

The Project Gutenberg eBook of Popular Technology; or, Professions and Trades. Vol. 1 (of 2), by Edward Hazen

This ebook is for the use of anyone anywhere in the United States and most other parts of the world at no cost and with almost no restrictions whatsoever. You may copy it, give it away or re-use it under the terms of the Project Gutenberg License included with this ebook or online at www.gutenberg.org. If you are not located in the United States, you'll have to check the laws of the country where you are located before using this eBook.

Title: Popular Technology; or, Professions and Trades. Vol. 1 (of 2)

Author: Edward Hazen

Release date: May 18, 2012 [EBook #39721]

Language: English

Credits: Produced by Chris Curnow, JoAnn Greenwood, and the Online Distributed Proofreading Team at <http://www.pgdp.net> (This file was produced from images generously made available by The Internet Archive)

*** START OF THE PROJECT GUTENBERG EBOOK POPULAR TECHNOLOGY; OR,
PROFESSIONS AND TRADES. VOL. 1 (OF 2) ***

POPULAR TECHNOLOGY;
OR,
PROFESSIONS AND TRADES.



BY EDWARD HAZEN, A. M.,

AUTHOR OF

"THE SYMBOLICAL SPELLING-BOOK," "THE SPELLER AND DEFINER," AND "A PRACTICAL GRAMMAR."

EMBELLISHED WITH EIGHTY-ONE ENGRAVINGS.

IN TWO VOLUMES.

VOL. I.

NEW YORK:
HARPER & BROTHERS, PUBLISHERS.

Entered, according to Act of Congress, in the year 1841, by

HARPER & BROTHERS,

In the Clerk's Office of the Southern District of New York.

**CONTENTS
OF
THE FIRST VOLUME.**

	Page
Preface	7
The Agriculturist	13
The Horticulturist	28
The Miller	34
The Baker	39
The Confectioner	44
The Brewer, and the Distiller	47
The Butcher	55
The Tobacco Planter, and the Tobacconist	59
The Manufacturer of Cloth	66
The Dyer, and the Calico-Printer	77
The Hatter	84
The Rope-Maker	91
The Tailor	96
The Milliner, and the Lady's Dress-Maker	100
The Barber	104
The Tanner, and the Currier	111
The Shoe and Boot Maker	116
The Saddler and Harness-Maker, and the Trunk-Maker	121
The Soap-Boiler, and the Candle-Maker	125
The Comb-Maker, and the Brush-Maker	134
The Tavern-Keeper	142
The Hunter	147
The Fisherman	154
The Shipwright	171
The Mariner	178
The Merchant	187
The Auctioneer	204
The Clergyman	208
The Attorney at Law	215
The Physician	221
The Chemist	229
The Druggist and Apothecary	236
The Dentist	240
The Teacher	249

PREFACE.

[vii]

The following work has been written for the use of schools and families, as well as for miscellaneous readers. It embraces a class of subjects in which every individual is deeply interested, and with which, as a mere philosophical inspector of the affairs of men, he should

become acquainted.

They, however, challenge attention by considerations of greater moment than mere curiosity; for, in the present age, a great proportion of mankind pursue some kind of business as means of subsistence or distinction; and in this country especially, such pursuit is deemed honorable and, in fact, indispensable to a reputable position in the community.

Nevertheless, it is a fact that cannot have escaped the attention of persons of observation, that many individuals mistake their appropriate calling, and engage in employments for which they have neither mental nor physical adaptation; some learn a trade who should have studied a profession; others study a profession who should have learned a trade. Hence arise, in a great measure, the ill success and discontent which so frequently attend the pursuits of men.

For these reasons, parents should be particularly cautious in the choice of permanent employments for their children; and, in every case, capacity should be especially regarded, without paying much attention to the comparative favor in which the several employments may be held; for a successful prosecution of an humble business is far more honorable than inferiority or failure in one which may be greatly esteemed.

To determine the particular genius of children, parents should give them, at least, a superficial knowledge of the several trades and professions. To do this effectually, a systematic course of instruction should be given, not only at the family fireside and in the schoolroom, but also at places where practical exhibitions of the several employments may be seen. These means, together with a competent literary education, and some tools and other facilities for mechanical operations, can scarcely fail of furnishing clear indications of intellectual bias.

[viii]

The course just proposed is not only necessary to a judicious choice of a trade or profession, but also as means of intellectual improvement; and as such it should be pursued, at all events, even though the choice of an employment were not in view.

We are endowed with a nature composed of many faculties both of the intellectual and the animal kinds, and the reasoning faculties were originally designed by the Creator to have the ascendancy. In the present moral condition of man, however, they do not commonly maintain their right of precedence. This failure arises from imbecility, originating, in part, from a deficiency in judicious cultivation, and from the superior strength of the passions.

This condition is particularly conspicuous in youth, and shows itself in disobedience to parents, and in various other aberrations from moral duty. If, therefore, parents would have their children act a reasonable part, while in their minority, and, also, after they have assumed their stations in manhood, they must pursue a course of early instruction, calculated to secure the ascendancy of the reasoning faculties.

The subjects for instruction best adapted to the cultivation of the young mind are the *common things* with which we are surrounded. This is evident from the fact, that it uniformly expands with great rapidity under their influence during the first three or four years of life; for, it is from them, children obtain all their ideas, as well as a knowledge of the language by which they are expressed.

The rapid progress of young children in the acquisition of knowledge often excites the surprise of parents of observation, and the fact that their improvement is almost imperceptible, after they have attained to the age of four or five years, is equally surprising. Why, it is often asked, do not children continue to advance in knowledge with equal and increased rapidity, especially, as their capabilities increase with age?

[ix]

The solution of this question is not difficult. Children continue to improve, while they have the means of doing so; but, having acquired a knowledge of the objects within their reach, at least, so far as they may be capable at the time, their advancement must consequently cease. It is hardly necessary to remark, that the march of mind might be continued with increased celerity, were new objects or subjects continually presented.

In supplying subjects for mental improvement, as they may be needed at the several stages of advancement, there can be but little difficulty, since we are surrounded by works both of nature and of art. In fact, the same subjects may be presented several times, and, at each presentation, instructions might be given adapted to the particular state of improvement in the pupil.

Instructions of this nature need never interfere injuriously with those on the elementary branches of education, although the latter would undoubtedly be considered of minor importance. Had they been always regarded in this light, our schools would now present a far more favorable aspect, and we should have been farther removed from the ignorance and the barbarism of the middle ages.

Were this view of education generally adopted, teachers would soon find, that the business of communicating instructions to the young has been changed from an irksome to a pleasant task, since their pupils will have become studious and intellectual, and, consequently, more capable of comprehending explanations upon every subject. Such a course would also be attended with the incidental advantage of good conduct on the part of pupils, inasmuch as the elevation of the understanding over the passions uniformly tends to this result.

For carrying into practice a system of intellectual education, the following work supplies as great an amount of materials as can be embodied in the same compass. Every article may be made the

[x]

foundation of one lecture or more, which might have reference not only to the particular subject on which it treats, but also to the meaning and application of the words.

The articles have been concisely written, as must necessarily be the case in all works embracing so great a variety of subjects. This particular trait, however, need not be considered objectionable, since all who may desire to read more extensively on any particular subject, can easily obtain works which are exclusively devoted to it.

Prolix descriptions of machinery and of mechanical operations have been studiously avoided; for it has been presumed, that all who might have perseverance enough to read such details, would feel curiosity sufficient to visit the shops and manufactories, and see the machines and operations themselves. Nevertheless, enough has been said, in all cases, to give a general idea of the business, and to guide in the researches of those who may wish to obtain information by the impressive method of actual inspection.

A great proportion of the whole work is occupied in recounting historical facts, connected with the invention and progress of the arts. The author was induced to pay especial attention to this branch of history, from the consideration, that it furnishes very clear indications of the real state of society in past ages, as well as at the present time, and also that it would supply the reader with data, by which he might, in some measure, determine the vast capabilities of man.

This kind of historical information will be especially beneficial to the youthful mind, by inducing a habit of investigation and antiquarian research. In addition to this, a knowledge of the origin and progress of the various employments which are in active operation all around, will throw upon the busy world an aspect exceedingly interesting.

It may be well, however, to caution the reader against expecting too much information of this kind, in regard to most of the trades practised in very ancient times. Many of the most useful inventions were effected, before any permanent means of record had been devised; and, in after ages, among the Greeks and Romans, the useful arts were practised almost exclusively by slaves. The latter circumstance led to their general neglect by the writers among these distinguished people.

[xi]

The information which may be obtained from this work, especially when accompanied by the inspection of the operations which it describes, may be daily applied to some useful purpose. It will be particularly valuable in furnishing subjects for conversation, and in preventing the mind from continuing in, or from sinking into, a state of indifference in regard to the busy scenes of this world.

In the composition of this work, all puerile expressions have been avoided, not only because they would be offensive to adult individuals of taste, but because they are at least useless, if not positively injurious, to younger persons. What parent of reflection would suffer his children to peruse a book calculated to induce or confirm a manner of speaking or writing, which he would not have them use after having arrived to manhood? Every sentence may be rendered perfectly plain by appropriate explanations and illustrations.

No formal classification of the professions and trades has been adopted, although those articles which treat of kindred subjects have been placed near each other, and in that order which seemed to be the most natural. The paragraphs of the several articles have been numbered for the especial accommodation of classes in schools, but this particular feature of the work need meet with no serious objection from miscellaneous readers, as it has no other effect, in reference to its use by them, than to give it the aspect of a school-book.

While writing the articles on the different subjects, the author consulted several works which embraced the arts and sciences generally, as well as many which were more circumscribed in their objects. He, however, relied more upon them for historical facts than for a knowledge of the operations and processes which he had occasion to detail. For this he depended, as far as practicable, upon his own personal researches, although in the employment of appropriate phraseology, he acknowledges his obligations to predecessors.

[xii]

With the preceding remarks, the author submits his work to the public, in the confident expectation, that the subjects which it embraces, that the care which has been taken in its composition, and that the skill of the artists employed in its embellishment, will secure to it an abundant and liberal patronage.

[13]



THE AGRICULTURIST.

1. Agriculture embraces, in its broad application, whatever relates to the cultivation of the fields, with the view of producing food for man and those animals which he may have brought into a state of domestication.

2. If we carry our observations so far back as to reach the antediluvian history of the earth, we shall find, from the authority of Scripture, that the cultivation of the soil was the first employment of man, after his expulsion from the garden of Eden, when he was commanded to till the ground from which he had been taken. We shall also learn from the same source of information, that "Cain was a husbandman," and that "Abel was a keeper of sheep." Hence it may be inferred, that Adam instructed his sons in the art of husbandry; and that they, in turn, communicated the knowledge to *their* posterity, together with the superadded information which had resulted from their own experience. Improvement in this art was probably thenceforth progressive, until the overwhelming catastrophe of the flood. [14]

3. After the waters had retired from the face of the earth, Noah resorted to husbandry, as the certain means of procuring the necessaries and comforts of life. The art of cultivating the soil was uninterruptedly preserved in many branches of the great family of Noah; but, in others, it was at length entirely lost. In the latter case, the people, having sunk into a state of barbarism, depended for subsistence on the natural productions of the earth, and on such animals as they could contrive to capture by hunting and fishing. Many of these degenerate tribes did not emerge from this condition for several succeeding ages; while others have not done so to the present day.

4. Notwithstanding the great antiquity of agriculture, the husbandmen, for several centuries immediately succeeding the deluge, seem to have been but little acquainted with any proper method of restoring fertility to exhausted soils; for we find them frequently changing their residence, as their flocks and herds required fresh pasturage, or as their tillage land became unproductive. As men, however, became more numerous, and as their flocks increased, this practice became inconvenient and, in some cases, impracticable. They were, therefore, compelled, by degrees, to confine their flocks and herds, and their farming operations, to lands of more narrow and specified limits.

5. The Chaldeans were probably the people who first adopted the important measure of retaining perpetual possession of the soil which they had cultivated; and, consequently, were among the first who became skilful in agriculture. But all the great nations of antiquity held this art in the highest estimation, and usually attributed its invention to superhuman agency. The Egyptians even worshipped the image of the ox in gratitude for the services of the living animal in the labours of the field. [15]

6. The reader of ancient history can form some idea of the extent to which this art was cultivated in those days, from the warlike operations of different nations; for, from no other source, could the great armies which were then brought into the field, have been supplied with the necessary provisions. The Greeks and the Romans, who were more celebrated than any other people for their military enterprise, were also most attentive to the proper cultivation of the soil; and many of their distinguished men, especially among the Romans, were practical husbandmen.

7. Nor was agriculture neglected by the learned men of antiquity. Several works on this subject, by Greek and Latin authors, have descended to our times; and the correctness of many of the principles which they inculcate, has been confirmed by modern experience.

8. Throughout the extensive empire of Rome, agriculture maintained a respectable standing, until

the commencement of those formidable invasions of the northern hordes, which, finally, nearly extinguished the arts and sciences in every part of Europe. During the long period of anarchy which succeeded the settlement of these barbarians in their newly-acquired possessions, pasturage was, in most cases, preferred to tillage, as being better suited to their state of civilization, and as affording facilities of removal, in cases of alarm from invading enemies. But, when permanent governments had been again established, and when the nations enjoyed comparative peace, the regular cultivation of the soil once more revived.

[16]

9. The art of husbandry was at a low ebb in England, until the fourteenth century, when it began to be practised with considerable success in the midland and south-western parts of the island; yet, it does not seem to have been cultivated as a science, until the latter end of the sixteenth century. The first book on husbandry, printed and published in the English language, appeared in 1534. It was written by Sir A. Fitzherbert, a judge of the Common Pleas, who had studied the laws of vegetation, and the nature of soils, with philosophical accuracy.

10. Very little improvement was made on the theory of this author, for upwards of a hundred years, when Sir Hugh Platt discovered and brought into use several kinds of substances for fertilizing and restoring exhausted soils.

11. Agriculture again received a new impulse, about the middle of the eighteenth century; and, in 1793, a Board of Agriculture was established by an act of Parliament, at the suggestion of Sir John Sinclair, who was elected its first president. Through the influence of this board, a great number of agricultural societies have been formed in the kingdom, and much valuable information on rural economy has been communicated to the public, through the medium of a voluminous periodical under its superintendence.

12. After the example of Great Britain, agricultural societies have been formed, and periodical journals published, in various parts of the continent of Europe, as well as in the United States. The principal publications devoted to this subject in this country, are the *American Farmer*, at Baltimore; the *New-England Farmer*, at Boston; and the *Cultivator*, at Albany.

13. The modern improvements in husbandry consist, principally, in the proper application of manures, in the mixture of different kinds of earths, in the use of plaster and lime, in the rotation of crops, in adapting the crop to the soil, in the introduction of new kinds of grain, roots, grasses, and fruits, as well as in improvements in the breeds of domestic animals, and in the implements with which the various operations of the art are performed.

[17]

14. For many of the improved processes which relate to the amelioration of the soil, we are indebted to chemistry. Before this science was brought to the aid of the art, the cultivators of the soil were chiefly guided by the precept and example of their predecessors, which were often inapplicable. By the aid of chemical analysis, it is easy to discover the constituent parts of different soils; and, when this has been done, there is but little difficulty in determining the best mode of improving them, or in applying the most suitable crops.

15. In the large extent of territory embraced within the United States, there is great variation of soil and climate; but, in each state, or district, the attention of the cultivators is directed to the production of those articles which, under the circumstances, promise to be the most profitable. In the northern portions of our country, the cultivators of the soil are called farmers. They direct their attention chiefly to the production of wheat, rye, corn, oats, barley, peas, beans, potatoes, pumpkins, and flax, together with grasses and fruits of various kinds. The same class of men, in the Southern states, are usually denominated planters, who confine themselves principally to tobacco, rice, cotton, sugar-cane, or hemp. In some parts of that portion of our country, however, rye, wheat, oats, and sweet potatoes, are extensively cultivated; and, in almost every part, corn is a favourite article.

16. The process of cultivating most of the productions which have been mentioned, is nearly the same. In general, with the occasional exception of new lands, the plough is used to prepare the ground for the reception of the seed. Wheat, rye, barley, oats, peas, and the seeds of hemp and flax, are scattered with the hand, and covered in the earth with the harrow. In Great Britain, such seeds are sown in drills; and this method is thought to be better than ours, as it admits of the use of the hoe, while the vegetable is growing.

[18]

17. Corn, beans, potatoes, and pumpkins, are covered in the earth with the hoe. The ground is ploughed several times during the summer, to make it loose, and to keep down the weeds. The hoe is also used in accomplishing the same objects, and in depositing fresh earth around the growing vegetable.

18. When ripe, wheat, barley, oats, and peas, are cut down with the sickle, cradle, or scythe; while hemp and flax are pulled up by the roots. The seeds are separated from the other parts of the plants with the flail, or by means of horses or oxen driven round upon them. Of late, threshing machines are used to effect the same object. Chaff, and extraneous matter generally, are separated from the grain, or seeds, by means of a fanning-mill, or with a large fan made of the twigs of the willow. The same thing was formerly, and is yet sometimes, effected by the aid of a current of air.

19. When the corn, or maize, has become ripe, the ears, with the husks, and sometimes the stalks, are deposited in large heaps. To assist in stripping the husks from the ears, it is customary to call together the neighbours. In such cases, the owner of the corn provides for them a supper, together with some means of merriment and good cheer.

20. This custom is most prevalent, where the greater part of the labour is performed by slaves. The blacks, when assembled for a husking match, choose a captain, whose business it is to lead the song, while the rest join in chorus. Sometimes, they divide the corn as nearly as possible into two equal heaps, and apportion the hands accordingly, with a captain to each division. This is done to produce a contest for the most speedy execution of the task. Should the owner of the corn be sparing of his refreshments, his want of generosity is sure to be published in song at every similar frolic in the neighborhood. [19]

21. Maize, or Indian corn, and potatoes of all kinds, were unknown in the eastern continent, until the discovery of America. Their origin is, therefore, known with certainty; but some of the other productions which have been mentioned, cannot be so satisfactorily traced. This is particularly the case with regard to those which have been extensively cultivated for many centuries.

22. The grasses have ever been valuable to man, as affording a supply of food for domestic animals. Many portions of our country are particularly adapted to grazing. Where this is the case, the farmers usually turn their attention to raising live stock, and to making butter and cheese. Grass reserved in meadows, as a supply of food for the winter, is cut at maturity with a scythe, dried in the sun, and stored in barns, or heaped in stacks.

23. Rice was first cultivated in the eastern parts of Asia, and, from the earliest ages, has been the principal article of food among the Chinese and Hindoos. To this grain may be attributed, in a great measure, the early civilization of those nations; and its adaptation to marshy grounds caused many districts to become populous, which would otherwise have remained irreclaimable and desolate.

24. Rice was long known in the east, before it was introduced into Egypt and Greece, whence it spread over Africa generally, and the southern parts of Europe. It is now cultivated in all the warm parts of the globe, chiefly on grounds subject to periodical inundations. The Chinese obtain two crops a year from the same ground, and cultivate it in this way from generation to generation, without applying any manure, except the stubble of the preceding crop, and the mud deposited from the water overflowing it. [20]

25. Soon after the waters of the inundation have retired, a spot is inclosed with an embankment, lightly ploughed and harrowed, and then sown very thickly with the grain. Immediately, a thin sheet of water is brought over it, either by a stream or some hydraulic machinery. When the plants have grown to the height of six or seven inches, they are transplanted in furrows; and again water is brought over them, and kept on, until the crop begins to ripen, when it is withheld.

26. The crop is cut with a sickle, threshed with a flail, or by the treading of cattle; and the husks, which adhere closely to the kernel, are beaten off in a stone mortar, or by passing the grain through a mill, similar to our corn-mills. The mode of cultivating rice in any part of the world, varies but little from the foregoing process. The point which requires the greatest attention, is keeping the ground properly covered with water.

27. Rice was introduced into the Carolinas in 1697, where it is now produced in greater perfection than in any other part of the world. The seeds are dropped along, from the small end of a gourd, into drills made with one corner of the hoe. The plants, when partly grown, are not transferred to another place, as in Asia, but are suffered to grow and ripen in the original drills. The crop is secured like wheat, and the husks are forced from the grain by a machine, which leaves the kernels more perfect than the methods adopted in other countries. [21]

28. Cotton is cultivated in the East and West Indies, North and South America, Egypt, and in many other parts of the world, where the climate is sufficiently warm for the purpose. There are several species of this plant; of which three kinds are cultivated in the southern states of the Union—the *nankeen cotton*, the *green seed cotton*, and the *black seed, or sea island cotton*. The first two, which grow in the middle and upland countries, are denominated *short staple cotton*: the last is cultivated in the lower country, near the sea, and on the islands near the main land, and is of a fine quality, and of a long staple.

29. The plants are propagated annually from seeds, which are sown very thickly in ridges made with the plough or hoe. After they have grown to the height of three or four inches, part of them are pulled up, in order that the rest, while coming to maturity, may stand about four inches apart. It is henceforth managed, until fully grown, like Indian corn.

30. The cotton is inclosed in pods, which open as fast as their contents become fit to be gathered. In Georgia, about eighty pounds of upland cotton can be gathered by a single hand in a day; but in Alabama and Mississippi, where the plant thrives better, two hundred pounds are frequently collected in the same time.

31. The seeds adhere closely to the cotton, when picked from the pods; but they are properly separated by machines called *gins*; of which there are two kinds,—the *roller-gin*, and the *saw-gin*. The essential parts of the former are two cylinders, which are placed nearly in contact with each other. By their revolving motion, the cotton is drawn between them, while the size of the seeds prevents their passage. This machine, being of small size, is worked by hand.

32. The *saw-gin* is much larger, and is moved by animal, steam, or water power. It consists of a receiver, having one side covered with strong wires, placed in a parallel direction about an eighth of an inch apart, and a number of circular saws, which revolve on a common axis. The saws pass between these wires, and entangle in their teeth the cotton, which is thereby drawn through the [22]

grating, while the seeds, from their size, are forced to remain on the other side.

33. Before the invention of the saw-gin, the seeds were separated from the upland cottons by hand,—a method so extremely tedious, that their cultivation was attended with but little profit to the planter. This machine was invented in Georgia by Eli Whitney, of Massachusetts. It was undertaken at the request of several planters of the former state, and was there put in operation in 1792.

34. In the preceding year, the whole crop of cotton in the United States was only sixty-four bales; but, in 1834, it amounted to 1,000,617. The vast increase in the production of this article has arisen, in part, from the increased demand for it in Europe, and in the Northern states, but, chiefly, from the use of the invaluable machine just mentioned.

35. Sugar-cane was cultivated by the Chinese, at a very early period, probably two thousand years before it was known in Europe; but sugar, in a candied form, was used in small quantities by the Greeks and Romans in the days of their prosperity. It was probably brought from Bengal, Siam, or some of the East India Islands, as it is supposed, that it grew nowhere else at that time.

36. In the thirteenth century, soon after the merchants of the West began to traffic in Indian articles of commerce, the plant was introduced into Arabia Felix, and thence into Egypt, Nubia, Ethiopia, and Morocco. The Spaniards obtained it from the Moors, and, in the fifteenth century, introduced it into the Canary Islands. It was brought to America, and to the West India Islands, by the Spaniards and Portuguese. It is now cultivated in the United States, below the thirty-first degree of latitude, and in the warm parts of the globe generally. [23]

37. Previous to the year 1466, sugar was known in England chiefly, as a medicine; and, although the sugar-cane was cultivated, at that time, in several places on the Mediterranean, it was not more extensively used on the continent. Now, in extent of cultivation, it ranks next to wheat and rice, and first in maritime commerce.

38. The cultivators of sugar-cane propagate the plant by means of cuttings from the lower end of the stalks, which are planted in the spring or autumn, in drills, or in furrows. The new plants spring from the joints of the cuttings, and are fit to be gathered for use in eight, ten, twelve, or fourteen months. While growing, sugar-cane is managed much like Indian corn.

39. When ripe, the cane is cut and brought to the sugar-mill, where the juice is expressed between iron or stone cylinders, moved by steam, water, or animal power. The juice thus obtained is evaporated in large boilers to a syrup, which is afterwards removed to coolers, where it is agitated with wooden instruments called *stirrers*. To accelerate its cooling, it is next poured into casks, and, when yet warm, is conveyed to barrels, placed in an upright position over a cistern, and pierced in the bottom in several places. The holes being partially stopped with canes, the part which still remains in the form of syrup, filters through them into the cistern beneath, while the rest is left in the form of sugar, in the state called *muscovado*.

40. This sugar is of a yellow colour, being yet in a crude, or raw state. It is further purified by various processes, such as redissolving it in water, and again boiling it with lime and bullocks' blood, or with animal charcoal, and passing the syrup through several canvas filters. [24]

41. Loaf-sugar is manufactured by pouring the syrup, after it has been purified, and reduced to a certain thickness by evaporation, into unglazed earthen vessels of a conical shape. The cones have a hole at their apex, through which may filter the syrup which separates from the sugar above. Most of the sugar is imported in a raw or crude state, and is afterward refined in the cities in sugar-houses.

42. Molasses is far less free from extraneous substances than sugar, as it is nothing more than the drainings from the latter. Rum is distilled from inferior molasses, and other saccharine matter of the cane, which will answer for no other purpose.

43. Sugar is also manufactured from the sap of the sugar-maple, in considerable quantities, in the northern parts of the United States, and in the Canadas. The sap is obtained by cutting a notch, or boring a hole, in the tree, and applying a spout to conduct it to a receiver, which is either a rude trough, or a cheap vessel made by a cooper. This operation is performed late in the winter, or early in the spring, when the weather is freezing at night, and thawing in the day.

44. The liquid in which the saccharine matter is suspended, is evaporated by heat, as in the case of the juice of the cane. During the process of evaporation, slices of pork are kept in the kettle, to prevent the sap or syrup from boiling over.

45. When a sufficient quantity of syrup, of a certain thickness, has been obtained, it is passed through a strainer, and, having been again placed over the fire, it is clarified with eggs and milk, the scum, as it rises, being carefully removed with a skimmer. When sufficiently reduced, it is usually poured into tin pans, or basins, in which, as it cools, it consolidates into hard cakes of sugar. [25]

46. Most of the lands in a state of nature, are covered with forest trees. This is especially the case in North America. When this division of our continent was first visited by Europeans, it was nearly one vast wilderness, throughout its entire extent; and even now, after a lapse of three centuries, a great portion of it remains in the same condition. The industrious settlers, however, are rapidly clearing away the natural encumbrances of the soil; and, before a similar period shall have passed away, we may expect, that civilized men will have occupied every portion of this vast

territory, which may be worthy of cultivation.

47. The mode of *clearing* land, as it is termed, varies in different parts of the United States. In Pennsylvania, and in neighborhoods settled by people from that state, the large trees are deadened by girdling them, and the small ones, together with the underbrush, are felled and burned. This mode is very objectionable, for the reason, that the limbs on the standing trees, when they have become rotten, sometimes peril the lives of persons and animals underneath. It seems, however, that those who pursue this method, prefer risking life in this way to wearing it out in wielding the axe, and in rolling logs.

48. A very different plan is pursued by settlers from New-England. The underbrush is first cut down, and piled in heaps. The large trees are then felled, to serve as foundations for log-heaps; and the smaller ones are cut so as to fall as nearly parallel to these as practicable. The smaller trees, as well as the limbs of the larger ones, are cut into lengths of twelve or fifteen feet.

