Evelyn, *Diary and Correspondence*; *Origin and Early History of the Royal Hospital at Chelsea*, edited by Major-General G. Hutt (1872); *Memoirs of the Life of Eleanor Gwinn* (1752); Burnet, *History of My Own Time*, part i., edited by Osmund Airy (Oxford, 1897);

Louise de Kéroualle, Duchess of Portsmouth, by H. Forneron, translated by Mrs Crawford (1887).

GWYNIAD, the name given to a fish of the genus *Coregonus* or White fish (*C. clupeoides*), inhabiting the large lakes of North Wales and the north of England. At Ullswater it is known by the name of “schelly,” at Loch Lomond by that of “powen.” It is tolerably abundant in Lake Bala, keeping to the deepest portion of the lake for the greater part of the year, but appearing in shoals near the shores at certain seasons. It is well flavoured, like all the species of *Coregonus*, but scarcely attains to the weight of a pound. The name gwyniad is a Welsh word, and signifies “shining”; and it is singular that a similar fish in British Columbia, also belonging to the family of Salmonoids, is called by the natives “quinnat,” from the silvery lustre of its scales, the word having in their language the same meaning as the Welsh “gwyniad.”

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