49. At a proper season of the year, when the brush has become dry enough, fire is applied, which consumes much of the small stuff. The logs are next hauled together with oxen or horses, and rolled into heaps with handspikes. The small stuff which has escaped the first burning, is thrown upon the heaps, and, fire being applied, the whole is consumed together. [26]

50. In the Northern, Middle, and Western states, where a great proportion of the timber is beech, maple, and elm, great quantities of ashes are obtained in this mode of clearing land. From these ashes are extracted the pot and pearl ashes of commerce, which have been, and which still are, among the principal exports of the United States.

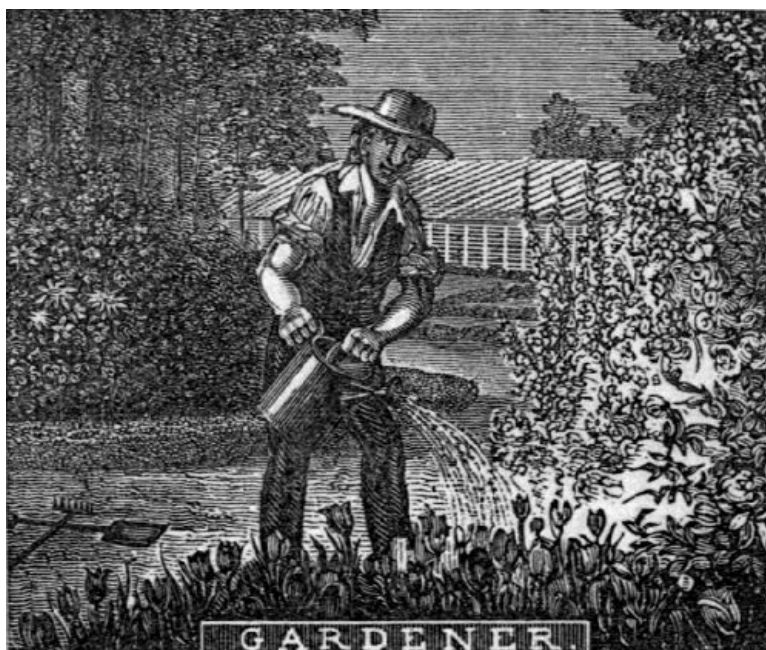
51. The usual process of making potash is as follows: the crude ashes are put into large tubs, or *leeches*, with a small quantity of salt and lime. The strength of this mixture is extracted by pouring upon it hot water, which passes through it into a reservoir. The water thus saturated is called black ley, which is evaporated in large kettles. The residuum is called black salts, which are converted into potash by applying to the kettle an intense heat.

52. The process of making pearlash is the same, until the ley has been reduced to black salts, except that no lime or salt is used. The salts are baked in large ovens, heated by a blazing fire, which proceeds from an arch below. Having been thus *scorched*, the salts are dissolved in hot water. The solution is allowed to be at rest, until all extraneous substances have settled to the bottom, when it is drawn off and evaporated as before. The residuum is called white salts. Another baking, like the former, completes the process.

53. Very few of the settlers have an ashery, as it is called, in which the whole process of making either pot or pearl ash is performed. They usually sell the black salts to the store-keepers in their neighborhood, who complete the process of the manufacture. [27]

54. The trade in ashes is often profitable to the settlers; some of them even pay, in this way, the whole expense of clearing their land. Pot and pearl ashes are packed in strong barrels, and sent to the cities, where, previous to sale, they are inspected, and branded according to their quality.

[28]



THE HORTICULTURIST.

1. The Creator of the Universe, having formed man from the dust of the ground, provided a

magnificent garden for his residence, and commanded him "to dress it and to keep it:" but, having transgressed the commandment of his lawful Sovereign, he was driven from this delightful paradise, thenceforth to gain a subsistence from the earth at large, which had been cursed with barrenness, thorns, thistles, and briars.

2. Scripture does not inform us, that Adam turned his attention to gardening; nor have we any means of determining the state of this art, in the centuries previous to the flood; but it is highly probable, that it had arrived to considerable perfection, before the advent of this destructive visitation from Heaven. [29]

3. Gardens, for useful purposes, were probably made, soon after the waters had subsided; and the statement in Scripture, that "Noah planted a vineyard," may, perhaps, be regarded as evidence sufficient to establish it as a fact. If this were the case, the art, doubtless, continued progressive among those descendants of Noah, who did not sink into a state of barbarism, after the confusion of tongues.

4. Among savage nations, one of the first indications of advancement towards a state of civilization, is the cultivation of a little spot of ground for raising vegetables; and the degree of refinement among the inhabitants of any country, may be determined, with tolerable certainty, by the taste and skill exhibited in their gardens.

5. Ornamental gardening is never attended to, in any country, until the arts in general have advanced to a considerable degree of perfection; and it uniformly declines with other fine or ornamental arts. Accordingly, we do not read of splendid gardens among the Babylonians, Egyptians, Jews, Greeks, Romans, and other nations of antiquity, until they had reached an exalted state of refinement; and when these nations descended from this condition, or were overthrown by barbarians, this art declined or disappeared.

6. During the period of mental darkness, which prevailed between the eighth and thirteenth centuries, the practice of ornamental gardening had fallen into such general disuse, that it was confined exclusively to the monks. After this period, it began again to spread among the people generally. It revived in Italy, Germany, Holland, and France, long before any attention was paid to it in England.

7. In the latter country, but few culinary vegetables were consumed before the beginning of the sixteenth century, and most of these were brought from Holland; nor was gardening introduced there, as a source of profit, until about one hundred years after that period. Peaches, pears, plums, nectarines, apricots, grapes, cherries, strawberries, and melons, were luxuries but little enjoyed in England, until near the middle of the seventeenth century. The first *hot* and *ice houses* known on the island, were built by Charles II., who ascended the British throne in 1660, and soon after introduced French gardening at Hampton Court, Carlton, and Marlborough. [30]

8. About the beginning of the eighteenth century, this art attracted the attention of some of the first characters in Great Britain, who gave it a new impulse in that country. But the style which they imitated was objectionable, inasmuch as the mode of laying out the gardens, and of planting and trimming the trees, was too formal and fantastical.

9. Several eminent writers, among whom were Pope and Addison, ridiculed this Dutch mode of gardening, as it was called, and endeavoured to introduce another, more consistent with genuine taste. Their views were, at length, seconded by practical horticulturists; and those principles of the art which they advocated, were adopted in every part of Great Britain. The English mode has been followed and emulated by the refined nations of the Eastern continent and by many opulent individuals in the United States.

10. Since the beginning of the present century horticultural societies have been formed in every kingdom of Europe. In Great Britain alone, there are no less than fifty; and, it is satisfactory to add, that there are also several of these institutions in the United States. The objects of the persons who compose these societies are, to collect and disseminate information on this interesting art, especially in regard to the introduction of new and valuable articles of cultivation. [31]

11. The authors who have written upon scientific and practical gardening, at different periods, and in different countries, are very numerous. Among the ancient Greek writers, were Hesiod, Theophrastus, Xenophon, and Ælian. Among the Latins, Varo was the first; to whom succeeded, Cato, Pliny the elder, Columella, and Palladius.

12. Since the revival of literature, horticulture, in common with agriculture, has shared largely in the labours of the learned; and many works, on this important branch of rural economy, have been published in every language of Europe. But the publications on this subject, which attract the greatest attention, are the periodicals under the superintendence of the great horticultural societies. Those of London and Paris, are particularly distinguished.

13. It is impossible to draw a distinct line between horticulture and agriculture; since so many articles of cultivation are common to both, and since a well-regulated farm approaches very nearly to a garden.

14. The divisions of a complete garden, usually adopted by writers on this subject, are the following: 1st. the culinary garden; 2d. the flower garden; 3d. the orchard, embracing different kinds of fruits; 4th. the vineyard; 5th. the seminary, for raising seeds; 6th. the nursery, for raising trees to be transplanted; 7th. the botanical garden, for raising various kinds of plants; 8th. the

arboretum of ornamental trees; and, 9th. the picturesque, or landscape garden. To become skilful in the management of even one or two of these branches, requires much attention; but to become proficient in all, would require years of the closest application.

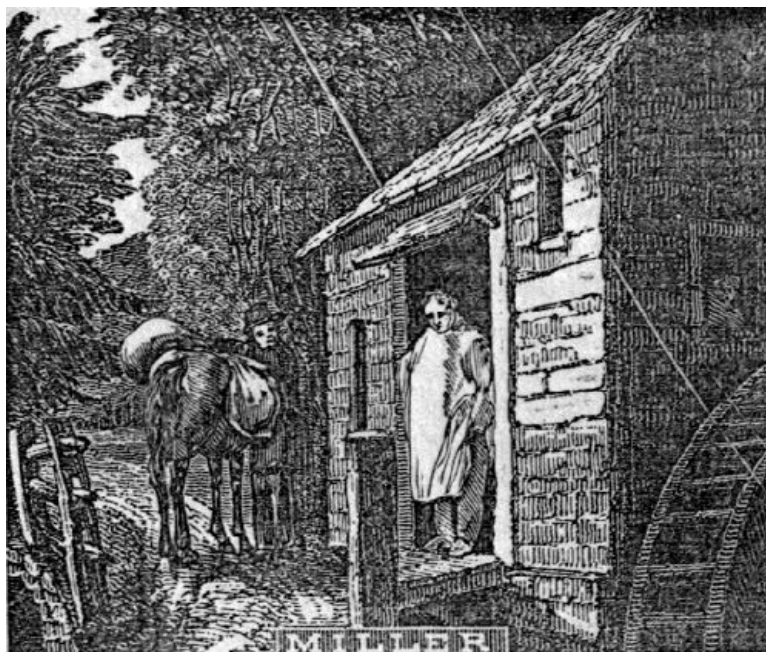
15. In Europe, the professed gardeners constitute a large class of the population. They are employed either in their own gardens, or in those of the wealthy, who engage them by the day or year. There are many in this country who devote their attention to this business; but they are chiefly from the other side of the Atlantic. In our Southern states, the rich assign one of their slaves to the garden. [32]

16. In the United States, almost every family in the country, and in the villages, has its garden for the production of vegetables, in which are also usually reared, a few flowers, ornamental shrubs, and fruit-trees: but horticulture, as a science, is studied and practised here by very few, especially that branch of it called picturesque, or landscape. To produce a pleasing effect, in a garden of this kind, from twenty to one hundred acres are necessary, according to the manner in which the ground may be situated. In an area of that extent, every branch of this pleasing art can be advantageously embraced.

17. Delicate exotic plants, which will not bear exposure to the open air during the winter, are preserved from the effects of the cold in *hot* or *green houses*, which may be warmed by artificial heat. A *hot-house* is exhibited in the representation of a garden, at the head of this article. It is composed chiefly of window-glass set in sashes of wood. A green-house is usually larger; and is designed for the preservation of those plants requiring less heat.

18. The vegetables commonly cultivated in gardens for the table, are,—corn, potatoes, tomatoes, peas, beans, squashes, cucumbers, melons, strawberries, raspberries, blackberries, gooseberries, currants, beets, parsnips, carrots, onions, radishes, cabbages, asparagus, lettuce, grapes, and various kinds of fruits. The flowers, ornamental shrubs, and trees, are very numerous, and are becoming more so by accessions from the forests, and from foreign countries.

19. The scientific horticulturist, in laying off his garden, endeavours to unite beauty and utility, locating the flowers, ornamental shrubs, and trees, where they will be most conspicuous, and those vegetables less pleasing to the eye, in more retired situations, yet, in a soil and exposure adapted to their constitution. In improving the soil of his garden, he brings to his aid the science of chemistry, together with the experience of practical men. He is also careful in the choice of his fruit-trees, and in increasing the variety of their products by engrafting, and by inoculation. [33]



THE MILLER.

1. The Miller belongs to that class of employments which relates to the preparation of food and drinks for man. His business consists, chiefly, in reducing the farinaceous grains to a suitable degree of fineness.

2. The simplest method by which grain can be reduced to meal, or flour, is rubbing or pounding it between two stones; and this was probably the one first practised in all primitive conditions of society, as it is still pursued among some tribes of uncivilized men.

3. The first machine for comminuting grain, of which we have any knowledge, was a simple hand-

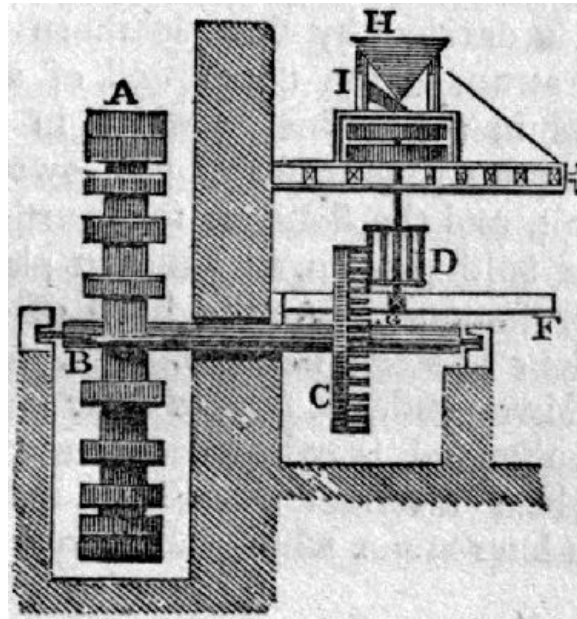
mill, composed of a nether stone fixed in a horizontal position, and an upper stone, which was put in motion with the hand by means of a peg. This simple contrivance is still used in India, as well as in some sequestered parts of Scotland, and on many of the plantations in the Southern states of our Union. But, in general, where large quantities of grain are to be ground, it has been entirely superseded by mills not moved by manual power.

[35]

4. The modern corn and flour mill differs from the primitive hand-mill in the size of the stones, in the addition of an apparatus for separating the hulls and bran from the farinaceous part of the grain, and in the power applied for putting it in motion.

5. The grinding surfaces of the stones have channels, or furrows, cut in them, which proceed obliquely from the centre to the circumference. The furrows are cut slantwise on one side, and perpendicular on the other; so that each of the ridges which they form, has a sharp edge; and, when the upper stone is in motion, these edges pass one another, like the blades of a pair of scissors, and cut the grain the more easily, as it falls upon the furrows.

6. By a careful inspection of the following picture, the whole machinery of a common mill may be understood.



A represents the water-wheel; B, the shaft to which is attached the cog-wheel C, which acts on the trundle-head, D; and this, in turn, acts on the moveable stone. The spindle, trundle-head, and upper stone, all rest entirely on the beam, F, which can be elevated or depressed, at pleasure, by a simple apparatus; so that the distance between the stones can be easily regulated, to grind either fine or coarse. The grain about to be submitted to the action of the mill, is thrown into the hopper, H, whence it passes by the shoe, or spout I, through a hole in the upper stone, and then between them both.

[36]

7. The upper stone is a little convex, and the other a little concave. There is a little difference, however, between the convexity and the concavity of the two stones: this difference causes the space between them to become less and less towards their edges; and the grain, being admitted between them, is, consequently, ground finer and finer, as it passes out in that direction, in which it is impelled by the centrifugal power of the moving stone.

8. If the flour, or meal, is not to be separated from the bran, the simple grinding completes the operation; but, when this separation is to be made, the comminuted grain, as it is thrown out from between the stones, is carried, by little leathern buckets fastened to a strap, to the upper end of an octagonal sieve, placed in an inclined position in a large box. The coarse bran passes out at the lower end of the sieve, or bolt, and the flour, or fine particles of bran, through the bolting-cloth, at different places, according to their fineness. At the head of the bolt, the superfine flour passes; in the middle, the fine flour; and at the lower end, the coarse flour and fine bran; which, when mixed, is called *canel*, or *shorts*.

9. The best material of which mill-stones are made, is the burr-stone, which is brought from France in small pieces, weighing from ten to one hundred pounds. These are cemented together with plaster of Paris, and closely bound around the circumference with hoops made of bar iron. For grinding corn or rye, those made of sienite, or granite rock, are frequently used.

[37]

10. A mill, exclusively employed in grinding grain, consumed by the inhabitants of the neighborhood, is called a *grist* or *custom* mill; and a portion of the grist is allowed to the miller, in payment for his services. The proportion is regulated by law; and, in our own country, it varies according to the legislation of the different states.

11. Mills in which flour is manufactured, and packed in barrels for sale, are called merchant mills. Here, the wheat is purchased by the miller, or by the owner of the mill, who relies upon the difference between the original cost of the grain, and the probable amount of its several products, when sold, to remunerate him for the manufacture, and his investments of capital. In

Virginia, and, perhaps, in some of the other states, it is a common practice among the farmers, to deliver to the millers their wheat, for which they receive a specified quantity of flour.

12. The power most commonly employed to put heavy machinery in operation, is that supplied by water. This is especially the case with regard to mills for grinding grain; but, when this cannot be had, a substitute is found in steam, or animal strength. The wind is also rendered subservient to this purpose. The wind-mill was invented in the time of Augustus Cæsar. During the reign of this emperor, and probably long before, mules and asses were employed by both the Greeks and Romans in turning their mills. The period at which water-mills began to be used cannot be certainly determined. Some writers place it as far back as the Christian era.

[38]

13. Wheat flour is one of the staple commodities of the United States, and there are mills for its manufacture in almost every part of the country, where wheat is extensively cultivated; but our most celebrated flour-mills are on the Brandywine Creek, Del., at Rochester, N. Y., and at Richmond, Va.

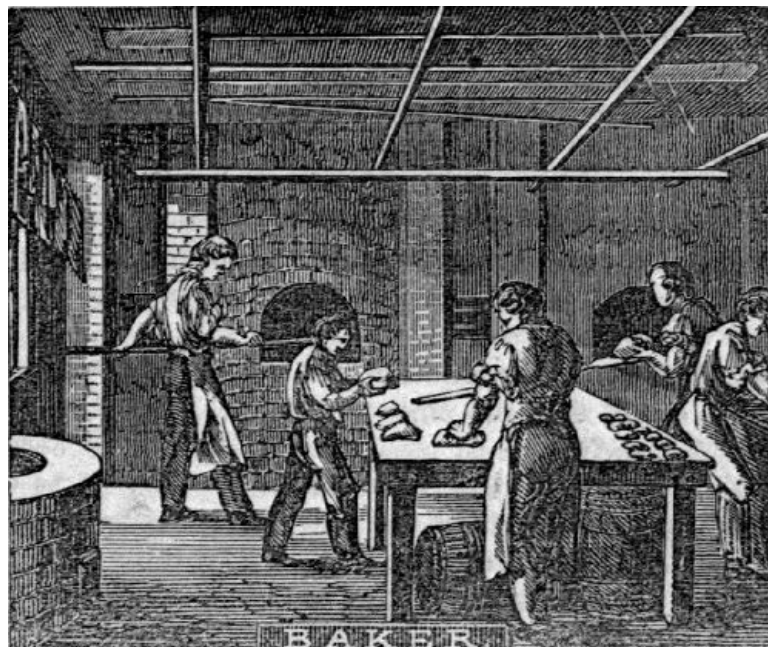
14. In our Southern states, hommony is a favorite article of food. It consists of the flinty portions of Indian corn, which have been separated from the hulls and eyes of the grain. To effect this separation, the corn is sometimes ground very coarsely in a mill; but the most usual method is that of pounding it in a mortar.

15. The mortar is excavated from a log of hard wood, between twelve and eighteen inches in diameter. The form of the excavation is similar to that of a common iron mortar, except that it is less flat at the bottom, to prevent the corn from being reduced to meal during the operation. The pestle is usually made by confining an iron wedge in the split end of a round stick, by means of an iron ring.

16. The white flint corn is the kind usually chosen for hommony; although any kind, possessing the requisite solidity, will do. Having been poured into the mortar, it is moistened with hot water, and immediately beaten with the pestle, until the eyes and hulls are forced from the flinty portions of the grain. The part of the corn which has been reduced to meal by the foregoing process, is removed by means of a sieve, and the hulls, by the aid of the wind.

17. Hommony is prepared for the table by boiling it in water for twelve hours with about one fourth of its quantity of white beans, and some fat bacon. It is eaten while yet warm, with milk or butter; or, if suffered to get cold, is again warmed with lard or some other fat substance, before it is brought to the table.

[39]



THE BAKER.

1. The business of the Baker consists in making bread, rolls, biscuits, and crackers, and in baking various kinds of provisions.

2. Man appears to be designed by nature, to eat all substances capable of affording nourishment to his system; but, being more inclined to vegetable than to animal food, he has, from the earliest times, used farinaceous grains, as his principal means of sustenance. As these, however, cannot be eaten in their native state without difficulty, means have been contrived for extracting their farinaceous part, and for converting it into an agreeable and wholesome aliment.

3. Those who are accustomed to enjoy all the advantages of the most useful inventions, without reflecting on the labour expended in their completion, may fancy that there is nothing more easy than to grind grain, to make it into paste, and to bake it in an oven; but it must have been a long time, before men discovered any better method of preparing their grain, than roasting it in the fire, or boiling it in water, and forming it into viscous cakes. Accident, probably, at length furnished some observing person a hint, by which good and wholesome bread could be made by means of fermentation. [40]

4. Before the invention of the oven, bread was exclusively baked in the embers, or ashes, or before the fire. These methods, with sometimes a little variation, are still practised, more or less, in all parts of the world. In England, the poor class of people place the loaf on the heated hearth, and invert over it an iron pot or kettle, which they surround with embers or coals.

5. The invention of the oven must have added much to the conveniences and comforts of the ancients; but it cannot be determined, at what period, or by whom, it was contrived. During that period of remote antiquity, in which the people were generally erratic in their habits, the ovens were made of clay, and hardened by fire, like earthenware; and, being small, they could be easily transported from place to place, like our iron bake-ovens. Such ovens are still in use in some parts of Asia.

6. There are few nations that do not use bread, or a substitute for it. Its general use arises from a law of our economy, which requires a mixture of the animal fluids, in every stage of the process of digestion. The saliva is, therefore, essential; and the mastication of dry food is required, to bring it forth from the glands of the mouth.

7. The farinaceous grains most usually employed in making bread, are,—wheat, rye, barley, maize, and oats. The flour or meal of two of these are often mixed; and wheat flour is sometimes advantageously combined with rice, peas, beans, or potatoes. [41]

8. The component parts of wheat, rye, and barley flour, are,—fecula, or starch, gluten, and saccharine mucilage. Fecula is the most nutritive part of grain. It is found in all seeds, and is especially abundant in the potato. Gluten is necessary to the production of light bread; and wheat flour, containing it in the greatest proportion, answers the purpose better than any other. The saccharine mucilage is equally necessary, as this is the substance on which yeast and leaven act, in producing the internal commotion in the particles of dough during fermentation.

9. There are three general methods of making bread; 1st. by mixing meal or flour with water, or with water and milk; 2d. by adding to the foregoing materials a small quantity of sour dough, or leaven, to serve as a fermenting agent; and, 3d. by using yeast, to produce the same general effect.

10. The theory of making light bread, is not difficult to be understood. The leaven or yeast acts upon the saccharine mucilage of the dough, and, by the aid of heat and moisture, disengages carbonaceous matter, which, uniting with oxygen, forms carbonic acid gas. This, being prevented from escaping by the gluten of the dough, causes the mass to become light and spongy. During the process of baking, the increased heat disengages more of the fixed air, which is further prevented from escaping by the formation of the crust. The superfluous moisture having been expelled, the substance becomes firm, and retains that spongy hollowness which distinguishes good bread.

11. Many other substances contain fermenting qualities, and are, therefore, sometimes used as substitutes for yeast and leaven. The waters of several mineral springs, both in Europe and America, being impregnated with carbonic acid gas, are occasionally employed in making light bread. [42]

12. The three general methods of making bread, and the great number of materials employed, admit of a great variety in this essential article of food; so much so, that we cannot enter into details, as regards the particular modes of manufacture adopted by different nations, or people. There are, comparatively, but few people on the globe, among whom this art is not practised in some way or other.

13. It is impossible to ascertain, at what period of time the process of baking bread became a particular profession. It is supposed, that the first bakers in Rome came from Greece, about two hundred years before the Christian era; and that these, together with some freemen of the city, were incorporated into a college, or company, from which neither they nor their children were permitted to withdraw. They held their effects in common, without possessing any individual power of parting with them.

14. Each bake-house had a patron, or superintendent; and one of the patrons had the management of the rest, and the care of the college. So respectable was this class of men in Rome, that one of the body was occasionally admitted, as a member of the senate; and all, on account of their peculiar corporate association, and the public utility of their employment, were exempted from the performance of the civil duties to which other citizens were liable.

15. In many of the large cities of Europe, the price and weight of bread sold by bakers, are regulated by law. The weight of the loaves of different sizes must be always the same; but the price may vary, according to the current cost of the chief materials. The law was such in the city of London, a few years ago, that if a loaf fell short in weight a single ounce, the baker was liable to be put in the pillory; but now, he is subject only to a fine, varying from one to five shillings, [43]

according to the will of the magistrate before whom he may be indicted.

16. In this country, laws of a character somewhat similar have been enacted by the legislatures of several states, and by city authorities, with a view to protect the community against impositions; but whether there is a law or not, the bakers regulate the weight, price, and quality of their loaves by the general principles of trade.

17. There is, perhaps, no business more laborious than that of the baker of loaf bread, who has a regular set of customers to be supplied every morning. The twenty-four hours of the day are systematically appropriated to the performance of certain labours, and to rest.

18. After breakfast, the yeast is prepared, and the oven-wood provided: at two or three o'clock, the *sponge is set*: the hours from three to eight or nine o'clock, are appropriated to rest. The baking commences at nine or ten o'clock at night; and, in large bakeries, continues until five o'clock in the morning. From that time until the breakfast hour, the hands are engaged in distributing the bread to customers. For seven months in the year, and, in some cases, during the whole of it, part of the hands are employed, from eleven to one o'clock, in baking pies, puddings, and different kinds of meats, sent to them from neighboring families.

19. In large cities, the bakers usually confine their attention to particular branches of the business. Some bake light loaf bread only; others bake unleavened bread, such as crackers, sea-biscuit, and cakes for people of the Jewish faith. Some, again, unite several branches together; and this is especially the case in small cities and towns, where the demand for different kinds of bread is more limited.

[44]



THE CONFECTIONER.

1. The Confectioner makes liquid and dry confects, jellies, marmalades, pastes, conserves, sugar-plums, ice-creams, candies, and cakes of various kinds.

2. Many of the articles just enumerated, are prepared in families for domestic use; but, as their preparation requires skill and practice, and is likewise attended with some trouble, it is sometimes better to purchase them of the confectioner.

3. *Liquid* and dry *confects* are preserves made of various kinds of fruits and berries, the principal of which are,—peaches, apricots, pears, quinces, apples, plums, cherries, grapes, strawberries, gooseberries, currants, and raspberries. The fruit, of whatever kind it may be, is confected by boiling it in a thick clarified syrup of sugar, until it is about half cooked. Dry confects are made by boiling the fruit a little in syrup, and then drying it with a moderate heat in an oven. The ancients confected with honey; but, at present, sugar is deemed more suitable for this purpose, and is almost exclusively employed.

[45]

4. *Jellies* resemble a thin transparent glue, or size. They are made by mixing the juice of the fruits mentioned in the preceding paragraph, with a due proportion of sugar, and then boiling the composition down to a proper consistence. Jellies are also made of the flesh of animals; but such preparations cannot be long kept, as they soon become corrupt.

5. *Marmalades* are thin pastes, usually made of the pulp of fruits that have some consistence, and about an equal weight of sugar. *Pastes* are similar to marmalades, in their materials, and mode of

preparation. The difference consists only in their being reduced by evaporation to a consistence, which renders them capable of retaining a form, when put into moulds, and dried in an oven.

6. *Conserves* are a species of dry confects, compounded of sugar and flowers. The flowers usually employed, are,—roses, mallows, rosemary, orange, violets, jessamine, pistachoes, citrons, and sloes. Orange-peel is also used for the same purpose.

7. *Candies* are made of clarified sugar, reduced by evaporation to a suitable degree of consistence. They receive their name from the essence, or substance, employed in giving them the required flavour.

8. *Sugar-plums* are small fruits, seeds, little pieces of bark, or odoriferous and aromatic roots, incrustated with hard sugar. These trifles are variously denominated; but, in most cases, according to the name of the substance inclosed by the incrustation.

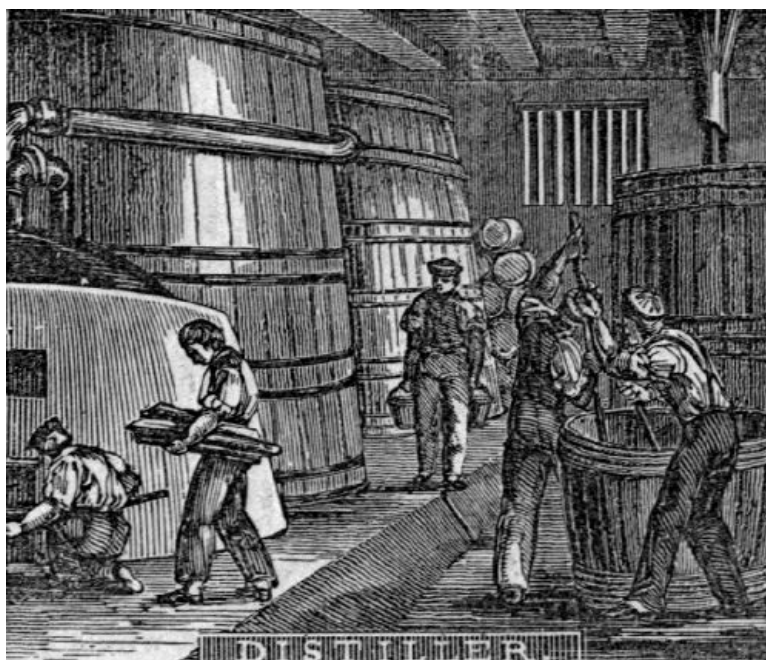
9. *Ice-cream* is an article of agreeable refreshment in hot weather. It is sold in confectionary shops, as well as at the public gardens, and other places of temporary resort in cities. It is composed, chiefly, of milk or cream, fruit, and lemon-juice. It is prepared by beating the materials well together, and rubbing them through a fine hair sieve. The congelation is effected by placing the containing vessel in one which is somewhat larger, and filling the surrounding vacancy with a mixture of salt and fine ice. [46]

10. *Cakes* are made of a great variety of ingredients; the principal of which are, flour, butter, eggs, sugar, water, milk, cream, yeast, wine, brandy, raisins, currants, caraway, lemon, orange, almonds, cinnamon, nutmeg, allspice, cloves, and ginger. The different combinations of these materials, produce so great a variety of cakes, that it would be tedious to detail even their names.

11. The confectioner, in addition to those articles which may be considered peculiar to his business, deals in various kinds of fruits and nuts, which grow in different climates. He also sells a variety of pickles, which he usually procures from those who make it a business to prepare them.

12. *Soda-water* is likewise often sold by the confectioner. This agreeable drink is merely water, impregnated with carbonic acid gas, by means of a forcing-pump. The confectioners, however, in large cities, seldom prepare it themselves, as they can procure it at less expense, and with less trouble, ready made.

13. Sometimes, the business of the pastry-cook is united with that of the confectioner, especially with that branch of it which relates to making cakes. Pies and tarts consist of paste, which, in baking, becomes a crust, and some kind of fruit or meat, or both, with suitable seasoning. The art of making pies and tarts is practised, more or less, in every family: it is not, therefore, essential to be particular in naming the materials employed, or the manner in which they are combined.



[47]

THE BREWER, AND THE DISTILLER.

THE BREWER.

1. Brewing is the art of preparing a liquor, which has received the general denomination of beer.

This beverage can be brewed from any kind of farinaceous grain; but, on various accounts, barley is usually preferred. It is prepared for the brewer's use by converting it into malt, which is effected by the following process.

2. The grain is soaked in a cistern of water about two days, or until it is completely saturated with that fluid. It is then taken out, and spread upon a floor in a layer nearly two feet thick. When the inside of this heap begins to grow warm, and the kernels to germinate, the maltster checks the rapid growth of the grain in that situation by changing it to the outside. This operation is continued, until the saccharine matter in the barley has been sufficiently evolved by the natural process of germination. [48]

3. The grain is next transferred to the kiln, which is an iron or tile floor, perforated with small holes, and moderately heated beneath with a fire of coke or stone coal. Here, the grain is thoroughly dried, and the principle of germination completely destroyed. The malt thus made is prepared for being brewed, by crushing it in a common mill, or between rollers. Malting, in Great Britain, and in some other parts of Europe, is a business distinct from brewing; but, in the United States, the brewers generally make their own malt.

4. The first part of the process of brewing is called *mashing*. This is performed in a large tub, or *tun*, having two bottoms. The upper one, consisting of several moveable pieces, is perforated with a great number of small holes; the other, though tight and immovable at the edges, has several large holes, furnished with ducts, which lead to a cistern beneath.

5. The malt, designed for one mashing, is spread in an even layer on the upper bottom, and thoroughly saturated and incorporated with water nearly boiling, by means of iron rakes, which are made to revolve and move round in the tub by the aid of machinery. The water, together with the soluble parts of the malt, at length passes off, through the holes before mentioned, into the reservoir beneath.

6. The malt requires to be mashed two or three times in succession with fresh quantities of water; and the product of each mashing is appropriated to making liquors of different degrees of strength.

7. The product of the *mashing-tun* is called *wort*, which, being transferred to a large copper kettle, is boiled for a considerable time with a quantity of hops, and then drawn off into large shallow cisterns, called *coolers*. When the mixture has become cool enough to be submitted to fermentation, it is drawn off into the *working tun*. [49]

8. The fermentation is effected with yeast, which, acting on the saccharine matter, disengages carbonic acid gas. This part of the process requires from eighteen to forty-eight hours, according to the degree of heat which may be in the atmosphere.

9. The beer is then drawn off into casks of different dimensions, in which it undergoes a still further fermentation, sometimes called the *brewer's cleansing*. During this fermentation, the froth, or yeast, works out at the bung-hole, and is received in a trough, on the edges of which the casks have been placed. The froth thus discharged from the beer, is the yeast used by the brewers.

10. The products of the brewery are denominated *beer*, *ale*, and *porter*. The difference between these liquors arises, chiefly, from the manner in which the malt has been prepared, the relative strength imparted to each, and the extent to which the fermentation has been carried.

11. There are several kinds of beer; such as table beer, half and half, and strong beer. They are adapted to use soon after being brewed, and differ from each other but little, except in the degree of their strength.

12. Ale and porter are called stock liquors; because, not being designed for immediate consumption, they are kept for a considerable time, that they may improve in quality. Porter is usually prepared for consumption by putting it into bottles. This is done either at the brewery, or in bottling establishments. In the latter case, the liquor is purchased in large quantities from the brewer by persons who make it their business to supply retailers and private families.

13. We have evidence that fermented liquor was in use three thousand years ago. It was first used in Egypt, whence it passed into adjacent countries, and afterward into Spain, France, and England. It was sometimes called the wine of barley; and one kind of it was denominated Pelusian drink, from the city Pelusium, where it was first made. [50]

14. Among the nations of modern times, the English are the most celebrated for brewing good liquors. London porter is especially in great repute, not only in that city, but in distant countries. Much fermented liquor of the different kinds, is consumed in the United States, where it is also made in considerable perfection.

THE DISTILLER.

1. Although alcohol can be extracted from any substance containing saccharine matter, yet sugar-cane, grapes, apples, peaches, rye, corn, and rice, on account of their abundance, and superior adaptation to the purpose, are more commonly used than any other. As whiskey is the chief article of this kind, manufactured in the United States, it will be selected to illustrate the general principles of distillation.

2. Corn and rye are the materials from which this liquor is mostly extracted; and these are used either together or separately, at the option of the distiller. The meal is scalded and mashed in a large tub: it is then permitted to stand, until it has become a little sweet, when more water is poured upon it, and, at a suitable temperature, a quantity of yeast is added. To aid in producing rapid fermentation, a little malt is sprinkled on the top.

3. After an adequate fermentation has taken place, the *beer*, as it is called, is transferred to a large close tub, from the top of which leads a tube extending to the worm in another tub filled with cold water. The worm is a long pewter tube, twisted spirally, that it may occupy a small space. [51]

4. The beer is heated in the close tub, by means of steam, which is conveyed to it, from a large kettle or boiler, by a copper or iron pipe. The heat causes the alcoholic particles to rise like vapour, and pass into the worm, where they are condensed into a watery fluid, which passes out into a receiver.

5. At first, pure alcohol distils from the worm; but the produce becomes gradually weaker, until, at length, the spirit in the beer being exhausted, it consists only of water condensed from steam. The remains of the beer are given as feed to hogs and cattle.

6. Brandy is distilled from grapes, rum from sugar-cane, arrack from rice, whiskey from various kinds of grain, peach-brandy from peaches, and cider-brandy from apples.

7. The great variety of articles employed in the productions of different kinds of ardent spirits, must necessarily vary the process of distillation in some particulars; but, in all cases, fermentation and heat are necessary to disengage the alcoholic properties of the saccharine matter, and also an apparatus for condensing the same from a gaseous to a liquid form. In some countries, the *alembic* is used as a condenser, instead of a worm. The form of this instrument is much like that of the retort; and when applied, it is screwed upon the top of the boiler.

8. Spirits, which come to market in a crude state, are sometimes distilled for the purpose of improving their quality, or for disguising them with drugs and colouring substances, that they may resemble superior liquors. The process by which they are thus changed, or improved, is called rectification. Many distilleries in large cities, are employed in this branch of business. [52]

9. There is, perhaps, no kind of merchandise in which the public is more deceived, than in the quality of ardent spirits and wines. To illustrate this, it is only necessary to observe, that Holland gin is made by distilling French brandy with juniper-berries; but most of the spirits which are vended under that name, consist only of rum or whiskey, flavoured with the oil of turpentine. Genuine French brandy is distilled from grapes; but the article usually sold under that denomination, is whiskey or rum coloured with treacle or scorched sugar, and flavoured with the oil of wine, or some kind of drug.

10. The ancient Greeks and Romans were acquainted with an instrument for distillation, which they denominated *ambix*. This was adopted, a long time afterward, by the Arabian alchemists, for making their chemical experiments; but they made some improvements in its construction, and changed its name to *alembic*.

11. The ancients, however, knew nothing of alcohol. The method of extracting this intoxicating substance, was probably discovered some time in the twelfth or thirteenth century; but, for many ages after the discovery, it was used only as a medicine, and was kept for sale exclusively in apothecary shops. It is now used as a common article of stimulation, in almost every quarter of the globe.

12. But the opinion is becoming general, among all civilized people, that the use of alcohol, for this purpose, is destructive of health, and the primary cause of most of the crimes and pauperism in all places, where its consumption is common. The formation of Temperance Societies, and the publication of their reports, together with the extensive circulation of periodical papers, devoted to the cause of temperance, have already diminished, to a very great extent, the use of spirituous liquors. [53]

13. Although the ancients knew nothing of distilling alcohol, yet they were well versed in the art of making wine. We read of the vineyard, as far back as the time of Noah, the second father of nations; and, from that period to the present, the grape has been the object of careful cultivation, in all civilized nations, where the climate and soil were adapted to the purpose.

14. The general process of making wine from grapes, is as follows. The grapes, when gathered, are crushed by treading them with the feet, and rubbing them in the hands, or by some other means, with the view to press out the juice. The whole is then suffered to stand in the vat, until it has passed through what is termed the *vinous* fermentation, when the juice, which, in this state, is termed *must*, is drawn off into open vessels, where it remains until the pressing of the husks is finished.

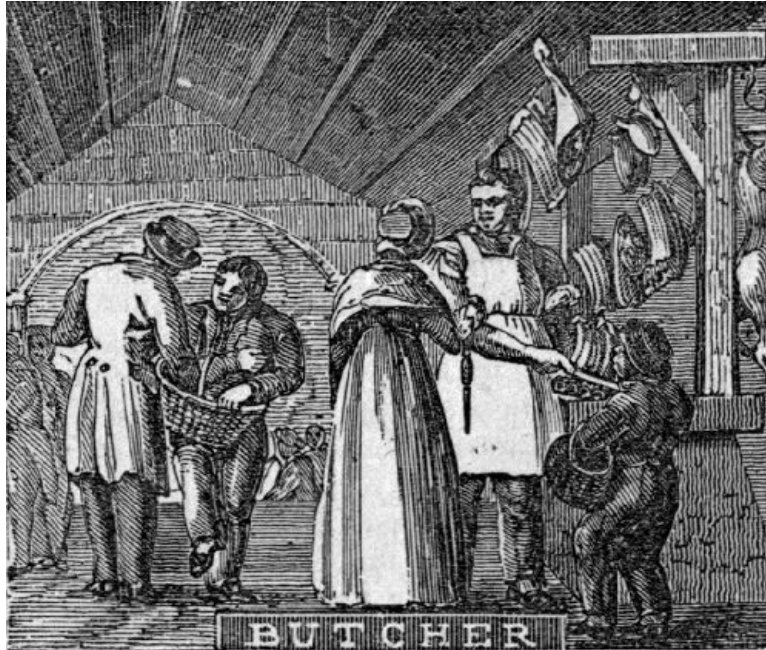
15. The husks are submitted, in hair bags, to the press; and the *must* which is the result of this operation, is mixed with that drawn from the vat. The whole is then put into casks, where it undergoes another fermentation, called the *spirituous*, which occupies from six to twelve days. The casks are then bunged up, and suffered to stand a few weeks, when the wine is racked off from the *lees*, and again returned to the same casks, after they have been perfectly cleansed. Two such rackings generally render the wine clear and brilliant.

16. In many cases, sugar, brandy, and flavouring substances, are necessary, to render the wine palatable; but the best kinds of grapes seldom require any of these additions. Wine-merchants often adulterate their wines in various ways, and afterwards sell them for those which are genuine. To correct acidity, and some other unpleasant qualities, lead, copper, antimony, and corrosive sublimate, are often used by the dealers in wine; though the practice is attended with deleterious effects to the health of the consumers.

[54]

17. The wines most usually met with in this country, are known by the following denominations, viz., *Madeira* and *Teneriffe*, from islands of the same names; *Port*, from Portugal; *Sherry* and *Malaga*, from Spain; *Champagne*, *Burgundy*, and *Claret*, from France; and *Hock*, from Germany.

[55]



THE BUTCHER.

1. Man is designed by nature, to subsist on vegetable and animal food. This is obvious, from the structure of his organs of mastication and digestion. It does not follow, however, that animal food is, in all cases, positively required. In some countries, the mass of the people subsist chiefly or entirely on vegetables. This is especially the case in the East Indies, where rice and fruits are the chief articles of food.

2. On the other hand, the people who live in the higher latitudes subsist principally on the flesh of animals. This is preferred, not only because it is better suited to brace the system against the rigours of the climate, but because it is most easily provided. In temperate climates, a due proportion of both animal and vegetable substances is consumed.

[56]

3. Although the skins of beasts were used for the purpose of clothing, soon after the fall of man, we have no intimation from the Scriptures, that their flesh, or that of any other animal, was used, until after the flood. The Divine permission was then given to Noah and his posterity, to use, for this purpose, "every moving thing that liveth." But in the law of Moses, delivered several centuries after this period, many exceptions are to be found, which were intended to apply only to the Jewish people. These restrictions were removed, on the introduction of Christianity. The unbelieving Jews, however, still adhere to their ancient law.

4. The doctrine of transmigration has had a great influence in diminishing the consumption of animal food. This absurd notion arose somewhere in Central Asia, and, at a very early period, it spread into Egypt, Greece, Italy, and finally among the remote countries of the ancient world. It is still entertained by the heathen nations of Eastern Asia, by the tribes in the vicinity of Mount Caucasus, and by some of the American savages, and African negroes.

5. The leading feature of this doctrine is, that the souls of departed men reappear on earth in the bodies of animals, both as a punishment for crimes committed during life, and as a means of purification from sin. This dogma was adopted by the Pythagoreans, a sect of Grecian philosophers; and, as a natural consequence, it led them, as it has ever done the votaries of this opinion, to the veneration of animals, and to abstinence from their flesh, lest they might devour that of some of their deceased friends or relatives.

6. People who dwell thinly scattered in the country, rear and slaughter the animals for the supply of their own tables; but, in villages, large towns, and cities, the inhabitants depend chiefly on the butcher for their meat. The animals commonly slaughtered are, sheep, cattle, and hogs.

[57]

7. The butchers obtain their animals from the farmers, or from drovers, who make it a business to purchase them in the country, and drive them to market. The farmers near large cities, who have good grazing farms, are accustomed to buy lean cattle, brought from a distance, with a view to fatten them for sale. There are also persons in the cities, who might, with propriety, be called cattle brokers; since they supply the butchers of small capital with a single animal at a time, on a credit of a few days.

8. Every butcher who carries on the business, has a house in which he kills his animals, and prepares them for sale. When it is intended to slaughter an ox, a rope is thrown about his horns or neck, with which he is forced into the *slaughter-house*, and brought to the floor by the aid of a ring. The butcher then knocks him on the head, cuts his throat, deprives him of his hide, takes out his entrails, washes the inside of his body with water, and cuts him up into quarters. The beef is now ready to be conveyed to the market-house. The process of dressing other quadrupeds varies but little from this in its general details. The cellular substance of mutton, lamb and veal, is often inflated with air, that the meat may appear fat and plump.

9. In large cities and towns, the meat is chiefly sold in the market-house, where each butcher has a stall rented from the corporation. It is carried there in a cart, and cut into suitable pieces with a saw, knife, and a broad iron cleaver.

10. In some of the large cities, it is a practice among the butchers, to employ *runners* to carry the meat to the houses, of those customers who may desire this accommodation. In villages, where there is no market-house, the butcher carries his meats from door to door in some kind of vehicle. [58]

11. Those who follow this occupation usually enjoy good health, and, as they advance in years, in most cases, become corpulent. Their good health arises from exercise in the open air; and their corpulency, from subsisting principally on fresh meats. It is thought, however, that their longevity is not so great as that of men in many other employments.



THE TOBACCO PLANTER, AND THE TOBACCONIST

THE TOBACCO PLANTER.

1. Tobacco is a native production of America, which was in common use among nearly all of the Indian tribes, when this continent was discovered by Europeans. Its original name among the nations of the islands, was *yoli*; whilst, with those of the continent, it was termed *petum*. The Spaniards, however, chose to call it *tobacco*, a term in the Haytian language, which designated the instrument in which the herb was smoked.

2. This plant was first introduced into Spain, then into Portugal and France, and, at length, into other countries of the Eastern continent. Sir Walter Raleigh carried it from Virginia to England, and taught his countrymen the various methods of consuming it among the natives. [60]

3. The introduction of this nauseous plant into Europe, was everywhere attended with ridicule and opposition. Hundreds of pamphlets were published, in various languages, dissuading from its use in the strongest terms. Even James the First, king of Great Britain, did not regard it as inconsistent with the royal dignity to take up his pen on the subject. In his "*Counterblast to Tobacco*," published in 1603, occurs the following remarkable passage: "It is a custom loathsome

to the eye, hateful to the nose, harmful to the brain; and, in the black fume thereof, nearest resembling the horrible Stygian smoke of the pit that is bottomless."

4. Pope Urban VIII. excommunicated those who took tobacco in churches; and Queen Elizabeth also prohibited its use in houses of public worship. In 1689, an ordinance was published in Transylvania, threatening those who should plant tobacco with the confiscation of their estates. The grand-duke of Moscow, and the king of Persia, prohibited its use under the penalty of the loss of the nose, and even of life. At present, however, the consumption of tobacco is looked upon with so much greater indulgence, that all the sovereigns of Europe, and most of those of other nations, derive a considerable revenue from the trade in this article.

5. But it is truly astonishing, that a nauseous weed, of an acrid taste, disagreeable odour, and deleterious qualities, should have had so great an influence on the social condition of nations; that its culture should have spread more rapidly than that of the most useful plants; and that it should, consequently, have become an article of extensive commerce.

6. Of this plant there are several species, which differ from each other, in size, strength, and flavour. Some one or more of these varieties, are cultivated in various parts of the world: but especially in North and South America, and in the West Indies. It is one of the staple productions of Maryland, Virginia, Kentucky, and Ohio. The whole value of the tobacco, exported annually from the United States, amounts to about five millions of dollars. [61]

7. The following description of the mode of cultivating this plant, and preparing it for the tobacconist, is applicable to the state of Maryland. A little variation in some of the details, would render it applicable to other parts of the world.

8. A small piece of ground, say one-sixteenth of an acre, is prepared by burning a large quantity of brush upon it. The surface is rendered light and even, by means of a hoe and rake; and the seeds, mixed with ashes, are sown as equally as possible. After they have been covered with earth, the ground is trodden down with the bare feet. The tobacco beds are made in March, and the plants become fit for the field in eight or ten weeks.

9. The field, in which the cultivation of the crop is to be continued, is ploughed two or three times, and then cross-ploughed into equal checks, in each of which is made a hill. Immediately after a rain, the plants are transferred to these hills, in the same manner in which cabbages are transplanted. While the tobacco is growing, the ground is ploughed several times, in order to keep it light, and to aid in destroying the weeds. When the plants are nearly grown, the tops are lopped or cut off, to prevent them from running to seed, and to cause the leaves to grow larger and thicker.

10. In July or August, the tobacco-worms begin to make their appearance, and to threaten the whole crop with destruction. To arrest the ravages of these insidious enemies, all hands, both great and small, together with all the turkeys that can be mustered, are brought into the field. These worms are produced from the eggs of a large insect, called the horn-bug. [62]

11. The tobacco, when ripe, is cut near the ground, and hung on small sticks about five feet in length, generally by pegs driven into the stalks. These sticks are then laid upon poles, arranged at proper distances from each other in the tobacco-house, shed, or hovel, as the case may be. It is then suffered to dry gradually in the atmosphere; or a large fire is made in the tobacco-house, to effect the drying more rapidly.

12. The leaves are next stripped from the stalks, and tied in small bunches according to their quality. This can only be done when *in order*, or rather, when the leaves are rendered tough by the absorption of moisture from the atmosphere. These bunches, when the leaves are so damp that they will not break, and so dry that they will not heat, are packed in hogs-heads by the aid of a large lever press. The tobacco is inspected in public warehouses, by men who have been appointed for the purpose by the public authorities.

THE TOBACCONIST.

1. It is the business of the tobacconist to convert the leaves of the tobacco plant into snuff, cigars, and smoking and chewing tobacco.

2. Although there may seem to be a great variety of snuffs, yet they may be all reduced to three kinds, viz., Scotch, rappee, and maccouba. These are variously modified by the quality of the tobacco, by some little variation in the manufacture, and by the articles employed in communicating the desired flavour.

3. In manufacturing snuff, the tobacco is ground in a mill of a peculiar construction. Before the weed is submitted to this operation, it is reduced to a certain degree of fineness, by means of a cutting machine; and then spread in a heap, one or two feet thick, and sprinkled with water, that it may *heat* and *sweat*. The time required in this preparation depends upon the state of the weather, and the kind of snuff for which the tobacco is designed. [63]

4. Scotch snuff is made of the strongest sort of tobacco, and is put up in bladders and bottles without being scented. Rappee and maccouba are put up in jars and bottles; and the former is generally scented with bergamot, and the latter with the ottar of roses. Sometimes, several ingredients, agreeable to the olfactory nerves, are employed.

5. Cigars are composed of two parts, called the *wrapper* and the *filling*. The former is made of pieces of thin leaves, cut to a proper shape, and the latter of those which are more broken. In all cases, the leaves used in the manufacture of cigars are deprived of the stems, which are reserved, either to be converted into inferior kinds of snuff, or for exportation to Holland, where they are usually flattened between rollers, and afterwards cut fine for smoking tobacco, to be sold to the poorer class of people.

6. The value of cigars depends chiefly on the quality of the tobacco. The best kind for this purpose, grows on the island of Cuba, near Havana. Tobacco from this seed is raised in many other places; and such, among tobacconists, is called *seed*; but it passes, among smokers of limited experience, for the real Havana. A very fine silky tobacco of this sort, is cultivated in Connecticut, which is much esteemed.

7. An expert hand will make five or six hundred Spanish cigars in a day, or from one thousand to fifteen hundred of those composed of Maryland or Kentucky tobacco. Making cigars, being light work, is well adapted to females, of whom great numbers are regularly employed in this branch of business. Tobacco intended for the pipe, is cut in a machine; and, after having been properly dried, it is put up in papers of different sizes. [64]

8. Chewing tobacco is almost exclusively prepared from the species of this plant which is cultivated in Virginia, chiefly in the vicinity of James river. It is better adapted to this purpose than any other, on account of its superior strength, and the great amount of resinous matter which it contains.

9. The first operation in preparing chewing tobacco, is that of depriving the leaves of the stems. The former are then twisted by hand into plugs of different sizes, or spun into a continued thread by the aid of the *tobacco-wheel*, which is a simple machine moved by a crank. The thread thus produced is formed into bunches, or twists, containing a definite amount of tobacco.

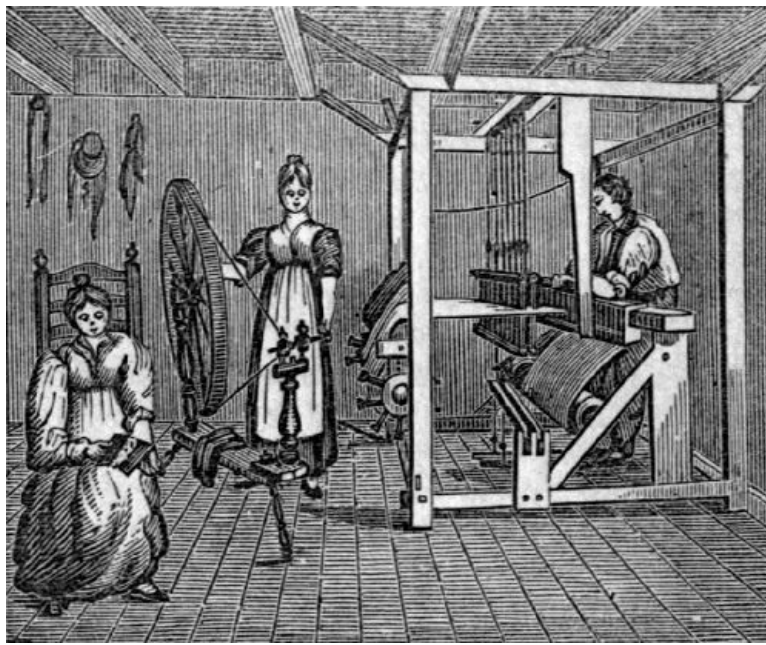
10. The tobacco, having been put into the form desired, is moistened with water, packed in strong kegs, and then pressed with powerful screw-presses. The whole process is completed by heating the kegs, with their contents, for several days, in an oven or a tight room made for the purpose. The same change in the quality of the tobacco is also produced by suffering it to stand nine or twelve months, before it is disposed of to the consumers.

11. Snuff is very commonly used in the Southern states, as a dentifrice; or, at least, it is applied to the teeth with this ostensible object. The application is made by means of a small stick, having the fibres minutely divided at one end. Although the tobacco seems to have the desired effect upon the teeth, so far as respects their appearance, yet its stimulating and narcotic powers are more to be dreaded in this mode of using it than in any other. Many females ruin their complexion and constitution, by *rubbing snuff*; and the deleterious effects of the practice are so well known, that few are willing to avow it. [65]

12. Tobacco is used, in some one of its various forms, by a great majority of mankind; and, although it is generally acknowledged to be, in most cases, injurious to the constitution, and often destructive of health, yet its consumption seems to be on the increase. It is one of the objects of trade, even in the most obscure parts of the world; and its devotees must and will have a supply, even though they stint themselves in food and clothing.

13. As regards the influence which this plant assumes over its votaries, it may be classed with alcohol and opium; although its effects are not so destructive; nor is the expense so considerable; yet this is an item by no means unworthy of attention, as the aggregate sum annually expended for this useless narcotic in the United States, would be sufficient for the support of common schools in every part of the country.

14. The general use of tobacco is perpetuated from generation to generation, by the desire, common to children and young people, to act and appear like older persons. Few ever begin the use of this nauseous weed, because it is agreeable to the senses to which it is applied; but because they fancy, in their childish simplicity, that it confers upon them some additional importance.



THE MANUFACTURER OF CLOTH.

1. Men, in the primitive ages, were clad with the skins of animals, until they had acquired sufficient skill to employ a better material. It cannot be determined from history, at what time cloth began to be manufactured from animal or vegetable fibre; but it is evident, that it was done at a very early period, even long before the flood.

2. The fibres of the vegetable kind, most commonly applied to this purpose, are the bark of several kinds of trees, together with hemp, flax, and cotton; and those of the animal kingdom are, silk, the wool of the sheep and lama, and the hair, or wool, of the goat and camel.

3. That the general process of manufacturing cloth may be perfectly understood, the manner of performing several operations must be separately described. For the purpose of illustration, cotton, wool, and flax, will be selected; because these are the materials of which our clothing is principally fabricated. The operations of making cloth, may be comprised under *carding* and *combing*, *spinning*, *weaving*, and *dressing*. [67]

4. *Carding and Combing*.—Wool and cotton are carded, with the view of disentangling the fibres, and arranging them longitudinally in small rolls. This is done by means of the teeth of two instruments, called cards, used by hand on the knee, or by the carding machine, which acts on the same principle, although far more expeditiously.

5. Machines for carding wool are to be found in every district of country in the United States, in which the people manufacture much of their woollen cloths in their own families. On account of the roughness of the fibres of wool, it is necessary to cover them well with grease or oil, that they may move freely on each other during the carding and spinning.

6. Long, coarse, or hard wools, used in the manufacture of camlets, bombazines, circassians, and other worsted fabrics, are not carded, but combed. In England, and in other countries where much of this kind of wool is used, wool-combing forms a distinct trade. The operation consists, chiefly, in drawing the locks through steel combs, the teeth of which are similar to our common flax-hatchel. The comb is heated to a certain temperature, to cause the fibres to straighten, and to remove from them the roughness which might otherwise cause the cloth made of them to thicken in washing, like flannel.

7. The old method of combing wool, however, has been in part superseded by the application of machines, the first of which was invented by Edmund Cartwright, of England, about the year 1790. The fibres of flax are arranged in a parallel direction, and freed from tow, by drawing them through a hatchel. [68]

8. *Spinning*.—The process of spinning consists in twisting the fibres into threads. The most simple method by which this is effected, is that by the common spinning-wheel. Of this well-known machine there are two kinds; one of which is applied to spinning wool, cotton, and tow, and the other, to spinning flax.

9. This operation is, in most cases, performed by females in the following manner. The roll of cotton or wool is attached to the spindle, which is put in rapid motion by a band passing over it from the rim, or periphery of the wheel. While the spinster is turning the wheel with the right hand, she brings back from the spindle her left, with which she has laid hold of the roll a few inches from the upper end. When the yarn thus produced has been sufficiently twisted, she turns it upon the spindle, and repeats the same operation, until it is full. This yarn is formed into skeins by winding it upon a reel.

10. The mode of spinning tow is a little different. The material having been formed into *bats* by hand-cards, the fibres are drawn out from between the fingers and thumb by the twisted thread, while the spinster gradually moves backward. Worsted is spun from combed wool nearly in the same manner.

11. The *flax* or *little wheel* is moved by the foot, so that both hands of the spinster are used in supplying, disposing, and occasionally wetting the fibres, as they are drawn from the distaff. Two bands pass from the periphery of the wheel, each of which performs a distinct office: the one keeps in motion the spindle, which twists the thread; the other moves the fliers, which wind the thread upon a spool, as fast as it is produced.

12. Spinning was almost exclusively performed in the modes just described, until the year 1767, when Richard Hargreaves, of England, invented a machine for spinning cotton, which he called a *jenny*. This consisted, at first, of eight spindles, moved by a common wheel, or cylinder, which was turned by hand. The number of spindles was afterwards increased to eighty-four. [69]

13. In 1769, Richard Arkwright, also an Englishman, invented the *water-spinning-frame*. The essential and most important feature of this invention, consists in drawing out the cotton, by causing it to pass between successive pairs of rollers, which revolve with different velocities, and which act as substitutes for the thumb and fingers, as applied in common spinning. These rollers are combined with the spindle and fliers of the common flax-wheel.

14. Another machine was invented by Samuel Crompton, in 1779. It is called a *mule*, because it combines the principles of the two preceding machines. It produces finer yarn than either of them, and has nearly superseded the jenny. Before the cotton is submitted to the spinning machine, it is prepared by several others, by which it is carded, extended, and partially twisted.

15. In the manufactories, the fine, short wools, used in the fabrication of broadcloths, flannels, and a variety of other cloths, are carded by machinery, and spun on a *slubbing* or *roving-machine*, or on a *jenny* or *mule*, in each of which the spindles are mounted on a carriage, which is moved backwards in stretching and twisting the material, and forwards in winding the thread upon the spindle.

16. Worsted still continues to be spun, in most cases, on the common spinning-wheel, as it can be done more perfectly in this way, than by any other machine which has hitherto been invented. Several machines have been constructed, which spin coarse threads of flax very well, and with great rapidity; but the materials for fine linen fabrics are still spun on the ancient flax-wheel. [70]

17. *Weaving*.—The first step preparatory to weaving, is to form a warp, consisting of a number of threads, which extend through the whole piece. To produce this parallel arrangement, the yarn is wound upon spools, which are afterwards placed in a frame perpendicularly by means of rods, on which they move as upon an axle. From these spools, the yarns are stretched upon pegs to the length of the proposed web, and are carried round or doubled a sufficient number of times to make it the proper width. The same object is more expeditiously effected, by winding the yarn spirally on a revolving frame.

18. The next step consists in winding the warp on a cylindrical beam, which is usually about ten inches in diameter. The threads, having been put through a harness, composed of moveable parts, called *heddles*, and also through a sley, or reed, are fastened on the other side to a large rod, from which three ropes extend to another cylinder, on which the cloth is wound, as fast as it is woven.

19. The heddles are suspended from cross-pieces, on the top of the loom, by means of cords and pulleys, and, during the operation of weaving, are moved up and down alternately by the aid of *treadles*. This reciprocal motion causes the web to open; and, while in this position, a shuttle, containing the *woof*, *weft*, or *filling* on a quill or bobbin, is passed through from right to left, or from left to right, as often as the position of the warp is changed. The threads of the filling are beaten up by the reed, or sley, which is placed in the *lay*.

20. Weaving is a business extensive in its application, being divided into almost as many branches as there are woven fabrics. Plain cotton, linen, woollen, and twilled cloths, silks, satins, carpets, &c., are all woven in looms of some kind, constructed on the same general principles. Power-looms, driven by water or steam, are now generally introduced into the cotton and woollen manufactories, both in Europe and in this country. One person can attend to two of these looms at the same time, and each one will weave between twenty and forty yards in a day. [71]

21. *Dressing*.—Cotton fabrics, when the webs are taken from the loom, are covered with an irregular nap, or down, formed by the protruding ends of the fibres. From the finest cottons, this is removed, by drawing them rapidly over an iron cylinder, kept red-hot by a fire within. The flame of coal-gas has recently been applied, to effect the same object.

22. Common domestic fabrics are taken from the loom, and, without further preparation, are folded up into pieces for sale. Finer articles are usually whitened and calendered, before they pass from the hand of the manufacturer. Stuffs of all kinds, made of vegetable fibres, are now whitened by immersing them in a solution of oxymuriate of lime. Cotton and linen goods, with a view of making them smooth and glossy, are calendered, or pressed, between steel rollers.

23. Many of the fine cottons are converted into calicoes, by transferring to them various colors. The process by which this is done, is called calico-printing, which will be described in a separate

article.

24. The texture of the fabrics made of worsted, or long wool, is completed, when issued from the loom. The pieces are subsequently dyed, and then pressed between heated metallic plates, to communicate to them the required gloss. But weaving does not always complete the texture of the stuffs made of the short wools. When taken from the loom, the web is too loose and open, to answer the purposes to which such cloths are usually applied. It is, therefore, submitted to another process, called *fulling*. [72]

25. *Fulling*, in common with almost every other operation pertaining to the manufacture of cloth, constitutes a separate trade. The art is only applied to stuffs composed of wool, or hair, as these only possess the properties which render it applicable. The practicability of fulling cloth depends on a certain roughness of the fibres, which admits of motion in one way, and retards it in another. This may be more fully understood by consulting the article on making hats.

26. The cloth, having been prepared by a proper cleansing, is deposited in a strong box, with a quantity of water and fuller's earth or soap, and submitted to the action of the *pestles*, or *stampers*, which are moved in a horizontal direction, backwards and forwards, by means of appropriate machinery. This operation reduces the dimensions of the cloth, and greatly improves the beauty and stability of the texture. The cloth is afterwards dried in the open air on frames prepared for the purpose.

27. After the cloth has been dyed, a nap is raised on one side of it by means of the common teazle. The nap is next cut off to an even surface. This was formerly done with a huge pair of shears; but, within a few years, it has most commonly been effected by a machine, the essential part of which is a spiral blade, that revolves in contact with another blade, while the cloth is stretched over a bed, or support, just near enough for the projecting filaments to be cut off at a uniform length, without injuring the main texture. Pressing and folding the cloth complete the whole process.

28. A great proportion of the woollen fabrics worn in the United States, are manufactured in families, part of which is sent to the clothiers to be dressed. Much cotton yarn, spun at the manufactories, is purchased for domestic use. Formerly, the raw material was procured, and spun into yarn on the *big wheel*. Coarse linens are also extensively manufactured in families, especially among the German population. [73]

29. The manufacture of cloth from wool was introduced into Britain by the Romans, some time in the Augustan age. At Winchester, they conducted the business on a scale sufficiently large to supply their army. After the Romans withdrew from the island, in the fifth century, the art was comparatively neglected, and gradually declined, until the reign of Edward III. This monarch invited into his dominions workmen from Flanders, in which country the manufacture had, for a long time, been in a flourishing condition.

30. Shortly after the first immigration of the Flemish manufacturers into England, an act was passed prohibiting the wearing of cloths made in any other country; and, in the time of Elizabeth, the manufacture had become so extensive, that the exportation of the raw material was forbidden by law.

31. It is supposed that there are now, in Great Britain, thirty millions of sheep; whose annual produce of wool is worth, on an average, about seven millions of pounds sterling; to this may be added five millions of pounds weight from foreign countries. This amount is increased in value, by manufacturing skill, to twenty or thirty millions of pounds. Not less than three millions of persons are supposed to be employed in this branch of British industry.

32. Both the woollen and cotton manufactures have arisen to great importance, of late years, in the United States; and, from the mechanical skill of our countrymen, the abundance of the raw material, and the vast amount of water-power, there is every reason to anticipate a rapid and continual increase in these divisions of American enterprise. [74]

THE SILK-WORM.

1. Silk is the production of a worm, of the caterpillar species, which, in due course, passes through several transformations, and at length becomes a butterfly, like others of the genus. It is produced from an egg, and when about to die, or rather again to change its form, spins for itself an envelope, called a *cocoon*. The worm then changes to a chrysalis, and, after remaining in this state from 5 to 8 days, the butterfly, or moth, comes out, forcing its way through the cocoon. The moths, or butterflies, eat nothing, and die as soon as they have provided for the propagation of their species. Enough of these are suffered to come to maturity, to provide a sufficient stock of eggs. The rest are killed, in a few days after they have spun their task, either by heating them in an oven, or by exposing them to the rays of the sun.

2. The fibres are wound upon a reel. To render this practicable, the cocoons are put into water heated to a suitable temperature, which dissolves the gummy substance that holds the fibres together. A number of threads being detached, and passed through a hole in an iron bar, form, by the aid of the remaining glutinous matter, one thread, which is wound upon a reel into skeins.

3. The raw silk, thus produced and prepared, is sold to the manufacturers, who twist and double the fibres variously, and finally form them into threads for sewing; or weave them into a great

variety of fabrics, which are too well known to need particular description here.

4. According to the ancients, the silk-worm was originally a native of China, and the neighboring parts of Asia, and had there been domesticated for a long time, before it was known in Europe. For many years after silk was sold among the nations of the West, even the merchants were ignorant of both the manner and place of its production. [75]

5. The Greeks became acquainted with silk, soon after the time of Alexander the Great; and the Romans knew little of the article, until the reign of Augustus. Dresses, composed entirely of this material, were seldom worn; but the fabrics which had been closely woven in the East, were unravelled, and the threads were recomposed in a looser texture, intermixed with linen or woollen yarn.

6. The prodigal Hehogabalus is said to have been the first individual, in the Roman empire, who wore a robe of pure silk. It is also stated, that the Emperor Aurelian refused his wife a garment of this description, on account of its exorbitant price. At that time, as well as at previous periods, it usually sold for its weight in gold.

7. A kind of gauze, originally made by the women on the island of Cos, was very celebrated. It was dyed purple, with the substance usually employed in communicating that colour in those days; but this was done before it was woven, as in that state it was too frail to admit of the process. Habits, made of this kind of stuff, were denominated "dresses of glass:" because the body could be seen through them.

8. The Roman empire had been supplied with silk through the medium of the Persians, until the time of Justinian, in the year 555. This emperor, having become indignant at the rapacity of the silk-merchants, determined, if possible, to supply his people from the insect itself.

9. After many unsuccessful attempts, he at length obtained a small quantity of the eggs from India, by the assistance of two Persian monks, who had contrived to conceal them in the hollow of their canes. The seeds of the mulberry-tree, on the leaves of which the worm feeds, were also procured at the same time, together with instructions necessary for the management of the worms. [76]

10. For six hundred years after the period just mentioned, the rearing of these worms, in Europe, was confined to the Greek empire; but, in the twelfth century, Roger, king of Sicily, introduced it into that island, whence it gradually spread into Italy, Spain, France, and other European countries.

11. The silk-worm was introduced into England by James the First; but it has never succeeded well in that country, on account of the dampness and coldness of the climate. The manufacture of fabrics from silk, however, is there very extensive, the raw material being obtained, chiefly, from Bengal and Italy. In the latter of these countries, in France, and other parts of Europe, as well as in Asia, the manufacture is also extensive.

12. Some attention has been paid to the rearing of silk-worms in the United States, and attempts have been made to introduce the manufacture of silks. The mulberry has been planted in various parts of the Union; and it is highly probable, that, in a few years, we shall be able to obtain excellent silks, without sending for them to foreign countries.



THE DYER, AND THE CALICO-PRINTER.

THE DYER.

1. The art of dyeing consists in impregnating flexible fibres with any color which may be desired, in such a manner, that it will remain permanent, under the common exposures to which it may be liable.

2. The union of the coloring matter with the fibres receiving the dye, is purely chemical, and not mechanical, as in the case of the application of paints. Wool has the greatest attraction for coloring substances; silk comes next to it; then cotton; and, lastly, hemp and flax. These materials, also, absorb dye-stuffs in different proportions.

3. Previous to the application of the dye, the greasy substance which covers the fibres of wool, and the gluey matter on those of silk, are removed by some kind of alkali. Their natural color is, also, discharged by the fumes of sulphur. The resinous matter and natural color of cotton and linen, are removed by bleaching. [78]

4. The materials used in dyeing are divided into two classes—*substantive* and *adjective*. The former communicates durable tints without the aid of any other substance previously applied; the latter requires the intervention of some agent which possesses an attraction for both the coloring matter and the stuff to be dyed, in order to make the color permanent. The substances used for this purpose are usually termed *mordants*.

5. Agents capable of acting in some way as mordants, are very numerous; but *alumina*, *alum*, the *sulphate* or *acetate of iron*, the *muriate of tin*, and *nut-galls*, are principally employed. The mordant not only fixes the color, but, in many cases, alters and improves the tints. It is always dissolved in water, in which the stuffs are immersed, previous to the application of the dye. Dyeing substances are also very numerous; but a few of the most important have, in practice, taken precedence of the others.

6. Blue, red, yellow, and black, are the chief colors, for which appropriate coloring substances are applied; but, by a judicious combination of these same materials, and by a proper application of mordants, intermediate hues of every shade are produced; thus, a green is communicated by forming a blue ground of indigo, and then adding a yellow by means of quercitron bark.

7. The *blue dye* is made of indigo; the *red dye*, of madder, cochineal, archil, Brazil-wood, or safflowers; the *yellow dye*, of quercitron bark, turmeric, hickory, weld, fustic, or saffron; the *black dye*, of the oxide of iron combined with logwood, or the bark of the common red, or soft maple, and the sulphate or acetate of iron. The dyes made of some of these substances require the aid of mordants, and those from others do not. [79]

8. In communicating the intermediate hues, the different dye-stuffs forming the leading colors, are sometimes mixed; and, at other times, they are made into separate dyes, and applied in succession.

9. In this country, the business of the dyer is often united with that of the clothier; but, where the amount of business will justify it, as in manufactories, and in cities or large towns, it is a separate business. The dyers sometimes confine their attention to particular branches. Some dye wool only or silk, while others confine themselves to certain colors, such as scarlet and blue. The principal profits of the dyer, when unconnected with manufacturing establishments, arise from dyeing garments or stuffs which have been partly worn.

10. The origin of the art of dyeing is involved in great obscurity, as the ancients have not furnished even a fable, which might guide us in our researches. It is evident, however, that the art must have made considerable progress, long before authentic history begins. Moses speaks of stuffs dyed blue, purple, and scarlet, and of sheep-skins dyed red. The knowledge of the preparation of these colors, implies an advanced state of the art, at that early period.

11. Purple was the favorite color of the ancients, and appears to have been the first which was brought to a state of tolerable perfection. The discovery of the mode of communicating it, is stated to have been accidental. A shepherd's dog, while on the sea-shore, incited by hunger, broke a shell, the contents of which stained his mouth with a beautiful purple; and the circumstance suggested the application of the shell-fish, as a coloring substance. This discovery is thought to have been made about fifteen hundred years before the advent of Christ. [80]

12. The Jews esteemed this color so highly, that they consecrated it especially to the service of the Deity, using it in stuffs for decorating the tabernacle, and for the sacred vestments of the high-priests. The Babylonians and other idolatrous nations clothed their idols in habits of purple, and even supposed this color capable of appeasing the wrath of the gods.

13. Among the heathen nations of antiquity generally, purple was appropriated to the use of kings and princes, to the exclusion of their subjects. In Rome, at a later period, purple habits were worn by the chief officers of the republic, and, at length, by the opulent, until the emperors reserved to themselves the distinguished privilege.

14. There were several kinds of shell-fish, from which this coloring substance was obtained, each of which communicated a shade somewhat different from the others. The kind collected near Tyre was the best; and hence the Tyrian purple acquired especial celebrity. So highly was it

esteemed by the Romans, in the time of Augustus, that wool imbued with this color was sold for one thousand denarii per pound, which, in our currency, amounts to one hundred and sixty-eight dollars.

15. After all, the boasted purple of antiquity is supposed to have been a very inferior dye, when compared with many which we now possess; and this is only one among many instances, wherein modern science has given us a decided superiority over the ancients.

16. The color, second in repute with the people of antiquity, was scarlet. This color was communicated by means of an insect, called *coccus*, and which is now denominated *kermes*. Besides the various hues of purple and scarlet, several others were in some degree of favor; such as green, orange, and blue. The use of vegetable dyes appears to have been but little known to the Romans; but the Gauls had the knowledge of imparting various colors, even the purple and scarlet, with the juice of certain herbs. [81]

17. The irruption of the northern barbarians into the Roman empire, destroyed this, with the rest of the arts of civilization, in the western parts of Europe; but, having been preserved, more or less, in the East, it was again revived in the West, principally by means of the intercourse arising from the Crusades.

18. Although indigo seems to have been known to the ancient Greeks and Romans, yet it does not appear to have been used for dyeing. The first that was applied to this purpose in Europe, was brought from India by the Dutch; but its general use was not established without much opposition from interested individuals. It was strictly prohibited in England, in the reign of Elizabeth, and, about the same time, in Saxony. Many valuable acquisitions were made to the materials employed in this art, on the discovery of America, among which may be enumerated, cochineal, logwood, Brazil-wood, and Nicaragua, together with the soft maple and quercitron barks.

19. The first book on the art of dyeing was published in 1429. This, of course, appeared in manuscript, as the art of printing had not then been discovered. An edition was printed in 1510. The authors to whom the world is most indebted for correct information on this subject, are Dufuy, Hallet, Macquir, and Berthollet, of France; and Henry and Bancroft, of England; all of whom wrote in the eighteenth century. [82]

THE CALICO-PRINTER.

1. Calico-printing is a combination of the arts of dyeing, engraving, and printing, wherewith colors are applied in definite figures. This art is applicable to woven fabrics, and chiefly to those of which the material is cotton.

2. The first object, after preparing the stuffs, as in dyeing, is to apply a *mordant* to those parts of the piece which are to receive the color. This is now usually done by means of a steel or copper cylinder, on which have been engraved the proposed figures, as on plates for copperplate-printing.

3. During the printing, the cylinder, in one part of its revolution, becomes charged with the mordant, the superfluous part of which is scraped off by a straight steel edge, leaving only the portion which fills the lines of the figures. As the cylinder revolves, the cloth comes into forcible contact with it, and receives the complete impression of the figures, in the pale color of the mordant.

4. The cloth, after having been washed and dried, is passed through the *coloring bath*, in which the parts previously printed, become permanently dyed with the intended color. Although the whole piece receives the dye, yet, by washing the cloth, and bleaching it on the grass in the open air, the color is discharged from those parts not impregnated with the mordant.

5. By the use of different mordants, successively applied, and a single dye, several colors are often communicated to the same piece of cloth; thus, if stripes are first made with the acetate of alumina, and then others with the acetate of iron, a coloring bath of madder will produce red and brown stripes. The same mordants, with a dye of quercitron bark, give yellow and olive or drab.

6. Sometimes, the second mordant is applied by means of engravings on wooden blocks. Cuts, designed for this purpose, are engraved on the *side* of the grain, and not on the *end*, like those for printing books. [83]

7. Calico-printing, so far as chemical affinities are concerned, is the same with dyeing. The difference consists, chiefly, in the mode of applying the materials, so as to communicate the desired tints and figures. The dye-stuffs, most commonly employed by calico-printers, are indigo, madder, and quercitron bark; by a dexterous application of these and the mordants, a great variety of colors can be produced. Indigo, being a substantive color, does not require the aid of mordants, but, like them, when other dyes are used, is applied directly to the cloth, sometimes by the engraved cylinder or block, and at others with the pencil by hand.

8. Calico-printing was practised in India twenty-two centuries ago, when Alexander the Great visited that country with his victorious army. The operation was then performed with a pencil. This method is still used in the East to the exclusion of every other. The art was also practised in Egypt in Pliny's time.

9. Calicoes were first brought to England in the year 1631. They derive their name from the city of Calicut, whence they were first exported to Europe. This branch of business was introduced into London in the year 1676. Since that time, it has been encouraged by several acts of Parliament; but it never became extensive in England, until the introduction of machinery for spinning cotton. It is supposed, that the amount of cottons annually printed in the United States, cannot be less than twenty millions of yards.

[84]



THE HATTER.

1. The business, peculiar to the hatter, consists in making hats from the fur or hair of animals, by the process called *felt*ing. The hair of animals is the only material which can be firmly matted together in this way; yet, that of every animal is not suitable for this purpose. The fur of the beaver, the otter, the seal, the muskrat, the rabbit, the hare, the coney, and the nutria, together with the wool of the lama, sheep, and camel, are employed to the exclusion of almost every other.

2. The skin of all animals having fur, is covered with two kinds of hair; the one, long and coarse; the other, short, fine, and thickly set. The coarse hair is pulled out from the skin, by the aid of a shoe-knife, and thrown away, while the fine, which is the fur, is cut from it with one of a circular form, such as the saddlers and harness-makers use in cutting leather.

[85]

3. In the application of the materials, the first object of the hatter is to make the *body*. In the common three, four, and five dollar hats, the body is composed of the wool of the sheep; but, in those of greater value, it is usually made of the wool of the lama, and different kinds of cheap furs. In describing the process of making hats, one of the latter kind will be selected.

4. A sufficient quantity of the materials for the body is weighed out, and divided into two equal parts. One of these is placed on a table, or, as the hatters call it, a *hurl*. The individual hairs composing this portion, are separated, and lightly and regularly spread out into a proper form, by the vibrations of a bow-string, which is plucked with a wooden pin.

5. The fur is then carefully compressed with a flat piece of wicker-work, denominated a hatter's basket, and covered with a damp piece of linen cloth, in which it is afterwards folded, pressed, and worked, with the hands, until it becomes matted together into a *bat*. This bat is next folded over a triangular piece of paper, and formed into a conical cap.

6. When another bat has been made in the same way, from the other half of the materials, the two are put together to form one, which is then worked in the damp cloth as before, until it is much contracted and matted together. After this, having been conveyed to another room, it is rolled in a woollen cloth, pressed, rubbed, and worked, with the hands and a rolling-pin, around a kettle of hot water, into which it is often plunged during the operation, which is called *planking*.

7. In this way, the materials are consolidated into *felt*, and the body contracted to the proper size. The reason why the process just described produces this effect, may be found in the nature of the fibres themselves. Upon a close examination, it will be observed, that these are covered with little scales, or beards, which admit of motion in one direction, but retard it in the other. This peculiar formation causes them to interlock in such a way as to become closely matted together.

[86]

8. When the body has been dried, and shaved on the knee with a sharp knife, to free it from

projecting filaments, it is stiffened with gum-shellac dissolved in alcohol, and then steamed in a box, to cause the stiffening *to set*. It is now prepared for being *napped*.

9. The fur for the *nap* is prepared on the hurl, like the conical cap first described. In applying the nap to the body, the latter is wet with hot water, and *flakes* of the former are matted down upon it, by working it on the planks around the kettle. After three layers have been put on in this way, the cap is beaten, while wet, with sticks, to raise the nap, and then drawn over a cylindrical block, which gives it the general form of a hat.

10. The nap having been raised with a card, the hat is prepared to be colored. The dye is made, chiefly, of the extract of logwood, copperas, and verdigris. The hats, to the number of forty-eight or more, are hung upon a wheel by means of pegs, which pass through the centre of the blocks. This wheel can be turned, so as to keep one half of the hats alternately in the dye. After having been properly colored, they are taken from the blocks, washed, and dried.

11. The hat is now prepared for the *finisher*, who first whips up the nap with a ratan, and, after having rendered it pliable with steam, draws it over the *finishing block*. The fibres composing the nap, are properly disposed with a card and brush, and rendered smooth and glossy by means of a hot iron. The superfluous part of the rim is cut off with a blade, placed in a gauge. The hat is finished by adding suitable trimmings, the nature of which, and the mode of application, can be easily learned by examining different kinds of hats. [87]

12. Hats of various colors have been worn; but those most in use are black, white, and drab. The white hats, which are intended only for ladies and children, have a nap of rabbits' fur, selected from the white skins. Drab hats are also made of stuffs of the natural color, assorted for that purpose.

13. The value of hats depends, of course, upon the workmanship, and the cost of the materials used in the manufacture. So great is the difference in these respects, that their price ranges between seventy-five cents and fifteen dollars. The woollen bodies used by hatters are now often procured from persons, who devote their attention exclusively to their manufacture.

14. Several years ago, woollen cloths were made in England, by the process of felting; but, on trial, they were found to be deficient in firmness and durability. Since the year 1840, an American citizen has been manufacturing cloths by this method; but, whether they are liable to the objection just mentioned, is yet uncertain.

15. Some kind of covering for the head, either for defence or ornament, appears to have been usually worn in all ages and countries, where the inhabitants have made the least progress in the arts of civilized life.

16. The form, substance, and color, of this article of dress, have been exceedingly various in different ages, according to the circumstances or humor of the wearer. The ancient Persians wore turbans, similar to those of the modern Turks; and the nations inhabiting the Indian Peninsula, wore a kind of head-dress so large, that it divested the person of all proportion. [88]

17. The imperial turban is said to have been composed of a great many yards of muslin, twisted and formed into a shape nearly oval, and surmounted with a woollen cap, encircled with a radiated crown. The turban of the prime minister was smaller in its dimensions, but of greater altitude. The chief magi, on account of his superior eminence, wore a higher turban than those of the monarch and minister united. Those worn by the inferior magi, were regulated by the dignity of the stations which they held.

18. The Jewish people and the neighboring nations borrowed the turban from the Persians; but, at a later period, they very commonly adopted the cap which the Romans were accustomed to give to their slaves, on their manumission.

19. The ancient helmet, made of steel, brass, and sometimes of more costly materials, was worn as a piece of defensive armor in war, instead of the ordinary coverings, used while engaged in peaceful occupations.

20. Roman citizens went bare-headed, except upon occasions of sacred rites, games, and festivals; or when engaged in travelling or in war. They were accustomed, however, in the city, to throw over their head the lappet of their toga, as a screen from the wind or sun. The people of Scotland used to wear a kind of bonnet, as in some parts of that country they do at the present time; and the English, before the invention of felt hats, covered the head with knit caps and cloth hoods, and sometimes with hats made of thrummed silk.

21. The Chinese do not wear hats, but use a cap of peculiar structure, which the laws of civility will not allow them to put off in public. The form and material of this is varied with the change of the season. That used in summer is shaped like a cone, is made of a beautiful kind of mat, and lined with satin; to this is added, at the top, a large tuft of red silk, which falls all round to the lower part of the cap, and which fluctuates gracefully on all sides, while the wearer is in motion. The kind worn in winter is made of shaggy cloth, bordered with some kind of fur, and ornamented in a similar manner. [89]

22. Head-dresses, from their variety, simplicity, and mutability, were but little regulated by commercial or manufacturing interests, until the introduction of felt hats, which has occasioned a uniformity in this article of dress, unknown in former ages.

23. Curiosity is naturally excited to become acquainted with the particulars of the invention of the hat, and the subsequent stages of improvement in the manufacture. But the operation of individual interest, so generally connected with the useful arts, seems to have concealed the whole in obscurity; and little information on the subject can now be obtained.

24. The hatters have a tradition, that the art of felting originated with St. Clement, the fourth bishop of Rome. Under this impression, in Catholic countries, they adopt him as their patron saint, and hold an annual festival in his honor. The principle of felting is said to have been suggested to his mind by the following circumstance; while fleeing from his persecutors, his feet became blistered, and, to obtain relief, he placed wool between them and his sandals. On continuing his journey, the wool, by the perspiration, motion, and pressure of the feet, assumed a compact form.

25. Notwithstanding this tradition, it appears, that felt hats were invented at Paris, by a Swiss, about the commencement of the fifteenth century; but they were not generally known, until Charles the Seventh made his triumphal entry into Rouen, in the year 1492, when he astonished the people by wearing a hat, lined with red silk, and surmounted with a plume of feathers.

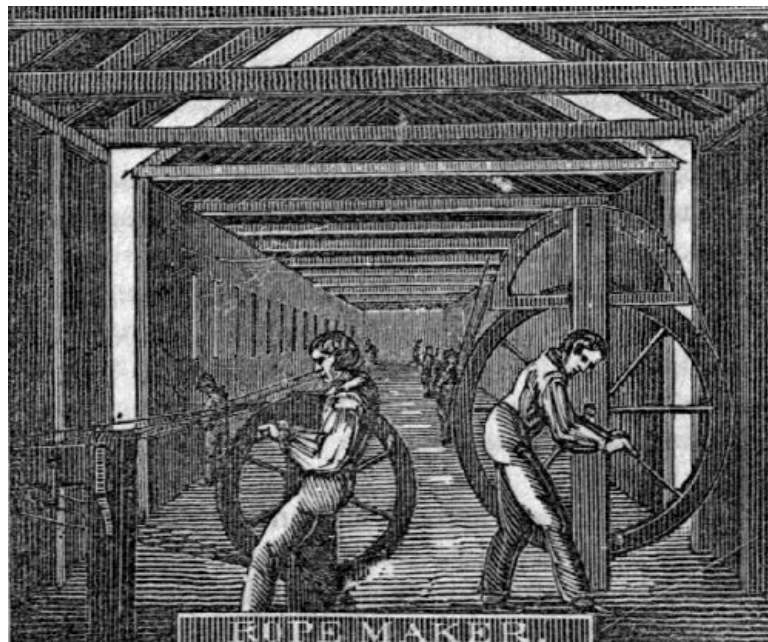
[90]

26. When some of the clergy first adopted this article of dress, it was considered an unwarrantable indulgence. Councils were held, and regulations published, forbidding any priest or monk to appear abroad wearing a hat; and enjoining them to keep to the use of chaperons, or hoods, made of black cloth, with decent cornets; if they were poor, they were, at least to have cornets fastened to their hats, upon penalty of suspension and excommunication.

27. At length, however, the pope permitted even the cardinals to wear hats; but, enjoined them to wear those of a red color at public ceremonies, in token of their readiness to spill their blood for their religion.

28. In England, considerable opposition was made to the use of the hat. By a statute, enacted in the thirteenth year of the reign of Elizabeth, every person between certain ages was obliged, on Sundays and holidays, to wear a woollen cap, made by some of the cappers of that kingdom, under the penalty of three shillings and four-pence for every day's neglect. This law continued in force, for about twenty-five years. The manufacture of hats was commenced, in England, in the time of Henry the Eighth, by Dutchmen and Spaniards.

29. Hats made of plaited straw, grass, or chip, are much used in the summer; and caps of cloth or fur are now frequently substituted for hats, in cold weather. Silk hats have also been much worn, since the year 1825. They are made of the common hat body, and a texture of silk with a long nap. The silk is fastened to the body with glue.



[91]

THE ROPE-MAKER.

1. Ropes may be made of any vegetable substance which has a fibre sufficiently flexible and tenacious. The Chinese and other orientals, in making ropes, use the ligneous parts of certain bamboos and reeds, the fibrous covering of the cocoa-nut, the filaments of the cotton pod, and the leaves of certain grasses; but the bark of plants and trees, is the most productive of fibrous matter suitable to this manufacture. That of the linden-tree, the willow, and the bramble is frequently used. In Europe and America, however, the fibres of hemp and flax are more

frequently employed, for this purpose, than any other material.

2. The operations of rope-making are commonly performed in *rope-walks*, which are sometimes more than a quarter of a mile in length. These are usually covered with a slight shed, the nature and appearance of which are well exhibited in the preceding picture. [92]

3. The first part of the process consists in spinning the material into yarn. The principle on which this is effected, is the same as that by which cotton or wool is drawn out and twisted into threads, although the machinery, and the mode of operating, are different.

4. The kind of wheel employed in spinning rope-yarn, is also exhibited in the cut. A band passes around the periphery, and over the semicircle above it, in which is placed a number of wheels, the pivots of which terminate, on the other side, in a small hook.

5. The spinner, having a quantity of the material properly disposed about the waist, attaches a number of fibres to one of the hooks, which, being put in motion by the band passing over the whirl, twists them rapidly into yarn. The part already twisted draws along with it more fibres from the bundle, and, as the spinner is regulating their uniform arrangement, he walks backward towards the other end of the walk.

6. When the thread has been spun to the proposed length, the spinner cries out to another, who immediately takes it off from the hook, gives it to a third person, and, in turn, attaches his own fibres to the same hook. In the meantime, the first spinner keeps fast hold of the end of his yarn, to prevent it from untwisting or doubling; and, as it is wound on the reel, proceeds up the walk, keeping the yarn of an equal tension throughout.

7. The second part of the process consists in forming the yarn into various kinds of ropes. The component parts of cordage are called strands; and the operation of uniting them with a permanent twist, is called *laying*, when applied to small ropes, and *closing*, when applied to cables or other large ropes. [93]

8. The simplest twist is formed of two strands. The thread used by sail-makers, and pack-thread, furnish examples of this kind; but cordage with two strands is not much used; that with three is the most usual. Lines and cords less than one and a half inches in circumference, are laid by means of the spinning-wheel. Preparatory to this operation, the workman fastens the hither end of the yarns to separate whirl-hooks, and the remote ends to the hook of a swivel, called the *loper*.

9. The strands having been properly distended, the spinning-wheel is turned in the same direction as when twisting the yarns. A further twisting of the strands, during this part of the process, is prevented by the motion of the loper, which gives way to the strain, and, at the same time, causes the strands to entwine about each other, and form a cord. To prevent them from entwining too rapidly, an instrument is interposed, which, from its form, is called the *top*. It has two or more notches, which terminate at the apex, and a handle, called a *staff*. As the top is moved from the loper to the wheel, it regulates the degree of twist which the cord or rope is to receive.

10. The principle on which large cordage is laid, or closed, is the same, although some part of the machinery is different. The strands for large ropes and cables are formed of many yarns, and require considerable *hardening*. This cannot be done with whirls driven by a wheel-band; it requires the power of a crank, turned by hand, or by some other considerable force. The strands, also, when properly hardened, become very stiff, and, when bent round the top, cannot transmit force enough to close the unpliant rope: it is, therefore, necessary that the loper, also, be moved by a crank. [94]

11. Cordage, which is to be exposed to the alternate action of air and water, is usually tarred. The application of this substance is made, in most cases, while the material is in a state of yarn. In effecting this object, the threads are drawn through boiling tar, and then passed between rollers, or through holes surrounded with oakum, to remove the superfluous tar. In like manner, ropes and cables are superficially tarred.

12. Various improvements have been made in the machinery, for performing the different operations of rope-making; but, these not having been generally adopted, it is unnecessary to notice them more particularly; especially, as they do not affect the general principles of the art.

13. Within a few years, cotton-yarn has been employed in the manufacture of ropes; but this material has not yet been sufficiently tested, to determine its fitness for the purpose. A kind of vegetable fibre, brought from Manilla, and hence called Manilla hemp, is very extensively applied in making ropes, and, for some purposes, is preferred to other materials.

14. The intestines of animals are composed of very powerful fibres, and those of sheep and lambs are manufactured into what is called *cat-gut*, for the use of musical instrument-makers, hatters, watch-makers, and a variety of other artificers. Animal hair, as that from the tail and mane of horses, is frequently employed as the material for ropes; and such are durable, elastic, and impervious to moisture. They, however, are not applicable in cases, where the rope is subject to considerable friction.

15. Hemp is cultivated in various parts of the world, and especially in Russia, whence it is exported to other countries in great quantities. It is also produced, to a considerable extent, in the state of Kentucky, and in many other parts of the United States. Flax is still more generally [95]

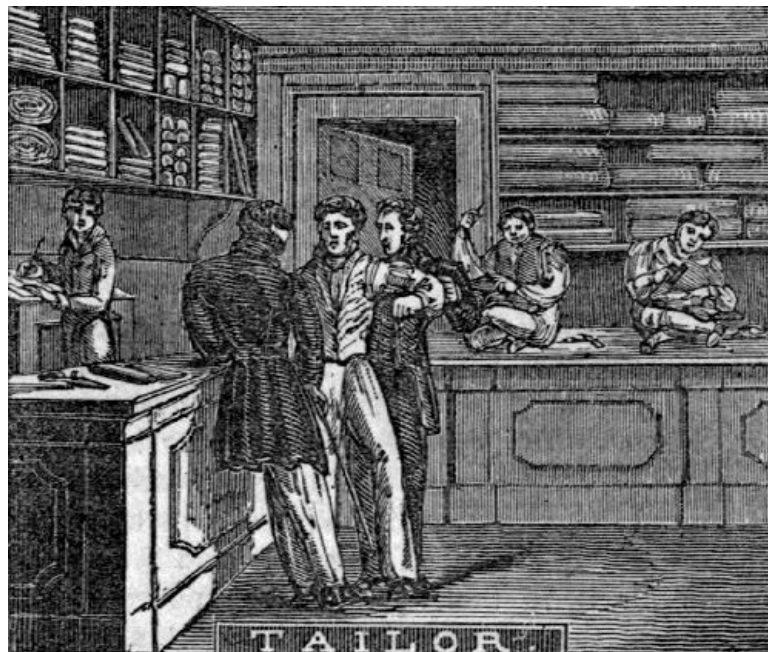
cultivated than hemp; but its chief application is to the manufacture of cloth, as it does not answer well for any cordage larger than a bed-cord. The formation of cloth from hemp is also very common; and, in this case, the yarn for the coarse cloths is spun on the rope-maker's wheel in the manner already described. The cloth is generally used for making bags, sacking-bottoms for beds, and sails for vessels.

16. Rope-making is a manufacture of general utility, as cordage of some kind is used more or less in every family in all civilized communities; nor are there many trades capable of being carried on, with convenience, without it. But the great utility of cordage, in all its varieties, is most conspicuous in the rigging and equipment of vessels; and the extensive demand for it, in this application, renders rope-making one of the most important and extensive of the primitive trades.

17. Nor does the utility of cordage end with its application to the purposes for which it was originally designed. Old ropes are converted into oakum by untwisting and picking them to pieces. The oakum thus produced is driven into the seams of vessels, to render them water-tight.

18. As regards the invention of this art, nothing can be gathered from ancient records. We only know, in general, that cordage was in considerable use among the nations of antiquity, especially among the Greeks and Romans, who probably learned its application to rigging vessels from the Phœnicians.

[96]



THE TAILOR.

1. The business of the tailor consists, principally, in cutting out and making clothes for men and boys, together with habits and cloaks for ladies. It is usual for persons who carry on this business in cities and large towns, to keep a stock of cloths and other stuffs adapted to the season, which they make up into garments to the order of customers. In such cases, they are termed *merchant tailors*.

2. The operation, preparatory to cutting out the cloth for a garment, is that of taking the measure of the person for whom it is designed. This is done with a narrow strip of paper or parchment, and the dimensions are either marked on the measure with the scissors, or entered in a *pattern-book* kept for the purpose.

[97]

3. The cloth is cut to the proper shape, with a large pair of shears. This is performed either by the individual who carries on the business, or by a foreman. The parts are sewed together, and the trimmings applied, by means of thread and silk; this is commonly done by those who devote their attention to this branch of the trade. It sometimes happens, however, that the same person performs the whole of the work, particularly in country places, where the business is very limited in extent.

4. Females often serve an apprenticeship to this business. Many of them learn to cut out, and make with skill, certain kinds of garments, and are after wards employed in families, or by the tailors. Most of the ready-made clothing, kept for sale in cities, is made up by females.

5. The instruments employed in performing the operations of the tailor, are few and simple; the principal of these are the shears, the scissors, the needle, the thimble, the bodkin, the goose, and the press-board.

6. The great art of a master tailor consists in fitting the dress to his customer, in such a manner as to conceal any defect of form, and display his person to the best advantage. He should, therefore, be a good judge of the human figure; as, from this knowledge, arises, chiefly, the superiority of one workman over another in this branch of the business.

7. The first hint on the art of clothing the human body, was given to man by the Deity himself; for we read in the Scriptures, that "Unto Adam and to his wife, the Lord God made coats of skins, and clothed them." From that time to the present, the art of cutting out garments, and of sewing their different parts together, has been practised, more or less, in every place, where there has been any degree of civilization. [98]

8. For a long time, it is probable, that thongs and the sinews of animals were used, for want of thread made of silk or vegetable fibre; and, doubtless, the same necessity caused the substitution of pointed bones and thorns, instead of needles. Such rude materials and instruments are still employed for similar purposes by savage nations. The dresses of the people of Greenland are sewed together with thongs made of the intestines of the seal, or of some fish, which they have the skill to cut fine, after having dried them in the air; and even the inhabitants of Peru, although considerably advanced in civilization, when that country was first visited by the Spaniards, made use of long thorns, in sewing and fixing their clothes.

9. We have no means of determining the period of the world, when this art was first practised, as a particular profession. We know, in general, that the dress of the ancients was usually more simple in its construction than that of the people of modern times; and, consequently, it required less skill to put the materials in the required form. It may, therefore, be inferred, that either the females or the slaves of each family usually made up the clothing of all its members.

10. The distinguishing dress of the Romans was the *toga*, or gown; as that of the Greeks was the *pallium*, or cloak. The toga was a loose, woollen robe, and covered nearly the whole person; it was round and close at the bottom, and open at the top, having no sleeves, but a large flap, or lappet, which was either thrown over the left shoulder, or over the head, to protect it from the heat or cold.

11. The Romans, at an early period of their history, used no other dress, and it was also, at that time, worn by the women. Afterwards, they wore, under the toga, a white woollen vest called *tunica*, which extended a little below the knee. At first it was without sleeves. Tunics, reaching to the ancles, or having sleeves, were reckoned effeminate; but, under the emperors, they became fashionable. [99]

12. The toga was usually assumed at the age of seventeen. Until then, the youth wore a kind of gown, bordered with purple, denominated *toga prætecta*; and such a garment was also worn by females, until they were married. The youthful dress was laid aside, and the *toga virilis*, or manly toga, assumed with great solemnity; as, by this act, the individual assumed the responsibilities of a citizen. The toga was worn chiefly in the city, and only by Roman citizens.



THE MILLINER, AND THE LADY'S DRESS-MAKER.

THE MILLINER.

1. The milliner is one who manufactures and repairs bonnets and hats for ladies and children. Her business requires the use of pasteboard, wire, buckram, silks, satins, muslins, ribands, artificial flowers, spangles, and other materials too numerous to be mentioned.

2. The first part of the process of making a hat, or bonnet, consists in forming a crown of buckram; which operation is performed on a block of suitable size and shape; and to this is applied pasteboard, or buckram, edged with wire, to form the front part. The foundation having been thus laid, it is usually covered and lined with some of the materials just enumerated, and finished by applying to it the trimmings required by the fashion, or by the individual customer. [101]

3. Ladies' hats are also made of rye straw, and a kind of grass, which grows in Italy; those made of the latter material are called *Leghorns*, from the name of the city, in or near which they are principally made. A few years since, these had almost superseded those made of straw; but the latter, of late, have nearly regained their former ascendancy.

4. In the United States, and likewise in various parts of Europe, there are several establishments for making straw hats, in which the proprietors employ females to perform the whole labor. The straw is first cut into several pieces, so as to leave out the joints, and then whitened by smoking them with the fumes of brimstone. They are next split longitudinally into several pieces by a simple machine, and afterwards plaited with the fingers and thumbs. The braid, or plait, thus produced, is sewn together to form hats adapted to the prevailing fashion.

5. Great quantities of straw are, also, plaited in families, especially in the New-England states, and sold to neighboring merchants, who, in turn, dispose of it to those who form it into hats. The milliners usually keep a supply of Leghorn and straw hats, which they line and trim according to the fancy of their customers.

6. Head-dresses were probably used nearly as early as any other part of dress; and their form and material have likewise been equally variable. In the early days of Rome, the head-dress of the women of that city was very simple; and, when they went abroad, which was seldom, they covered their faces with a veil; but, when riches and luxury had increased, dress became, with many, the principal object of attention; hence, a woman's toilet and ornaments were called her *world*. [102]

7. The head-dresses of the ladies, in various parts of Europe, especially in the eighteenth century, were particularly extravagant, being sometimes so high, that the face seemed to be nearly in the centre of the body. In 1714, this fashion was at its height in France; but two English ladies visiting the court of Versailles, introduced the low head-dresses of their own country.

8. The high head-dresses had no sooner fallen into disuse in France, than they were adopted in England, and even carried to a greater degree of extravagance. To build one of these elevated structures in the fashionable style, both the barber and milliner were necessary. The head-dresses of the ladies of the present age, are characterized by great simplicity, when compared with those of several periods in preceding ages.

THE LADY'S DRESS-MAKER.

1. This business is nearly allied to the foregoing, and is, therefore, often carried on in conjunction with it. This is especially the case in villages and small towns, where sufficient business cannot be obtained in the exclusive pursuit of one branch.

2. The customers of the lady's dress-maker are not always easily pleased, as they frequently expect more from her skill than it is possible to accomplish. She, however, can do much towards concealing the defects of nature; and, by padding and other means, can sometimes render the person tolerably well proportioned, when, in its natural shape, it would be quite inelegant. It is to be regretted, however, that dress-makers are guided by fashion and whim in moulding the external form of females, rather than by the best specimens of the human figure, as exhibited by eminent painters and sculptors.

3. The dress-maker should have some acquaintance with the anatomy and functions of those parts to which pressure is usually applied; for, who that knows the structure, size, and office of the liver, and other internal organs of digestion and vitality, would venture to apply to them a compressive force calculated to interfere most seriously, if not dangerously, with their healthful action? [103]

4. The fashions for ladies' dresses are chiefly procured from France, and the dress-makers from that country are, therefore, often preferred by fashionable ladies. Sometimes, however, a dress-maker, having a name with a French termination, will answer the purpose.

5. Corset-making is frequently a separate branch of business; but corsets have become less necessary; inasmuch as small waists are less admired by the gentlemen than formerly. On this account, also, the ladies have discovered that tight lacing is somewhat uncomfortable, especially in hot weather, and in crowded assemblies.



THE BARBER.

1. It is the business of the barber to cut and dress the hair, to make wigs and false curls, and to shave the beards of other men. In ancient times, he used also to trim the nails; and even at the present day, in Turkey, this is a part of his employment.

2. The period, when men began to shave their beards, is not certainly known. It appears that the practice was common among the Israelites in the time of Moses; as that legislator has left on record a prohibitory law concerning it. They probably borrowed the custom from the Egyptians. It is stated by Plutarch, that Alexander the Great ordered his men to be shaved, that their enemies might not lay hold of their beards in time of battle. Before this time, however, many of the Greeks shaved their beards.

[105]

3. The practice does not appear to have been introduced amongst the ancient Romans, until about the year 296 before the Christian era, when Paulus Ticinius Mænas brought to Rome a number of barbers from Sicily. Scipio Africanus was the first man who shaved his beard every day.

4. At first, the barbers had no shops, but shaved their customers at the corners of the streets. After a while, they followed their vocation in shops, or shades; and, at this period, it was customary for females to officiate in the various branches of the art. These places, however, were frequented only by the poorer class of the people, as opulent families generally kept slaves for the performance of these duties. The day on which a young Roman first cut off his beard, was celebrated by him and his friends as one of peculiar interest; and this much-desired indication of manhood was consecrated to some one of the gods, generally to Jupiter Capitolinus.

5. The return of barbarism, in the fifth and sixth centuries, banished this custom from the Western empire; nor was it again revived in Europe, until the seventeenth century. During the reigns of Louis XIII. and Louis XIV. of France, both of whom ascended the throne in boyhood, the courtiers and fashionable people began to use the razor, that they might appear with smooth chins, and thus resemble, in this particular, the youthful monarchs. From France, the fashion, at length, spread all over Europe. At one time, in the reign of the English queen Elizabeth, the fellows of Lincoln's Inn were compelled by statute to shave their beards, at least, once in two weeks. Omission was punished with fine, loss of commons, and finally with expulsion.

6. The custom of shaving was introduced into Russia by Peter the Great, who compelled his subjects to pay a tax for the privilege of retaining their beards. This singular impost was exceedingly unpopular, and excited greater complaints amongst the people than any other measure of that emperor. The decree was rigidly enforced, and every one who would not, or could not, pay the tax, was forcibly deprived of this favorite ornament, if he would not remove it voluntarily. Some of the people saved the sad trimmings of their chins; and, that they might never be entirely separated from these precious relics, ordered that they should be deposited with their bodies in their coffins.

[106]

7. Among the European nations that have been curious in whiskers, the Spaniards have been particularly distinguished; and the loss of honor among them used to be punished by depriving the individual of his whiskers.

8. The Portuguese were but little, if at all, behind the Spaniards in their estimate of these valuable ornaments. As an evidence of this, it is stated, that, in the reign of Catharine, Queen of Portugal, the brave John de Castro, having taken the castle of Diu in India, and being afterwards in want of money, applied to the inhabitants of Goa to loan him one thousand piastres, and, as

security for that sum, sent them one of his whiskers, telling them that "All the gold in the world cannot equal the value of this natural ornament of my valor." The people, in admiration of his magnanimity, sent him the money, and, at the same time, returned his incomparable whisker.

9. In the reign of Louis XIII. of France, whiskers attained the highest degree of favor. They also continued in fashion during the early part of the succeeding reign. Louis XIV. and the great men of France, took a pride in wearing them. It was no uncommon thing, at that time, for the ladies to comb and dress the whiskers of their beaux; and the men of fashion were particular in providing whisker-wax, and every article necessary to this agreeable pastime. [107]

10. The whiskers belonging to the image of the Chinese philosopher Confucius, which is preserved by his countrymen, are supposed to be capable of conferring upon those who might wear them, a portion of the wisdom and manly beauty of that illustrious sage. Great care, however, is taken that none shall enjoy these great personal qualifications by such easy means; as decapitation is the penalty for plucking the whiskers from the position which they occupy.

11. When the practice of shaving off the beard was again revived in Europe, instrumental music was employed in the barber's shop, to amuse customers waiting their turn; but, at the present time, newspapers are furnished for this purpose. In taking off the beard, soft water, good soap, a brush, and a sharp razor, are the usual requisites. The razor should be placed nearly flat on the face, and be moved from point to heel. Barbers have usually some regular customers, many of whom have a box of soap and a brush appropriated to their individual use.

12. In ancient times, great attention was paid to dressing the hair. The Hebrew women plaited, and afterwards confined it with gold and silver pins; they also adorned it with precious stones. The Greeks, both male and female, at every period of their ancient history, wore long hair, which they usually permitted to hang gracefully upon the shoulders, back, and sometimes upon the breast.

13. Adult males, among the Romans, usually wore their hair short, and dressed with great care, especially in later ages, when attention to this part of the person was carried to such excess, that ointments and perfumes were used even in the army. The hair was cut for the first time, when the boy had attained his seventh year, and the second time, when he was fourteen years old. His locks, at each cutting, were commonly dedicated to Apollo or Bacchus. [108]

14. Both men and women, among the Greeks and Romans, sometimes permitted their hair to grow in honor of some divinity. The Jews, also, when under the vow of a Nazarite, were not permitted to trim their hair or beards. In grief and mourning, the Romans suffered their hair and beards to grow. The Greeks, on the contrary, when in grief, cut their hair and shaved their beards, as likewise did some of the barbarous nations of early time.

15. Artificial hair began to be fashionable, at an early period, and was used by the Greeks, Carthaginians, and Romans. In the time of Ovid, blond hair was in great favour at Rome; and those ladies who did not choose to wear wigs, powdered their hair with a kind of gold dust. They wore hanging curls all round the head, to which they were fastened with circular pins of silver. Every wealthy Roman lady of fashion kept at least one slave to frizzle and curl the hair.

16. The time, when wigs first came into use, cannot now be ascertained. It is certain, however, that they were worn by females a long time before they became fashionable among the men.

17. Wigs, perukes, or periwigs, were revived in the seventeenth century. In the reign of Louis XIII., or about the year 1629, they became fashionable at Paris; and, as that city was generally imitated by the rest of Europe in things of this nature, they soon became common. The wigs were very large, as may be seen by examining ancient portraits, and were covered with a profusion of hair-powder. At first, it was disreputable for young people to wear them, as the loss of the hair at an early age was attributed to a disease, which was, of itself, discreditable.

18. When wigs were first introduced into England, some of the clergy opposed them violently, considering their use more culpable than wearing long hair; since, as they alleged, it was more unnatural. Many preachers inveighed against wigs in their sermons, and cut their own hair shorter to manifest their abhorrence of the reigning mode. [109]

19. The worldly-wise, however, observed that a periwig procured for the wearer a degree of respect and deference which otherwise might not have been accorded; and hence there was a strong tendency to the use of this appendage. The judges and physicians, especially, understood well this influence of the wig, and gave to it all the advantages of length and breadth. The fashion, at length, was adopted by the ecclesiastics themselves, not only in England, but in most of the European kingdoms, as well as in the British colonies of America.

20. The fashion, however, except in cases of baldness, wherein alone it is excusable, is now nearly banished from Europe and America. This desirable change was effected principally by the example of republican America, and by the influence of the French Revolution. The law passed in England in 1795, imposing a tax of a guinea a head per annum on those who wore hair-powder, contributed to the same result, as well as to diminish the use of that article.

21. The manufacture of wigs and false curls is an important branch of the business of the barber. The first process in forming a wig is to produce, in the hair about to be used for this purpose, a disposition to curl. This is done by winding it on a cylinder of wood or earth, and afterwards boiling it in water. It is then dried, and baked in an oven. Thus prepared, it is woven on a strong

thread, and is subsequently sewn on a caul fitted to the head. False curls are made on the same principle.

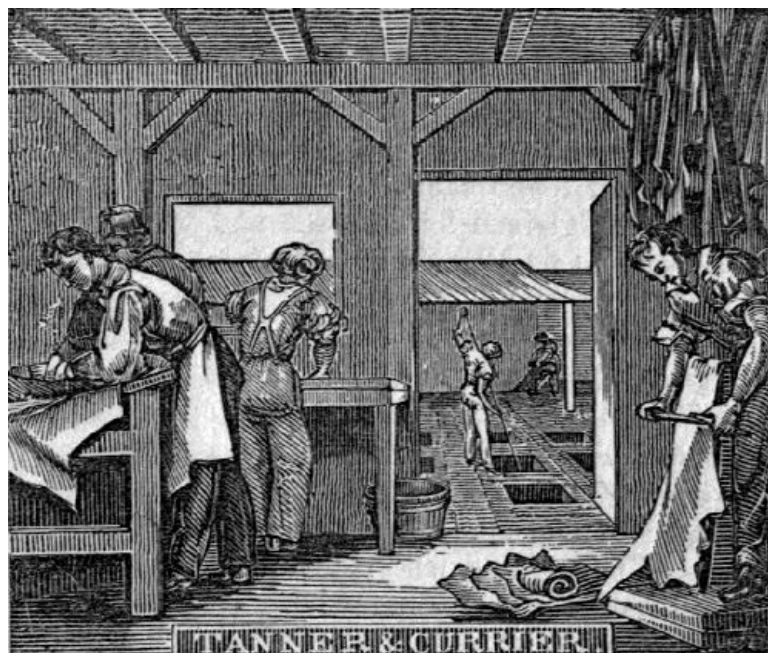
22. Wigs and false curls were not made in ancient times precisely in the same manner; although their appearance, when finished, was probably similar. The hair was then attached directly to a piece of thin leather, by means of some adhesive substance, or composition. [110]

23. Many barbers, especially those who have a reputation for making wigs and false curls in a fashionable style, keep for sale perfumery, as well as a variety of cosmetics.

24. From the eleventh to the eighteenth century, surgical operations were almost exclusively performed by the barbers and bath-keepers. As phlebotomy was one of the chief sources of profit to the barbers, they adopted a sign emblematical of this operation. It consisted of a pole, representing the staff which the individual held in his hand, while the blood was flowing from the arm. The white band wound spirally about the pole, represented the fillet of linen with which the arm was afterwards secured.

25. It is hardly necessary to remark, that the same sign is still employed by the barbers; although, with a few exceptions, they have ceased to perform the operation of which it was significant.

[111]



THE TANNER, AND THE CURRIER.

THE TANNER.

1. The art of tanning consists in converting hides and skins into leather, by impregnating them with astringent matter.

2. It is impossible to determine the period at which the art of tanning was discovered. It was doubtless known to the ancients, and probably to the antediluvians, in some degree of perfection; since skins were applied as means of clothing the human body, before the arts of spinning and weaving were practised. It is likely, however, that they were applied to this purpose, for a considerable time, in their natural state; and that accident, at length, suggested the means of rendering them more applicable, by saturating them with certain mineral or vegetable substances.

3. Although the art of converting skins into leather was practised in remote ages, yet it was not until near the end of the eighteenth century, that the true principle of the process was understood. Before this time, it was supposed, that the astringent principle of the agents employed, was a resinous substance, which adhered mechanically to the fibres, and thus rendered them firm and insoluble. The correct explanation was first given by Deyeux, and afterwards more fully developed by M. Seguin. These chemists clearly proved, that the formation of leather was the result of a chemical union between a substance called tannin, and the gelatinous part of the skin. [112]

4. The subject, however, was not thoroughly understood, and reduced to scientific principles, until the year 1803, when Sir Humphrey Davy gave it a careful investigation, in a series of chemical experiments. These inquiries resulted in the conviction, that the method of tanning

which had been in general use, may, with a few alterations, be considered preferable to that by which the process is carried on with more rapidity.

5. The skin which envelopes the bodies of animals, consists of three layers. That on the outside is a thin, white, elastic membrane, called the *cuticle*, or *scarf skin*; that on the inside is a strong membrane, denominated the *cutis*, or *true skin*; between these two is a very thin membrane, to which anatomists have given the name *rete mucosum*, and in which is situated the substance which gives color to the animal. The cutis is composed of fibres, which run in every direction, and, being by far the thickest layer, is the one that is converted into leather.

6. The skins of large animals, such as those of the ox and horse, are denominated hides; and those of smaller animals, as of the calf, goat, and sheep, are called skins. Of the former description, is made thick, of the latter, thin leather. The process of tanning different skins varies in many particulars, according to the nature of the leather, and the uses to which it is to be applied. [113]

7. The general process of changing thick hides into sole-leather, is as follows: They are first soaked in water, to free them from dirt and blood; and then, if rigid, they are beaten and rubbed, or rolled under a large stone, to render them pliable. They are next soaked in lime-water, or hung up in a warm room, and smoked, until a slight putrescency takes place. The hair, cuticle, rete mucosum, on one side, and the fleshy parts on the other, are then scraped off, on a *beam*, with a circular knife.

8. Nothing now remains but the cutis, or true skin. Several hides, in this state of preparation, are put together into a vat, for the purpose of impregnating them with tannin. This substance is found in astringent vegetables, and is obtained, in a proper state for application, by infusion in water. In that condition, it is called *ooze*, which is first applied in a weak state.

9. After the ooze, of different degrees of strength, has been renewed several times, they are put between layers of bark, and suffered to remain several months, fresh bark, from time to time, being supplied. The whole process generally occupies from twelve to sixteen months. When strong solutions of tannin are used, the leather is formed in a much shorter time; but, in that case, it is much more rigid, and more liable to crack. It is rendered smooth and compact, by beating it with a wooden beetle, or by passing it between rollers.

10. Oak bark, on account of its cheapness, and the quantity of tannin which it contains, is more extensively employed by tanners than any other vegetable substance. In sections of country, where this kind cannot be conveniently obtained, the bark of the hemlock, spruce, and chestnut, the leaves of the sumach, and various other astringents, are substituted. [114]

11. The process of tanning calf-skins is somewhat different in many of its details. They are first put into a solution of lime, where they remain during ten or fifteen days, and are then scraped on both sides on the beam, with a circular knife, as in the former case, and for the same purpose. They are then washed in water, and afterwards immersed in an infusion of hen or pigeon's dung. Here they are left for a week or ten days, according to the state of the weather and other circumstances; during which time, they are frequently *handled*, and scraped on both sides. By these means, the lime, oil, and saponaceous matter, are discharged, and the skin is rendered pliable.

12. They are next put into a vat containing weak ooze, and afterwards removed to several others of regularly increasing strength. In the mean time, they are taken up and handled every day, that they may be equally acted upon by the tanning principle. The time occupied in the whole process, is from two to six months. The light and thin sorts of hides, designed for upper leather, harnesses, &c., are treated in a similar manner.

13. The tanner procures his hides and skins from various sources, but chiefly from the butcher, and from individuals who kill the animals for their own consumption. Great quantities of dry hides are also obtained from South America, where cattle are killed in great numbers, principally for the sake of this valuable envelope of their bodies.

THE CURRIER.

1. It is the business of the currier to dress the thinner kinds of leather. In most cases, in the United States, except in and near large cities, the business of tanning and currying are usually united in the same individual; or, at least, the two branches of business are carried on together, by the aid of workmen, skilled in their respective trades. [115]

2. The mode of dressing the different kinds of skins, varies in some respects; but, as the general method of operating is the same in every sort, a description applicable in one case will convey a sufficiently accurate idea of the whole. We shall, therefore, select the calf-skin, since it is more frequently the subject of the currier's skill than any other.

3. The skin is first soaked in water, until it has become sufficiently soft, and then shaved with the *currier's knife*, on the inner side, over the *currier's beam*. It is then placed on a table, somewhat inclined from the workman, and scoured on both sides with the edge of a narrow, smooth stone, set in a handle, and again, with an iron *sleeker* of a similar shape. The skin is next *stuffed* with a composition of tallow and tanner's oil, on the flesh side, and then hung up to dry. Afterwards it is rubbed on the hair side with a board, and again scraped on the flesh side with the knife. Having

been thus prepared, the skin is blacked on the flesh side with lampblack and tanner's oil, and subsequently rubbed with paste, applied with a brush. When it has been dried, the whole process is finished by rubbing both sides with a glass sleeker.

4. Horse hides are blacked on the hair side, or, as the curriers term it, on the *grain*, with a solution of copperas water. Leather designed for harnesses, for covering carriages, and for other similar purposes, is also blacked on that side in the same manner.

5. The trade of the currier is divided into two or three branches. Some dress only calf-skins and other thick leather designed for shoes, harnesses, and carriages; others confine themselves to dressing skins, which are to be applied to binding books, and to other purposes requiring thin leather. It may be well to remark here, that the dressers of thin leather usually tan the skins themselves, using the leaves of sumach, instead of bark.

[116]



THE SHOE AND BOOT MAKER.

1. As the shoe is an article of primary utility, it was used, more or less, in the earliest ages. Some writers suppose, that the Deity, in clothing man with skins, did not leave him to go barefooted, but gave him shoes of the same material.

2. The shoes of the ancient Egyptians were made of the papyrus. The Chinese, as well as the inhabitants of India, and some other nations of antiquity, manufactured them from silk, rushes, linen, wood, the bark of trees, iron, brass, silver, and gold, and sometimes ornamented them with precious stones.

3. The Romans had various coverings for the feet, the chief of which were the *calceus* and the *solea*. The calceus somewhat resembled the shoe we wear at present, and was tied upon the instep with a latchet or lace. The solea, or sandal, was a thick cork sole, covered above and beneath with leather, and neatly stitched on the edge. It left the upper part of the foot bare, and was fastened to it by means of straps, which were crossed over the instep, and wound about the ankle. Roman citizens wore the calceus with the toga, when they went abroad in the city, while the solea was worn at home and on journeys. The solea was also used at entertainments; but it was changed for the calceus, when the guests were about to surround the table.

[117]

4. The senators wore shoes, which came up to the middle of the leg, and which had a golden or silver crescent on the top of the foot. The shoes of the women were generally white, sometimes red, scarlet, or purple, and were adorned with embroidery and pearls; but those of the men were mostly black. On days of public ceremony, however, the magistrates wore red shoes.

5. Boots were used in very ancient times, and were primarily worn, as a kind of armor, with a view of protecting the lower extremities in battle. They were, at first, made of leather, afterwards of brass or iron, and were proof against the thrusts and cuts of warlike weapons. The boot was called *ocrea* by the Romans, who, as well as the Greeks, used it in the army, and in riding on horseback, and sometimes in pedestrian journeys.

6. The fashion of boots and shoes, like every other part of dress, has been subject to a number of changes, as regards both their form and material. In Europe, about one thousand years ago, the greatest princes wore shoes with wooden soles. In the reign of William Rufus, of England, the

shoes of the great had long, sharp points, stuffed with tow, and twisted like a ram's horn. The clergy preached against this fashion; but the points continued to increase in length, until the reign of Richard the Second, when they were tied to the knees with chains of silver or gold. In the year 1463, Parliament interposed, and prohibited the manufacture or use of shoes or boots with *pikes* exceeding two inches in length.

[118]

7. Lasts adapted to each foot, commonly called *rights and lefts*, were not introduced into England, until about the year 1785; nor was cramping, or *crimping*, the front part of boots practised there for ten years after that period. These improvements did not become generally known, or, at least, were not much used, in the United States, for many years after their adoption in Great Britain.

8. Many facts, besides the preceding, might be adduced to prove, that the art of making shoes and boots, although uninterruptedly practised from the earliest ages, has received many important improvements within the last fifty years.

9. In Europe and America, boots and shoes are commonly made of leather. In shoes for females, however, it is not unusual to use prunello, which is a kind of twilled, worsted cloth. In all cases, thick leather is used for the soles.

10. The business of *making* boots and shoes is carried on very systematically in large establishments. The materials are cut out and fitted by the foreman, or by the person who carries on the business, whilst the pieces are stitched together, and the work finished, by workmen who sit upon *the bench*.

11. As a matter of convenience, the trade have fixed upon certain sizes, which are designated by numbers; and, corresponding to these, the lasts are formed by the last-maker; but, to be still more exact, individuals sometimes procure lasts corresponding to their feet, on which they cause their boots and shoes to be made.

12. The following is a description of the process of making a leather shoe: after the materials have been cut out according to the measure, or size, and the parts of the *uppers* have been stitched together, the sole-leather is hammered on the *lapstone*, tacked to the last, and trimmed with a knife. The upper leather is next stretched on the last with a pair of pincers, fastened to its proper place with tacks, and then sewed to the bottom of the sole with a waxed thread. A narrow strip of leather, called a *welt*, is also fastened to the sole by similar means, and to this is stitched another sole. A heel being added, the shoe is finished by trimming and polishing it with appropriate instruments.

[119]

13. The edges of fine leather shoes and boots, are trimmed with thin strips of the like material, whilst those of prunello, and other thin shoes for ladies, are bound with narrow tape. The binding is applied by females with thread, by means of a common needle.

14. Shoe-thread is commonly spun from flax; that from hemp is much stronger, and was formerly preferred; but it is now used only for very strong work. The greater part of the shoe-thread used in the United States, is spun by machinery, at Leeds, in England, from Russian flax. The wax employed by shoemakers, was formerly composed of tar and rosin; but it is now most usually made of pitch.

15. The shoemaker, in sewing together different parts of his work, uses threads of various sizes, which are composed of several small threads of different lengths. A hog's bristle is fastened to each end of it, which enables the workman to pass it with facility through the holes made with the awl.

16. An expeditious way of fastening the soles of boots and shoes to the upper leathers, is found in the use of wooden pegs or brass nails. The old method, however, is generally preferred, on several accounts; but chiefly, because the work is more durable, and because it can be more easily repaired.

[120]

17. Journeymen working at this trade most usually confine their labours to particular kinds of work; as few can follow every branch with advantage. Some make shoes and boots for men; others confine their labours to those designed for ladies; but, by their aid, the master-shoemaker can, and usually does, supply every kind at his store.

18. It is no uncommon thing in the country, for the farmers to purchase leather, and employ the shoemaker to make it up; and this is done, in most cases, on their own premises. The shoemaker employed in this way, removes from house to house, changing his location, whenever he has completely served a whole family in his vocation. In such cases, he is said, by the trade, to be *whipping the cat*. The set of tools with which he operates, is called his *kit*.

19. The shoemaker usually buys his leather from the manufacturer; and procures his tools, tacks, and various other articles of a similar nature, at the *finding stores*. In some cases, the shoemaker with little or no capital, gets his materials from the *leather-cutter*, who makes it a business to supply them ready cut to the proper size and shape. There are, however, but few leather-cutters in our country; but, in England, this branch of trade is one of considerable importance, and is frequently connected with that of the leather-dresser.



THE SADDLER AND HARNESS-MAKER, AND THE TRUNK-MAKER.

THE SADDLER AND HARNESS-MAKER.

1. The invention of the saddle has been attributed to the Selians, a people of ancient Franconia. Under this impression, it has been supposed that the Latins gave it the name of *sella*. The period at which it was first used, cannot be ascertained. It is certain, however, that the horse had been rendered subservient to man, several centuries before this convenient article was thought of.

2. At first, the rider sat upon the bare back of the animal, and guided him with a switch, but afterwards with a strap put round the nose. In the course of time, the rider came to use, upon the back of the horse, the skins of beasts, in order to render his seat more easy. The Greeks, and many other refined nations of antiquity, sometimes used superb trappings, composed of cloth, leather, and skins dressed with the hair on; and, in addition to the gold, silver, and precious stones, with which these were ornamented, the horses were often otherwise decked with bells, collars, and devices of various kinds. [122]

3. The Romans, in the days of the republic, deemed it more manly to ride on the bare back of the animal than on coverings. At a later period, they used a kind of square pannel, without stirrups; and about the year 340 of the Christian era, they began to ride on saddles. It appears, that those first employed were very heavy, as the Emperor Theodosius, in the same century, forbade the use of any which weighed over sixty pounds. The use of saddles was established in England by Henry the Seventh, who enjoined on his nobility the practice of riding upon them.

4. The frame of a saddle is called a *tree*. It is not made by the saddlers, but by persons who confine their attention to this branch of business. The trees are constructed of wood, with a small quantity of iron, and covered with canvas.

5. In making a common saddle, the workman first extends two strips of *straining web* from the pommel to the hinder part of the tree, and fastens them with tacks. The tree is then covered on the upper side with two thicknesses of linen cloth, between which a quantity of wool is afterwards interposed. A covering of thin leather, usually made of hog's-skin, is next tacked on, and the flaps added. Under the whole are placed the pads and saddle-cloth; the former of which is made of thin cotton or linen cloth, and thin leather, stuffed with hair. The addition of four straps, two girths, two stirrup-leathers, and as many stirrups, completes the whole operation.

6. The roughness, or the little indentations in the flaps, are produced by passing the leather between rollers, in contact with a rough surface, or by beating it with a mallet, on the face of which has been fastened a piece of the skin from a species of shark, commonly called the dog-fish. [123]

7. Saddles are often covered with buckskin, curiously stitched into figures, and having the spaces between the seams stuffed with wool; this is particularly the case in side-saddles. The form of saddles, and the quality of the materials, together with the workmanship, are considerably varied, to suit the purposes to which they are to be applied, and to accommodate the fancy of customers.

8. The process of making bridles and harness for horses, is extremely simple. The leather is first cut out with a knife of some description, but usually with one of a crescent-like form, or with a

blade set in a gauge, and then stitched together with the kind of thread used by shoemakers. The awl employed in punching the holes is straight; and needles are most commonly used, instead of the bristles which point the shoemaker's threads. The mode of manufacturing saddle-bags, portmanteaus, and valises, is too obvious to need description.

THE TRUNK-MAKER.

1. The manufacture of trunks is equally simple with that of making harness. In common cases, it consists chiefly in lining the inside of a wooden box with paper, or some kind of cloth, and covering the outside with a skin, or with leather, which is fastened to the wood by means of tacks. Narrow strips of leather are fastened upon hair trunks with brass nails, by way of ornament, as well as to confine the work.

2. Instead of a wooden box, oblong rims of iron, and very thick, solid pasteboard, fastened together by means of strong thread, are used in the best kinds of trunks. The frame or body, thus formed, is covered with some substantial leather, which is first stuck on with paste, and then secured by sewing it to the pasteboard with a waxed thread. Over the whole, are applied strips of iron, fastened with brass or copper nails with large heads. The lines and figures on the leather, added by way of ornament, are produced by a *crease*, a tool made of wood, ivory, or whalebone. Its form is much like that of the blade of a common paper-folder.

[124]

3. How long trunk-making has been a separate trade, cannot be exactly ascertained. The trunk-makers in France were incorporated into a company, in 1596. In the United States, this branch of business is very commonly united with that of the saddler and harness-maker.

[125]



THE SOAP-BOILER, AND THE CANDLE-MAKER.

THE SOAP-BOILER.

1. The business of the soap-boiler consists in manufacturing soap, by the combination of certain oily and alkaline substances.

2. The earliest notice of this useful article occurs in the works of Pliny, in which it is stated, that soap was composed of tallow and ashes; that the mode of combining them was discovered by the Gauls; but that the German soap was the best.

3. For many ages before the invention of soap, saponaceous plants, and several kinds of earth, together with animal matters and the ley from ashes, were employed for the purpose of cleansing the skin, and articles of clothing. The idea of combining some of these substances, with the view of forming soap, probably originated in accident.

[126]

4. The vegetable oils and animal fats, capable of saponification, are very numerous; but those most commonly employed in the manufacture of the soaps of commerce, are olive-oil, whale-oil, tallow, lard, palm-oil, and rosin; and the alkalies with which these are most frequently combined, are soda, the ley of ashes, or its residuum, potash.

5. Soda is sometimes called the *mineral alkali*; because it is found, in some parts of the world, in the earth. It was known to the ancients, at a very early period, under the denomination of *natron*.

It received this appellation from the lakes of Natron, in Egypt, from the waters of which it was produced by evaporation, during the summer season.

6. The soda of commerce is now chiefly obtained from the *salsola*, a genus of plants which grows on the sea-shore. In Spain, the plant from which soda is obtained is denominated *barilla*; hence, the substance produced from it by incineration has received the same appellation. The ashes of a sea-weed which grows on the coasts of Scotland and Ireland, is called *kelp*. In Europe, *barilla* and *kelp* are more extensively employed in the manufacture of soap than any other alkaline substances; but, in this country, where wood is so much used for fuel, common ashes are generally preferred.

7. The process of making the ordinary brown or yellow soap, from wood-ashes, is conducted in the following manner. The alkali is first obtained in a state of solution in water, by *leeching* the ashes as described in [page 26](#), and then poured, in a weak state, into a copper or iron caldron, having a large wooden tub carefully affixed to the top of it.

8. When the ley has been properly heated, the tallow, either in a *tried* state or in the suet, is gradually added. More ley, of greater concentration, is poured in; and the ingredients are moderately boiled for several hours; while a person, as represented in the preceding cut, aids their chemical union by agitating them with a wooden spatula. [127]

9. After a quantity of rosin has been added, and properly incorporated with the other materials, the fire is withdrawn until the next morning, when it is again raised; then, with the view of forming the *paste* into hard soap, a quantity of muriate of soda (common salt) is added. The muriatic acid of this substance, uniting with the potash, forms with it muriate of potash, which dissolves in the water, while the soda combines with the tallow and rosin. Hard soap, therefore, contains no potash; although this alkali is generally employed during the early part of the process of making it.

10. After the addition of the muriate of soda, the boiling and stirring are continued two or three hours, when the fire is withdrawn, and the contents of the caldron are suffered to be at rest. When the soap has completely separated from the watery part and extraneous matters, it is laded into another caldron, again diluted with strong ley, and heated. The *paste* having been brought to a proper consistence, more common salt is added as before, and for the same purposes.

11. The chemical part of the process having been thus completed, the soap is laded into single wooden boxes, or into one or more composed of several distinct frames, which can be removed separately from the soap, after it has become solid enough to stand without such support. The soap is cut into bars, of nearly a uniform size, by means of a small brass wire.

12. Manufacturers of soap have contrived various methods of adulterating this article, or of adding ingredients which increase its weight, without adding to its value. The most common means employed for this purpose is water, which may be added, in some cases, in considerable quantities, without greatly diminishing the consistence of the soap. [128]

13. This fraud may be detected by letting the soap lie for some time exposed to the atmosphere. The water will thus be evaporated, and its quantity can be known by weighing the soap, after its loss of the superfluous liquid. To prevent evaporation, while the soap remains on hand, it is said, that some dealers keep it in saturated solutions of common salt. Another method of adulteration is found in the use of pulverized lime, gypsum, or pipe-clay. These substances, however, can be easily detected by means of a solution in alcohol, which precipitates them.

14. The process of manufacturing soft soap, differs but little in its details from that described in the preceding paragraphs. The chief difference consists in omitting the use of salt. Soft soap, therefore, is composed of a greater proportion of water, and more alkali than is necessary to saturate the unctuous matters. Soft soap is made by almost every family in the country, from ashes, grease, and oily matters, reserved for the purpose.

15. The celebrated Marseilles white soap, is composed of

Soda,	6.
Olive-oil,	60.
Water,	34.

Castile soap, of

Soda,	9.
Olive-oil,	76.5.
Water, with a little coloring matter,	14.5.

Fine toilet-soaps are made with oil of almonds, nut-oil, palm-oil, suet, or butter, combined with soda or potash, according to their preparation in a solid or pasty state. [129]

16. In the manufacture of white soap, the tallow is more carefully purified, and no rosin is used. In other particulars, the process differs but little from that employed in the production of the common kind. Two tons of tallow should yield three tons of white soap. In making the same

quantity of common brown or yellow soap, twelve hundred weight less is required, on account of the substitution of that amount of yellow rosin.

17. The mottled appearance of some soaps is caused by dispersing the ley through it, towards the close of the operation, or by adding a quantity of sulphate of iron, indigo, or the oxide of manganese. Castile soap, now manufactured in the greatest perfection at Marseilles, in France, receives its beautifully marbled appearance from the sulphate of iron.

THE CANDLE-MAKER.

1. The subject of the candle-maker's labors may be defined to be a wick, covered with tallow, wax, or spermaceti, in a cylindrical form, which serves, when lighted, for the illumination of objects in the absence of the sun. The business of candle-making is divided into two branches; the one is confined to the manufacturing of tallow candles, and the other, to making those composed of wax or spermaceti.

2. The process of making candles from tallow, as conducted by the tallow-chandler, needs only a brief description, since it differs but little from the method pursued by families in the country, with which most persons are familiar. The difference lies chiefly in the employment of a few conveniences, by which the candles are more rapidly multiplied.

3. The first part of the process consists in preparing a wick, to serve as a foundation. The coarse and slightly twisted yarn used for this purpose, is spun in the cotton-factories; and, being wound into balls, is, in that form, sold to the tallow-chandlers, as well as to individuals who make candles for their own consumption. [130]

4. A sufficient number of threads is combined, to form a wick of a proper size; and, as they are wound from the balls, they are measured off, and cut to the proper length, by a simple contrivance, which consists of a narrow board, a wooden pin, and the blade of a razor. The pin and razor are placed perpendicular to the board, at a distance determined by the length of the proposed wick. The wicks are next put upon cylindrical rods, about three feet long; and a great number of these are arranged on a long frame.

5. To obtain the tallow in a proper state for use, it is separated from the membranous part of the suet, by boiling the latter in an iron or copper kettle, and then subjecting the *cracklings* to the action of a press. The substance that remains, after the tallow has been expressed, is called *greaves*, which are sometimes applied to fattening ducks for market. This is especially the case in the city of London.

6. The *tried* tallow is prepared for application to the wicks, by heating it to a proper temperature. It is then poured into a suitable receptacle, where it is kept in *order* either by a moderate fire underneath, or by the occasional addition of hot tallow.

7. The *broaches*, as the sticks with their wicks are called, are taken up, several at a time, either between the fingers or by means of a simple instrument denominated a *rake*, and dipped into the tallow. They are then returned to the frame, and suffered to cool, while successive broaches are treated in the same way. The dipping is repeated, until the candles have been thickened to the proper size.

8. In the preceding plate, is represented a workman in the act of dipping several broaches of candles, suspended on a rake, which he holds in his hands. The mode of making dipped candles just described, is more generally practised than any other, and in this manner five or six hundred pounds can be made by one hand, in a single day. In some establishments, however, a more complicated apparatus is used, by which every part of the process is greatly expedited. [131]

9. Mould candles are made very differently. The moulds consist of a frame of wood, in which are arranged several hollow cylinders, generally made of pewter. At the lower extremity of each cylinder, is a small hole, for the passage of the wick, which is introduced by means of a hook on the end of a wire. The cotton is fastened at the other end, and placed in a perpendicular situation in the centre of the shafts, by means of a wire, which passes through the loops of the wicks. The melted tallow, having been poured on the top of the wooden frame, descends into each mould. After the candles have become sufficiently cold, they are extracted from the cylinders with a bodkin, which is inserted into the loop of the wick. One person can thus mould two or three hundred pounds in a day.

10. Candles are also made of bees-wax and spermaceti; but the mode of their manufacture differs in no particular from that of common mould candles. The wicks for wax-candles are usually made of a peculiar kind of cotton, which grows in Asiatic Turkey.

11. Before the wax is applied to this purpose, the coloring matter is discharged. This is effected by bleaching the wax, in the following manner. It is first divided into flakes, or thin laminæ, by pouring it, in a melted state, through a colander upon a cylindrical wheel, which, at the same time, is kept revolving, while partly immersed in cold water. The wax, having been removed from the water, is placed upon a table or floor covered with some kind of cloth. Here it is occasionally sprinkled with water, until the bleaching has been completed. The process occupies several weeks, or even months, according to the state of the weather, that being best which is most favorable to a rapid evaporation. [132]

12. Spermaceti is a substance separated from sperm oil, which is obtained from a species of

whale, called *physeter macrocephalus*, or *spermaceti cachalot*. This oil is obtained from both the head and body of the animal, but that procured from the former contains twice the quantity of spermaceti.

13. To separate the spermaceti from the oil yielded by the body, it is first heated, then put into casks, and suffered to stand two or three weeks, in order to *granulate*. The oily part is now filtrated through strainers; and the remainder, which is called *foots*, is again heated, and put into casks. After having stood several weeks, these are put into bags, and submitted to the action of a powerful press. The spermaceti thus obtained, is melted and moulded into cakes. The oil thus separated from the spermaceti, is called spring or fall strained; because it is filtered and expressed only during those seasons of the year.

14. The oil from the head of the whale is treated like that from the body, in almost every particular. The difference consists, principally, in omitting the use of the strainer, and in the employment of stronger bags and a more powerful press. The oil obtained from the *head-matter*, is called *pressed*, since it is separated by the action of the press only. It is also denominated *winter-strained*, because the operation is performed in the cold weather.

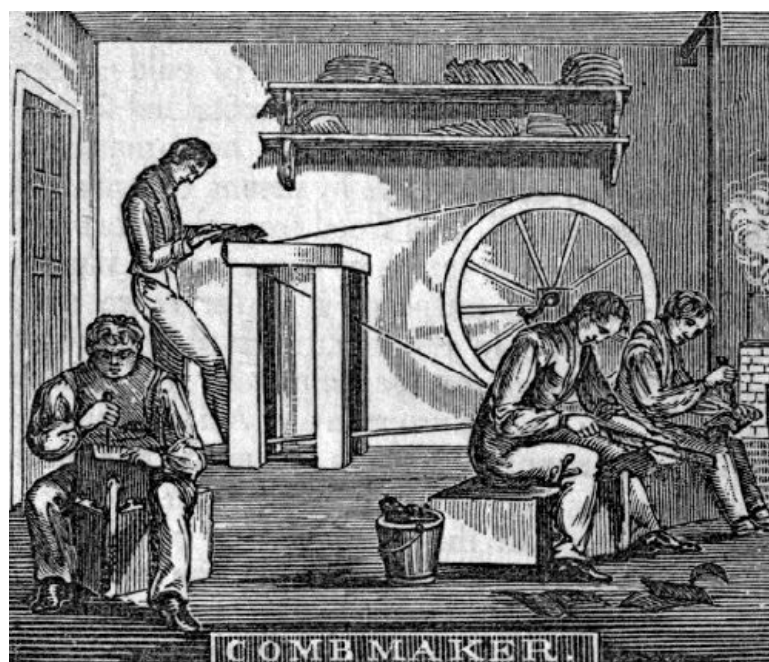
15. The spermaceti, having been melted and moulded into cakes, is reserved until the succeeding summer, when it is cut into thin shavings, by means of a large shave, similar to the *spoke-shave* of the wheelwrights, and again pressed as before. The oil of this last pressing is called *taut pressed*, and is the least valuable kind, since a slight degree of cold causes it to become thick. The spermaceti obtained from the oil of the body, and that from the head-matter, are melted together, and purified by means of potash-ley. [133]

16. The sperm-oil, thus freed from the spermaceti, is extensively used in lamps as a means of illumination; and, for many purposes, it is far more convenient than tallow. In the country, lard is frequently employed instead of oil, especially by the German population. In some European and Asiatic countries, vegetable oils supply the place of animal fats, in this application.

17. The origin of the art of making candles is not known. It is evident, however, that the business is comparatively modern, since the Greeks and Romans, as well as other nations of antiquity, employed torches of pine and fir, and lamps supplied with oil, in the production of artificial light. The words in the Scriptures translated *candle*, imply nothing more nor less than a light produced by some kind of oil consumed in a lamp.

18. The lamps in ancient times were suspended by a chain or cord from the ceiling, or supported on stands and moveable tables, which were called by the Romans *lampadaria*, or *candelabra*. Many specimens of this utensil are preserved in several museums of Europe, and some have lately been found in the ruins of Herculaneum.

19. The Chinese make their candles from the tallow obtained from the seeds and capsules of the tallow-tree. This tree, which is produced in great abundance in China, is said to grow in various parts of South Carolina and Georgia. In appearance, it resembles the Lombardy poplar.



THE COMB-MAKER, AND THE BRUSH-MAKER.

THE COMB-MAKER.

1. The comb is a well-known instrument, employed in cleansing, dressing, and confining the hair. It is made of various materials, but most commonly of tortoise-shell, the horns and hoofs of cattle, ivory, bone, and several kinds of hard wood.

2. It is impossible to determine the period of the world at which it was introduced, since history and tradition, the sources from which we obtain information of this nature, are silent with regard to its origin. It is evident, however, that the comb is an instrument of primary necessity; and hence it must have been invented in the earliest ages. This opinion is confirmed by the fact, that the comb has been frequently found in use amongst savages, when first visited by civilized men. [135]

3. Combs employed in fixing the hair, are made of tortoise-shell, or of the horns of cattle. The genuine tortoise-shell is taken from the *testudo imbricata*, or *hawk's-bill turtle*; but a kind of shell, inferior in quality, is obtained from the *testudo caretta*, or *loggerhead turtle*. These turtles inhabit the seas of warm and temperate climates; but they are especially numerous in the West Indian seas, where *shell* is a valuable article of commerce. That from St. Domingo is especially esteemed for its brilliancy of shade and color.

4. The shell of the hawk's-bill turtle was extensively employed for ornamental purposes by the refined nations of antiquity; although we have no account of its application to the manufacture of combs. The Greeks and Romans decorated with it the doors and pillars of their houses, as well as their beds and other furniture. The Egyptians dealt largely with the Romans in this elegant article.

5. The general length of the hawk's-bill turtle is about three feet from the bill to the end of the shell; but it has been known to measure five feet, and to weigh five or six hundred pounds. In the Indian Ocean, especially, specimens of prodigious magnitude are said to have occurred.

6. The shell employed in the arts, grows upon the back and feet of the animal. That on the back, consists of thirteen laminæ, or plates, which lap over each other, like tiles on the roof of a house. The plates vary in thickness from one-eighth to one-fourth of an inch, according to the age and size of the turtle. The quantity of merchantable shell obtained from a single subject of the usual size, is about eight pounds, which, at the usual price, is worth sixty or seventy dollars. [136]

7. The process of making combs from the horns of cattle, is not difficult to be understood. The tips and butts are first cut off with a saw, and the remaining portion is also divided longitudinally on one side with the same instrument. The horns are then soaked for several days, and afterwards boiled in oil, to render them pliable. They are next spread out and pressed between hot iron plates. This operation clarifies the horn, and produces a plate of proper thickness.

8. After the plates thus produced, have been cut in pieces corresponding in size to the proposed combs, and when these have been shaved to a suitable thickness with instruments adapted to the purpose, the teeth are cut either with a *twinning saw*, as represented in the preceding cut, or with a *twinning machine*.

9. In the former case, the plate is fastened with a wooden *clamp*, by the part which is designed to be left for the back of the comb; and when twins, or two combs, are to be formed from one piece, the other end is bent down, so as to render the upper surface considerably convex. To this surface the *twinning saw* is applied by the hand of the workman, who makes a number of incisions; which are completed both ways with two different kinds of saws, and the end of each tooth is cut from the back of the opposite comb with an instrument called a *plugging awl*.

10. The *twinning machine* was invented, about twenty years ago, by a Mr. Thomas, of Philadelphia; but it has been successfully improved by several individuals since that time. It is, altogether, an ingenious and useful contrivance. The cutting part consists of two chisels, which are made to act on the plate alternately, and in a perpendicular direction, each chisel cutting one side of two teeth, and severing one from the opposite back, at every stroke. It is impossible, however, to form a clear conception of the manner in which the machine operates, except by actual inspection. It performs the work with great rapidity; since from one to two hundred dozens of combs can be cut in twelve hours; whereas, not one-fourth of that number can be *twinned* in the old method, during the same time. [137]

11. After the teeth have been rounded, and in other respects brought to the proper form with suitable instruments, the combs are polished by rubbing them first with the dust of a peculiar kind of brick, then by applying them to a moving cylinder covered with buff leather, charged with rotten-stone, ashes, or brick-dust; and, finally, by rubbing them with the hand, charged with rotten-stone and vinegar.

12. The combs are next colored, or stained; and, as the tortoise-shell is by far the best and most expensive material for this kind of comb, the great object of the manufacturer is to produce colors as nearly resembling those of the real shell as practicable. This is done in considerable perfection, in the following manner:

13. The combs are first dipped in aqua-fortis, and then covered with a paste made of lime, pearlash, and red lead. To produce the requisite variety of shades, both taste and judgment are necessary in applying the composition, and in determining the time which it should remain upon the combs. To give the combs a still stronger resemblance to shell, they are also immersed for fifteen or twenty minutes in a dye of Nicaragua.

14. The combs having been covered with oil, they are next heated upon iron plates, and brought

to the desired shape by bending them upon wooden blocks with a woollen list. The whole process is finished by rubbing off the oil with a silk handkerchief.

15. The general process of making shell combs differs but little from that which has been just described, varying only in a few particulars, in compliance with the peculiar nature of the material. [138]

16. On account of the great value of shell, the workmen are careful to make the most of every portion of it; accordingly, when a piece falls short of the desired size, it is enlarged by *welding* to it another of smaller dimensions. The union is effected, by lapping the two pieces upon each other, and then pressing them together between two plates of hot iron. The heat of the iron is prevented from injuring the shell, by the interposition of a wet linen cloth, and by immersing the whole in hot water. In a similar manner, broken combs are often mended; and by the same method, two pieces of horn can also be joined together.

17. Both horn and shell combs are often stamped with figures, and otherwise ornamented with carved work. In the latter case, the ornaments are produced, by removing a part of the material with a saw and graver. The saw employed is not more than the twelfth of an inch in width; and, being fastened to a frame, it is moved up and down, with great rapidity, by means of the foot, while the part of the comb to be cut away is applied to the teeth. The operator is guided in the work by a pattern, which has been struck on paper from an engraved plate.

18. Combs for dressing and cleansing the hair, are made of horn, shell, bone, ivory, and wood; but it is unnecessary to be particular in describing the manner in which every kind of comb is manufactured. We will only add, that the teeth of fine ivory and bone combs are cut with a buzz, or circular saw, which, fastened to a mandrel, is moved in a lathe.

THE BRUSH-MAKER.

1. There are few manufactured articles in more general use than brushes. This has arisen from their great utility, and the low prices at which they can be purchased. The productions of the brush-maker's labor are denominated variously, according to the purposes to which they are to be applied. [139]

2. The operations connected with this business are very simple, as there is scarcely a tool employed which is not familiar to every other class of mechanics. The brush-maker, however, does not manufacture every part of the brush. He procures his wooden *stocks* and handles from various sources, but chiefly from the turner, and bone handles, from the tooth-brush handle-maker.

3. The first part of the process which may be considered as belonging particularly to the brush-maker, consists in boring the holes for the reception of the bristles. This is done with a *bit* of a proper size, which is kept in motion with a lathe, while the wood is brought against it with both hands. To enable the operator to make the holes in the right place and in the proper direction, a pattern is applied to the hither side of the stock.

4. The greater part of the bristles used by the brush-makers in the United States, are imported from Russia and Germany. Large quantities, however are obtained from Pennsylvania, and some parts of the Western States. American bristles are worth from thirty to fifty cents per pound, a price sufficiently high, one would suppose, to induce the farmers to preserve them, when they butcher their swine. Were this generally done, a tolerable supply of the shorter kinds of bristles might be obtained in our own country.

5. When the bristles come into the hands of the brush-maker, the long and short, and frequently those of different colors, are mixed together. These are first assorted, according to color; and those of a whitish hue are afterwards washed with potash-ley and soap, to free them from animal fat, and then whitened by bleaching them with the fumes of brimstone. [140]

6. The bristles are next combed with a row of steel teeth, for the purpose of placing them in a parallel direction, and with a view of depriving them of the short hair which may be intermixed. The workman, immediately after combing a handful, assorting it into separate parcels of different lengths. This is very readily done, by pulling out the longest bristles from the top, until those which remain in the hand have been reduced to a certain length, which is determined by a gauge marked with numbers. At each pulling, the handful is reduced in height near half an inch.

7. The stocks and the bristles having been thus prepared, they are next fastened together. This is effected either with wire or by a composition of tar and rosin. The wire is used in all cases in which the fibre is doubled; but when the bristles are required in their full length, as in sweeping-brushes, the adhesive substance is employed.

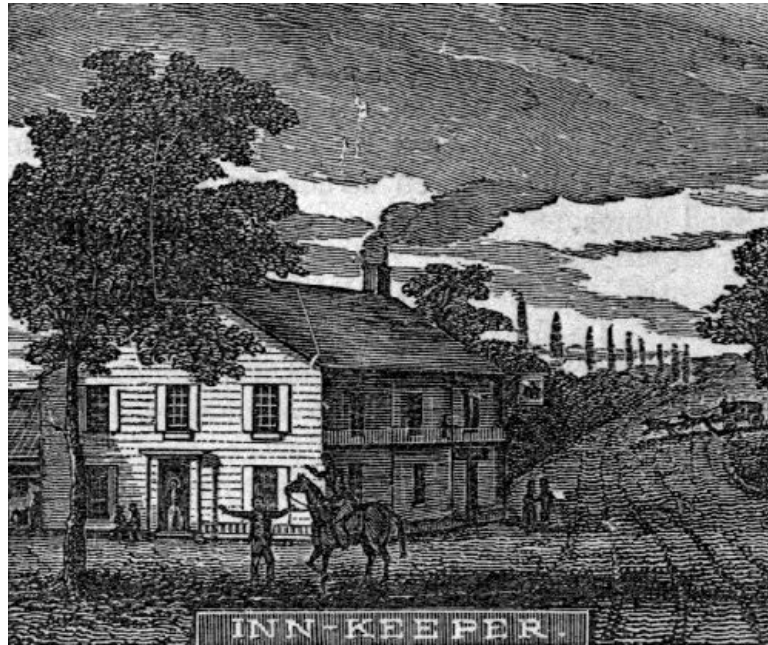
8. It is superfluous to enter into detail, to show the manner in which the wire and composition are applied in fixing the bristles, as any person, with an ordinary degree of observation, can readily comprehend the whole, by examining the different kinds of brushes which are met with in every well-regulated household. The bristles, after having been fixed to the stock or handle, are trimmed with the shears or knife, according as they are required to be equal or unequal in length.

9. The brush is next handed over to the *finisher*, who applies to the back of the stock a thin veneer of wood, which secures the wire against the oxidizing influence of the atmosphere, and

gives to the brush a finished appearance. The stock, together with the veneer, is then brought to the desired shape with suitable instruments, polished with sand-paper, and covered with varnish. [141]

10. Those brushes which the manufacturer designs to be ornamented, are sent in great quantities to the *ornamenter*, who applies to them various figures, in gold or Dutch leaf, japan or bronze, and sometimes prints, which have been struck on paper from engraved plates.

[142]



THE TAVERN-KEEPER.

1. A house in which travellers are entertained is denominated a tavern, inn, coffee-house, hotel, or house of public entertainment; and an individual who keeps a house of this description, is called an inn-keeper or tavern-keeper. Of these establishments there are various grades, from the log cabin with a single room, to the splendid and commodious edifice with more than a hundred chambers.

2. This business is one of great public utility; since, by this means, travellers obtain necessary refreshments and a temporary home, with very little trouble on their part, and that, in most cases, for a reasonable compensation. This is especially the case in the United States, where the public houses, taking them together, are said to be superior to those of any other country. [143]

3. Travellers, in the early ages of the world, either carried with them the means of sustenance, and protection from the weather, or relied upon the hospitality of strangers; but, as the intercourse between different places for the purposes of trade, increased, houses of public entertainment were established, which at first were chiefly kept by women.

4. The people of antiquity, in every age and nation, whether barbarous or civilized, were, however, remarkable for their hospitality. We find this virtue enjoined in the Mosaic writings, and scriptures generally, in the poems of Homer, as well as in other distinguished writings, which have descended to our times. The heathen nations were rendered more observant of the rites of hospitality by the belief, that their fabulous gods sometimes appeared on earth in human shape; and the Jews and ancient Christians, by the circumstance, that Abraham entertained angels unawares.

5. On account of the occasional acts of violence committed by both the guest, and the master of the house, it became necessary to take some precautions for their mutual safety. When, therefore, a stranger applied for lodgings, it was customary among the Greeks for both to swear by Jupiter, that they would do each other no harm. This ceremony took place, while each party stood with his foot placed on his own side of the threshold; and a violation of this oath by either party, excited against the offender the greatest horror.

6. The Greeks and Romans, in common with the people of many other nations, were in the habit of making arrangements with persons at a distance from their homes, for mutual accommodation, when either party might be in the vicinity of the other. In these agreements, the contracting parties included their posterity, and delivered to each other tokens, which might be afterwards exhibited in proof of ancient ties of hospitality between the families. They swore fidelity to each other by the name of Jupiter, who was surnamed the Hospitable; because he was supposed to be the protector of strangers, and the avenger of their wrongs. [144]

7. This relation was considered a very intimate one, especially by the Romans; and, in their language, it was called *hospitium*, or *jus hospitii*; hence, the guest and entertainer were both called *hostes*, a word from which *host* is derived, which is employed to designate both the landlord and the guest. The Roman nobility used to build, for the reception of strangers, apartments called *hospitalia*, on the right and left of the main building of their residence.

8. During the middle ages, also, hospitality was very commonly practised; and the virtue was not considered one of those which might be observed or neglected at pleasure; the practice of it was even enjoined by statute, in many countries, as a positive duty, which could not be neglected with impunity. In some cases, the moveable goods of the inhospitable person were confiscated, and his house burned. If an individual had not the means of entertaining his guest, he was permitted to steal, in order to obtain the requisite supply.

9. The nobles of Europe, during this period, were generally distinguished for their cordial entertainment of strangers, and their immediate adherents. Their extraordinary liberality arose, in part, from the general customs of the age, and partly from a desire to attach to their interests as great a number of retainers as possible, with a view to maintain or increase their political importance. Strangers were also entertained at the monasteries, which were numerous in almost every kingdom of Europe. Several of these institutions were established in solitary places, with the express purpose of relieving travellers in distress. [145]

10. It is evident, that the arrangements for mutual accommodation, and the hospitable character of the ancients, were unfavorable to the business of keeping tavern; but the free intercourse between different nations, which arose from the Crusades, and the revival of commerce, contributed greatly to the habit of regularly entertaining strangers for a compensation, and led to the general establishment of inns.

11. These inns, however, were not, at first, well supported; inasmuch as travellers had been long accustomed to seek for lodgings in private houses. In Scotland, inns were established by law, A.D. 1424; and, to compel travellers to resort to them, they were forbidden, under a penalty of forty shillings, to use private accommodations, where these public houses were to be found.

12. How far legislative enactments have been employed for the establishment of inns in other countries, we have not been able to learn, as the authorities to which we have referred for information on this point are silent with regard to it. We know, however, that laws have been made in almost every part of Europe, as well as in the United States, with the view of compelling the landlord to preserve proper order, and to accommodate his customers at reasonable charges.

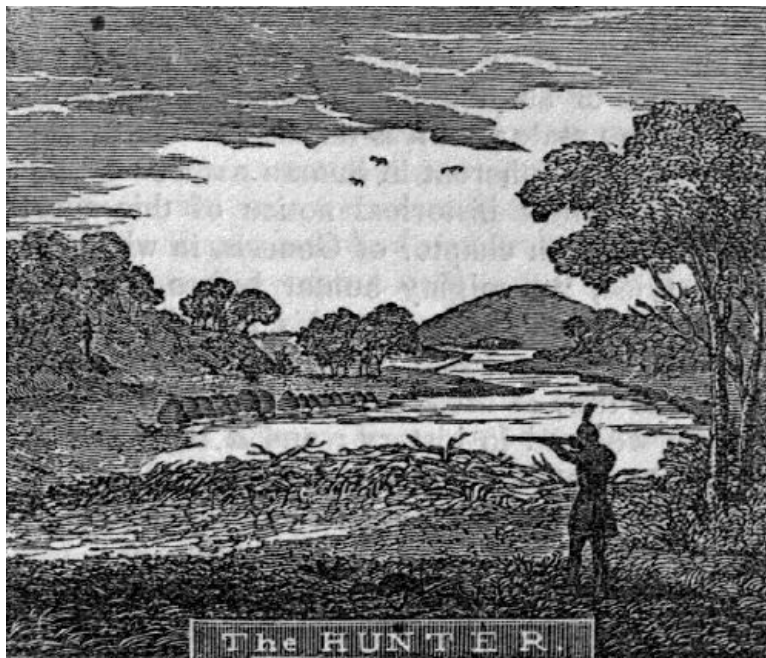
13. In the United States, and in all other commercial countries, this business has become one of great importance, not only to the individuals who have engaged in it, but also to the community in general. Within the present century, the amount of travelling has greatly increased, and the excellence of the public houses has advanced in the same ratio. Some of these establishments in the cities and large towns, are among the most extensive and splendid edifices of the country; and, in every place through which there is much travelling, they are usually equal or superior to the private dwellings of the neighborhood. [146]

14. The business of keeping tavern, however, is not always confined to the proper object of entertaining travellers, or persons at some distance from home. A public house is frequently the resort of the people who live in the immediate vicinity, and is often the means of doing much injury, by increasing dissipation.

15. In all cases in which ardent spirits are proposed to be sold, a license must be obtained from the public authorities, for which must be paid the sum stipulated by law; but any person is permitted to lodge travellers, and to supply them with every necessary means of cheer and comfort for a compensation, without the formality of a legal permission; yet, a license to sell liquors is called a tavern-license; because most tavern-keepers regard the profits on the sale of ardent spirits as one of their chief objects.

16. A public house in which no strong drink is sold, is called a temperance tavern; and such establishments are becoming common; but they are not, at present, so well supported as those in which the popular appetite is more thoroughly complied with. The time, however, may not be far distant, when the public sentiment will undergo such a salutary change, that the tavern-keepers generally will find it their best policy to relinquish the sale of this poisonous article.

17. As travellers often apply to the bar for "something to drink," merely to remunerate the landlord for the use of his fire, or some little attention, the friends of temperance would essentially promote their cause, by encouraging the practice of paying for a glass of water, or some trifle of this kind. This would increase the number of temperance taverns, and, perhaps, be the means of preventing many generous people from forming those dissipated habits, which are so often attended with ruinous results.



THE HUNTER.

1. Hunting and fishing are usually considered the primary occupations of man; not because they were the first employments in which he engaged, but because they are the chief means of human sustenance among savage nations.

2. The great and rapid increase of the inferior animals, and, probably, the diminished fertility of the soil after the deluge, caused many branches of the family of Noah to forsake the arts of civilized life, especially after the dispersion caused by the confusion of tongues.

3. Many of these families, or tribes, continued in this barbarous state for several ages, or until their increase of numbers, and the diminished quantity of wild game, rendered a supply of food from the objects of the chase extremely precarious. Necessity then compelled them to resort to the domestication of certain animals, and to the cultivation of the soil. But the practice of hunting wild animals is not confined to the savage state; as it is an amusement prompted by a propensity inherent in human nature.

[148]

4. The earliest historical notice of this sport is found in the tenth chapter of Genesis, in which Nimrod is styled, "a mighty hunter before the Lord." So great was his prowess in this absorbing pursuit, that he was proverbially celebrated on this account even in the time of Moses. Nimrod is the first king of whom we read in history; and it is by no means improbable, that his skill and intrepidity in subduing the wild beasts of the forest, contributed largely towards elevating him to the regal station.

5. Although the spoils of the chase are of little consequence to men, after they have united in regular communities, in which the arts of civilized life are cultivated; yet the propensity to hunt wild animals continues, and displays itself more or less among all classes of men.

6. The reader of English history will recollect, that William the Conqueror, who began his reign in the year 1066, signalized his passion for this amusement, by laying waste, and converting, into one vast hunting-ground, the entire county of Hampshire, containing, at that time, no less than twenty-two populous parishes. Severe laws were also enacted, prohibiting the destruction of certain kinds of game, except by a few persons having specified qualifications. With some modifications, these laws are still in force in Great Britain.

7. In other countries of Europe, also, large tracts have been appropriated by the kings and nobles to the same object. This tyrannical monopoly is attempted to be justified by the unreasonable pretension, that all wild animals belong, of right, to the monarch of the country, where they roam.

[149]

8. The quadrupeds most hunted in Europe, are the stag, the hare, the fox, the wolf, and the wild boar. These beasts are pursued either on account of their intrinsic value, or for sport, or to rid the country of their depredations. In some instances, all three of these objects may be united. The method of capturing or killing the animals is various, according to the character and objects of the persons engaged in it.

9. In Asia, the wolf is sometimes hunted with the eagle; but, in Europe, the strongest greyhounds are employed to run him down. This task, however, is one of extreme difficulty, as he can easily run twenty miles upon a stretch, and is besides very cunning in the means of eluding his pursuers. Chasing the fox on horseback, with a pack of hounds, is considered an animating and manly sport, both in Europe and in North America.

10. The most prominent victim of the hunter, in Africa, is the lion. He is usually sought in small

parties on horseback with dogs; but sometimes, when one of these formidable animals has been discovered, the people of the neighborhood assemble, and encircle him in a ring, three or four miles in circumference. The circle is gradually contracted, until the hunters have approached sufficiently near to the beast, when they dispatch him, usually with a musket-ball.

11. In the southern parts of Asia, tiger-hunting is a favorite amusement. Seated upon an elephant, trained especially for the purpose, the hunter is in comparative safety, while he pursues and fires upon the tiger, until his destruction is effected.

12. The white bear and the grisly bear are the most formidable animals in North America; yet they are industriously hunted by both Indians and white men, on account of the value of their flesh and skins. Bisons, or, as they are erroneously called, buffaloes, are found in great numbers in the vast prairies which occur between the Mississippi and the Rocky Mountains. They are commonly met with in droves, which sometimes amount to several thousands. [150]

13. When the Indian hunters propose to destroy these animals, they ride into the midst of a herd, and dispatch them with repeated wounds; or, they get a drove between themselves and a precipice, and, by shouting and yelling, cause the animals to crowd each other off upon the rocks below. In this manner, great numbers are disabled and taken at once. The hunters, at other times, drive the bisons into inclosures, and then shoot them down at their leisure. The hide of this animal is dressed with the hair adhering to it; and skins, in this state, are used by the savages for beds, and by the white people, in wagons, sleighs, and stages.

14. North America, and the northern parts of Asia, have been, and, in some parts, still are, well stocked with fur-clad animals; and these are the principal objects of pursuit, with those who make hunting their regular business. Some of these animals were common in every part of North America, when this portion of the western continent was first visited by Europeans; and a trade in peltries, more or less extensive, has been carried on with the natives, ever since the first settlement of the country.

15. For the purpose of conducting this trade with advantage, a company was formed in England, in 1670, by Prince Rupert and others, to whom a charter was granted, securing to them the exclusive privilege of trading with the Indians about Hudson's Bay. Another company was formed in 1783-4, called the North-West Fur Company. Between these companies, there soon arose dissensions and hostilities, and many injuries were mutually inflicted by the adherents of the parties. Both associations, however, were at length united, under the title of the Hudson's Bay Fur Company. The Indian trade, on the great lakes and the Upper Mississippi, has long been in possession of the North American Fur Company. Most of the directors of this company reside in the city of New-York. [151]

16. The companies just mentioned supply the Indians with coarse blue, red, and fine scarlet cloths, coarse cottons, blankets, ribands, beads, kettles, firearms, hatchets, knives, ammunition, and other articles adapted to the wants of the hunters, receiving, in return, the skins of the muskrat, beaver, otter, martin, bear, deer, lynx, fox, &c.

17. The intercourse with the Indians is managed by agents, called clerks, who receive from the company a salary, ranging from three to eight hundred dollars per annum. The merchandise is conveyed to the place of trade, in the autumn, by the aid of Canadian boatmen and half-Indians. The most considerable portion of the goods are sold to the Indians on a credit, with the understanding of their making payment in the following spring; but, as many neglect this duty, a high price is affixed to the articles thus intrusted to savage honesty. The clerk furnishes the debtor with a trap, having his own name stamped upon it, to show that the hunter has pledged every thing which may be caught in it.

18. Each clerk is supplied with four laborers and an interpreter. The latter attends to the store in the absence of the clerk, or watches the debtors in the Indian camp, lest they again sell the produce of their winter's labors. The peltries, when obtained by the clerk, are sent to the general agent of the company.

19. The fur trade is also prosecuted, to some extent, by a class of men in Missouri, who proceed from the city of St. Louis, in bodies comprising from fifty to two hundred individuals. After having ascended the Missouri river, or some of its branches, and, perhaps, after having passed the Rocky Mountains, they separate, and pursue the different animals on their own individual account, either alone or in small parties. The Indians regard these men as intruders on their territories; and, when a favorable opportunity is presented, they frequently surprise and murder the wandering hunters, and retain possession of their property. [152]

20. In consequence of the unremitted warfare which has, for a long time, been carried on against the wild animals of North America, their number has been greatly diminished; and, in many parts, almost every species of the larger quadrupeds, and the fur-clad animals, has been exterminated. Even on the Mississippi, and the great lakes, the latter description of animals has been so much reduced in number, that the trade in peltries, in those parts, has become of little value. Another half century will, probably, nearly terminate the trade in every part of North America.

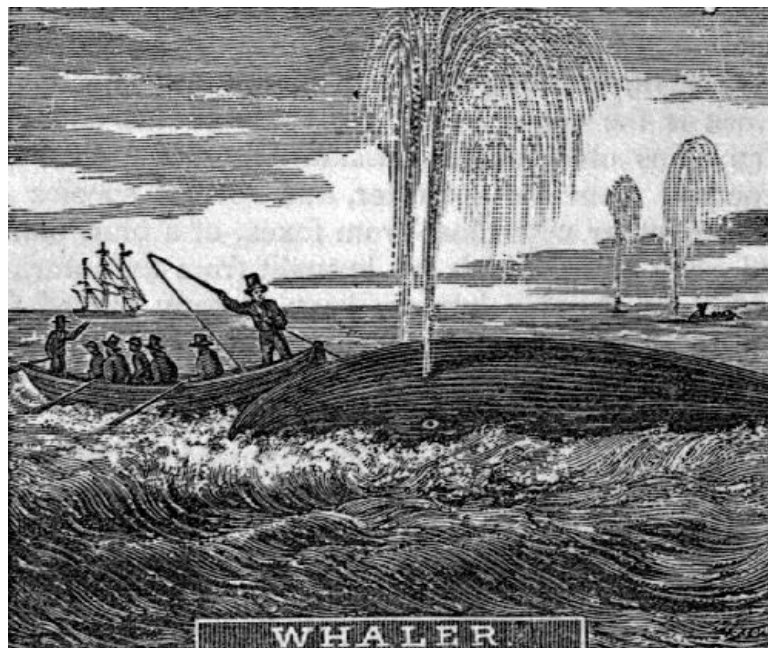
21. The fur trade was prosecuted with considerable success, during the latter part of the last century, principally by the English, on the north-west coast of America, and the adjacent islands. The peltries obtained by these enterprising traders, were carried directly to China. The trade was interrupted for a while by the Spaniards, who laid claim to those regions, and seized the British

traders engaged there, together with the property in their possession. This affair, however, was afterwards amicably adjusted by the Spanish and English governments; and the whole trade, from California north and to China, was opened to the latter.

22. The fur trade, in those parts, is now chiefly in the hands of the Russian Company in America, which has a capital of a million of dollars invested in the business. Most of the persons owning the stock, are merchants, residing at Irkutsk, a town of Siberia, which is the centre of the fur trade of that country. The skins obtained in Russian America are chiefly procured from the sea-otter, and several species of seal, together with those from foxes, of a blue, black, and gray color, which are brought from the interior. Parties of Russian hunters have already passed the Rocky Mountains, and interfered with the trade of the Hudson's Bay Company. The fur trade of Siberia is chiefly carried on with China. [153]

23. The chief objects of the hunters in Siberia, are the black fox, the sable, the ermine, the squirrel, the beaver, and the lynx. In the region near the Frozen Ocean, are also caught blue and white foxes. Siberia is the place of banishment for the Russian empire; and the exiles were formerly required to pay to the government an annual tribute of a certain number of sable-skins. The conquered tribes in Siberia, were also compelled to pay their taxes in the skins of the fox and sable; but now, those of less value, or money, are frequently substituted.

24. Although the skins of beasts were the first means employed to clothe the human body, yet it does not appear that the Greeks and Romans, and the other refined nations of antiquity, ever made use of furs for this purpose. The custom of wearing them, originated in those regions, where the fur-clad animals were numerous, and where the severity of the climate required this species of clothing. The use of furs was introduced into the southern parts of Europe by the Goths, Vandals, Huns, and other barbarous nations, which overran the Roman empire.



[154]

THE FISHERMAN.

1. Although permission was given by the Deity, immediately after the flood, to employ for human sustenance "every moving thing that liveth," yet it is not probable, that fishes were used as food, to any considerable extent, for several centuries afterwards. It is stated by Plutarch, that the Syrians and Greeks, in very ancient times, abstained from fish. Menelaus, one of Homer's heroes, complains, on a certain occasion, that his companions had been reduced by hunger to the necessity of eating fish; and there is no mention in Homer, that the Grecians, at any time, used this food at the siege of Troy, although, for the ten years during which that contest was carried on, their camp was on the sea-shore.

2. Moses, the Jewish lawgiver, is very explicit in designating the land animals which might be used by the Israelites as food; and he was equally so with regard to the animals which inhabit the waters. We learn, from the twelfth chapter of Numbers, that the children of Israel, while journeying to the land of Canaan, "remembered the fish which they did eat," in Egypt. [155]

3. This is the earliest notice on record, of the actual use of that class of animals for food; although it is probable, that they had been applied to this purpose, in Egypt, six or seven hundred years before that period, or soon after the settlement of this country by the descendants of Ham.

4. For a long time before the advent of Our Saviour, fishing had been a regular business, even in

Judea; and from the class of men who followed this occupation, he chose several of his apostles. At the time just mentioned, fish had become a common article of diet, in all parts of the world subject to the Roman power, and probably in almost all other countries.

5. The methods of catching fish, pursued in ancient times, were similar to those of the present day; for then, as now, they were caught with a hook, with a spear, and with a seine or net, according to the character of the animal, and the nature of the fishing station. But the great improvements in navigation, made since the twelfth century, have given modern fishermen the command of the Atlantic and Pacific Oceans, and, consequently, a knowledge of many species of fish which were formerly unknown.

6. According to Linnæus, the great naturalist, about four hundred species of fish have come to our knowledge; and he presumes, that those which remain unknown are still more numerous. Notwithstanding this great variety, the chief attention of fishermen is confined to a few kinds, which are the most easily caught, and which are the most valuable when taken. [156]

7. Every place which contains many inhabitants, and which is located in the vicinity of waters well stored with fish, is supplied with these animals by men who make fishing a business; still, these fisheries may be considered local in their benefits, and perhaps do not require particular notice in this article. We will only remark, therefore, that, in large cities, fresh fish are sold either in a fish-market, or are *hawked* about the streets. The wives of the fishermen are very often employed in selling the fish caught by their husbands. The fisheries which are of the greatest consequence, in general commerce, are those which relate to herring, mackerel, salmon, seal, and whale.

8. *Herring Fishery*.—There are several species of herring; but, of these, four kinds only are of much importance, viz., the common herring, the shad, the hard head, and the alewife; of which, the first is the most valuable, being by far the most numerous, and being, also, better adapted than the others for preservation.

9. The winter residence of the common herring is within the arctic circle, whence it emigrates, in the spring, to more southern portions of the globe, for the purpose of depositing its spawn. The first body of these migratory animals, appears on the coasts of both Europe and America, in April, or about the first of May; but these are only the precursors of the grand shoals which arrive in a few weeks afterwards.

10. Their first approach is indicated by the great number of birds of prey, which follow them in their course; but, when the main body appears, the number is so great, that they alter the appearance of the ocean itself. In this last and principal migration, the shoals are five or six miles in length, and three or four in breadth; and, before each of these columns, the water is driven in a kind of ripple. Sometimes, the fish sink together ten or fifteen minutes, and then rise again to the surface, when they reflect, in clear weather, the rays of the sun, in a variety of splendid colors. [157]

11. These fish proceed as far south as France, on the coasts of Europe, and as far as Georgia, in America, supplying every bay, creek, and river, which opens into the Atlantic. Having deposited their spawn, generally in the inland waters, they return to their head-quarters in the Arctic Ocean, and recruit their emaciated bodies for another migration in the following spring.

12. In a few weeks, the young ones are hatched by the genial heat of the sun; and, as they are not found in southern waters in the winter, it is evident that they proceed northward in the fall, to their paternal haunts under the ice, and thus repair the vast destruction of their race, which had been caused by men, fowl, and fish, in the previous season.

13. These fish are caught in nearly every river, from Maine to Georgia, which has a free communication with the Atlantic; but the most extensive fisheries are on the Hudson and Delaware Rivers, and on those which flow into the Chesapeake Bay.

14. The instrument employed in catching these fish is called a *seine*, which is a species of net, sometimes in length several hundred fathoms, and of a width suiting the depth of the water in which it is to be used. The two edges of the net-work are fastened each to a rope; and, to cause the seine to spread laterally in the water, pieces of lead are fastened to one side, and pieces of cork to the other.

15. In spreading the seine in the water, one end is retained on land by a number of persons, while the rest of it is strung along from a boat, which is rowed in the direction from the shore. The seine having been thus extended, the further end is brought round, in a sweeping manner, to the shore; and the fish that may be included are taken into the boats with a scoop-net, or are hauled out upon the shore. In this way, two or three hundred thousands are sometimes taken at a single *haul*. This fish dies immediately after having been taken from the water; hence the common expression, "As dead as a herring." [158]

16. The herrings are sold, as soon as caught, to people who come to the fishing stations to procure them; or, in case an immediate sale cannot be effected, they are cured with salt, and afterwards smoked, or continued in brine. In the Southern states, the herring is generally thought to be superior to any other fish for the purpose of salting down; although the shad and some others are preferred while fresh.

17. The importance of this fishery is superior to that of any other; since the benefits resulting

from it are more generally diffused. The ancients, however, do not appear to have had any knowledge of this valuable fish. It was first brought into notice by the Dutch, who are said to have commenced the herring fishery on the coasts of Scotland, in the year 1164, and to have retained almost exclusive possession of it, until the beginning of the present century.

18. The shad is a species of herring, which inhabits the sea near the mouths of rivers, and which ascends them in the spring, to deposit its spawn. It is caught in all the rivers terminating on our Atlantic coasts, as well as in some of the rivers of the North of Europe. This fish is captured in the same manner and often at the same time with the common herring. It is highly esteemed in a fresh state; although it is not so good when salted, as the herring and some other kinds of fish.

19. *Mackerel Fishery.*—The common mackerel is a migratory fish, like the herring, and ranks next to that tribe of fishes in regard to numbers, and perhaps in general utility. Its place of retirement in the winter, is not positively known; but it is supposed by some, to be far north of the arctic circle; and by others, to be in some part of the Atlantic farther south. Shoals of this fish appear on the coasts of both Europe and America, in the summer season. Of this fish there are twenty-two species. [159]

20. The mode of catching the mackerel, is either with a net or with hooks and lines. The latter method succeeds best, when the boat or vessel is driven forward by a gentle breeze; and, in this case, a bit of red cloth, or a painted feather, is usually employed as a bait. Several hooks are fastened to a single line, and the fish bite so readily, that the fishermen occasionally take one on each hook at a haul. The mackerel is *cured* in the usual manner, and packed in barrels, to be sold to dealers.

21. This fish was well known to the ancients, as one of its places of resort, in the summer, was the Mediterranean Sea. It was highly esteemed by the Romans, for the reason, that it was the best fish for making their *sarum*, a kind of pickle or sauce much esteemed by this luxurious people.

22. *Salmon Fishery.*—The salmon is a celebrated fish, belonging to the trout genus. It inhabits the seas on the European coasts, from Spitzbergen to Western France; and, on the western shore of the Atlantic, it is found from Greenland to the Hudson River. It also abounds on both coasts of the North Pacific Ocean. The length of full-grown salmon is from three to four feet; and their weight, from ten to fifteen pounds.

23. As soon as the ice has left the rivers, the salmon begin to ascend them, for the purpose of depositing their spawn. It has been ascertained that these fish retain a remarkable attachment to the river which gave them birth; and, having once deposited their spawn, they ever afterwards choose the same spot for their annual deposits. This latter fact has been established by a curious Frenchman, who, fastening a ring to the posterior fin of several salmon, and then setting them at liberty, found that some of them made their appearance at the same place three successive seasons, bearing with them this distinguishing mark. [160]

24. In ascending the rivers, these fish usually proceed together in great numbers, mostly swimming in the middle of the stream; and, being very timid, a sudden noise, or even a floating piece of timber, will sometimes turn them from their course, and send them back to the sea; but having advanced a while, they assume a determined resolution, overcoming rapids and leaping over falls twelve or fifteen feet in perpendicular height.

25. Salmon are caught chiefly with seines, and sometimes seven or eight hundred are captured at a single haul; but from fifty to one hundred is the most usual number, even in a favorable season. They are also taken in *weirs*, which are inclosures so constructed that they admit the ingress, but not the regress of the fish.

26. The salmon fisheries are numerous in Great Britain and Ireland, as well as in most of the northern countries of Europe. In the United States, the most valuable fisheries of this kind are on the rivers in Maine, whence the towns and cities farther south are principally supplied with these fish, in a fresh condition. They are preserved in ice, while on their way to market. In the cured state, salmon is highly esteemed; although it is not easily digested.

27. *Cod Fishery.*—There are several species of cod-fish, or gadus; but the most important and interesting of the class, is the common cod. These fish are found in great abundance on the south and west coasts of Iceland, on the coasts of Norway, off the Orkney and Western Isles, and in the Baltic Sea. Farther south, they gradually diminish in numbers, and entirely disappear, some distance from the Straits of Gibraltar. [161]

28. But the great rendezvous of cod-fish is on the coasts of Labrador, the banks of Newfoundland, Cape Breton, and Nova Scotia. They are invited to these situations by the abundance of small fish, worms, and other marine animals of the crustaceous and testaceous kinds, on which they feed. The fishermen resort, in the greatest numbers, to the banks, which, stretch along the eastern coasts of Newfoundland about four hundred and fifty miles. The water on these banks varies from twenty to fifty fathoms in depth.

29. By negotiations with Great Britain, the French, Dutch, Spanish, and Americans, have acquired the right to catch and cure fish, both on the *Grand Banks*, and several other places on the coasts of the English possessions in North America. The number of vessels employed on the several fishing stations, during each successive season, amounts to six or seven thousand, each measuring from forty to one hundred and twenty tons, and carrying eight or ten men.

30. The fishing on the Grand Banks commences in April, and continues until about the first of August. Here, the fish are caught exclusively with hooks, which are usually baited with a small fish called the capelin, as well as with herring, clams, and the gills of the cod itself. But this fish is not very particular in its choice of bait, it biting greedily at almost any kind which may be presented. An expert fisherman will frequently catch from one hundred to three hundred cod in a single day.

31. As soon as the fish have been caught, their heads are cut off, and their entrails taken out. [162] They are then salted away in bulk in the hold; and, after having lain three or four days to drain, they are taken to another part of the vessel, and again salted in the same manner. The fishermen from New-England, however, give them but one salting while on the fishing station; but, as soon as a cargo has been obtained, it is carried home, where conveniences have been prepared for curing the fish to greater advantage. By pursuing this plan, two or three trips are made during the season. Some of the fish are injured before they are taken from the vessel; and these form an inferior quality, called *Jamaica fish*, because such are generally sold in that island, for the use of the negroes.

32. The fish which are caught on the coasts of Labrador, at the entrance of Hudson's Bay, in the Straits of Belleisle, and on fishing stations of similar advantages, are cured on the shore. They are first slightly salted, and then dried in the sun, either on the rocks, or on scaffolds erected for the purpose. In these coast fisheries, the operations commence in June, and continue until some time in August. The cod are caught in large seines, as well as with hook and line.

33. *Seal Fishery*.—There are several species of the seal; but the kind which is most numerous, and most important in a commercial view, is the common seal. It is found on the sea-coasts throughout the world, but in the greatest numbers in very cold climates, where it furnishes the rude inhabitants with nearly all their necessaries and luxuries.

34. The animal is valuable to the civilized world, on account of its skin and oil. The oil is pure, and is adapted to all the purposes to which that from the whale is applied. In the spring of the year, the seals are very fat; and, at that time, even small ones will yield four or five gallons of oil. [163] The leather manufactured from the skins, is employed in trunk-making, in saddlery, and in making boots and shoes.

35. Since the whale fishery has declined in productiveness in the northern seas, *sealing* has arisen in importance; and accordingly, vessels are now frequently fitted out for this purpose, in both Europe and America; whereas, a few years since, it was regarded only as a part of the objects of a whaling voyage.

36. Our countrymen of New-England have particularly distinguished themselves in this branch of business; and the part of the globe which they have found to be the most favorable to their objects, has been the islands in the Antarctic Ocean. A sealing voyage to that quarter often occupies three years, during which time the hunters are exposed to great hardships, being often left in small detachments on desolate islands, for the purpose of pursuing the animals to greater advantage.

37. The best time for sealing in the Arctic Ocean, is in March and April, when the seals are often met with in droves of several thousands on the ice, which is either fixed, or floating in large pieces. When the sealers meet with one of these droves, they attack the animals with clubs, and stun them by a single blow on the nose. After all that can be reached, have been disabled in this way, the skin and blubber are taken off together.

38. This operation is called *fleaching*, and is sometimes a horrible business; since some of the seals, being merely stunned, occasionally recover, and, in their denuded state, often make battle, and even leap into the water, and swim off. The skins, with the blubber attached to them, are packed away in the hold; and, in case the vessel is to return home soon, they are suffered to remain there, until she arrives in port; but, when this is not expected, the skins, as soon as [164] convenient, are separated from the blubber, and the latter is put into casks. There are other methods of capturing the seal; but it is, perhaps, not necessary to enter into further details.

39. *Whale Fishery*.—There are five species of the whale, of which the *Balæna Physalis*, or razor-back, is the largest. When full grown, it is supposed to be about one hundred feet in length, and thirty or thirty-five feet in circumference. It is so powerful an animal, that it is extremely difficult to capture it; and, when captured, it yields but little oil and whalebone. The species to which whalers direct their attention is denominated the *Mystecetus*, or the *right whale*.

40. The mystecetus is found, in the greatest numbers, in the Greenland seas, about the island of Spitzbergen, in Davis' Straits, in Hudson's and Baffin's Bays, and in the northern parts of the Pacific Ocean. It is also found in the Antarctic Ocean, and along the coasts of Africa and South America, and occasionally on the coasts of the United States.

41. Each vessel engaged in this fishery, is generally fitted out by several individuals, who receive, of the return cargo of oil and whalebone, a portion corresponding to the amount which they have contributed to the common stock, after the men have received their proportion of it. Should the voyage prove altogether unsuccessful, which seldom happens, the owners lose the amount of the outfit, and the captain and hands, their time.

42. The whalers commence operations in the northern latitudes, in the month of May; but the whales are most plentiful in June, when they are met with between the latitudes 75° and 80°, in

almost every variety of situation, sometimes in the open seas, at others in the loose ice, or at the edges of the *fields* and *floes*, which are near the main, impervious body of ice.

[165]

43. On the fishing station, the boats are kept always ready for instant service, being suspended from davits, or cranes, by the sides of the ship, and being furnished with a lance and a harpoon, to the latter of which is attached about one hundred and twenty fathoms of strong but flexible rope. When the weather and situation are favorable, the *crow's nest*, which is a station at the mast-head, is occupied by some person with a telescope.

44. The moment a whale is discovered, notice is given to the watch below, who instantly man one or two boats, and row with swiftness to the place. Sometimes, a boat is kept manned and afloat near the ship, that no time may be lost in making ready; or, two or three are sent out on *the look-out*, having every thing ready for an attack.

45. The whale being very timid and cautious, the men endeavor to approach him unperceived, and strike him with the harpoon, before he is aware of their presence. Sometimes, however, he perceives their approach, and dives into the water, to avoid them; but, being compelled to come again to the surface to breathe, or, as it is termed, *to blow*, they make another effort to harpoon him. In this way, the whalers often pursue him for a considerable time, and frequently without final success. The animal, when unmolested, remains about two minutes on the surface, during which time he blows eight or nine times, and then descends for five or ten minutes, and often, while feeding, for fifteen or twenty.

46. When the whale has been struck, he generally dives towards the bottom of the sea either perpendicularly or obliquely, where he remains about thirty minutes, and sometimes nearly an hour. The harpoon has, near its point, two barbs, or withers, which cause it to remain fast in the integuments under the skin; and the rope attached to it, is coiled in the bow of the boat in such a way, that it runs out without interruption. When more line is wanted, it is made known to the other boats by the elevation of an oar. Should the rope prove too short for the great descent of the whale, it becomes necessary to sever it from the boat, lest the latter be drawn under water; for this emergency, the harpooner stands ready with a knife.

[166]

47. When the whale reappears, the assisting boats make for the place with their greatest speed; and, if possible, each harpooner plunges his weapon into the back of the creature. On convenient occasions, he is also plied with lances, which are thrust into his vitals. At length, overcome with wounds, and exhausted by the loss of blood, his approaching dissolution is indicated by a discharge of blood from his blow-holes, and sometimes by a convulsive struggle, in which his tail, raised, whirled, and jerked in the air, resounds to the distance of several miles. The whale having been thus conquered, and deprived of life, the captors express their joy with loud huzzas, and communicate the information to the ship by striking their flag.

48. A position near a large field of solid ice is very advantageous; because a whale diving under it is obliged to return again to blow; and this circumstance gives opportunity to make upon him several attacks. Close fields of drift ice present great difficulties; since the boats cannot always pass through them with sufficient celerity. In that case, the men sometimes travel over the ice, leaping from one piece to another, and carrying with them lances and harpoons, with which they pierce the animal as often as possible. If they succeed in thus killing him, they drag him back under the ice with the fast line.

49. The whale, having been towed to the ship, and secured alongside, is raised a little by means of powerful blocks, or tackle. The harpooners, with spurs fastened to the bottom of their feet to prevent them from slipping, descend upon the huge body, and, with spades and knives adapted to this particular purpose, cut the blubber into oblong pieces, which are peeled off, and hoisted upon deck with the *speck-tackle*. These long strips are then cut into chunks, which are immediately packed away in the hold. After the animal has been thus successively flenched, and the whale-bone taken out, the carcase is dismissed to the sharks, bears, and birds of prey.

[167]

50. The blubber is somewhat similar, in consistence, to the fat which surrounds the body of the hog, although not quite so solid. In young whales, its color is yellowish white; and, in old ones, yellow or red. Its thickness varies in different parts and in different individuals, from eight to twenty inches. The weight of a whale sixty feet in length, is about seventy tons, of which the blubber weighs about thirty tons.

51. The whale-bone is situated in the mouth. About three hundred laminæ, or blades, grow parallel to each other on either side of the upper jaw, being about half an inch thick, and ten or twelve inches wide, where they are united by the gum. As the whale grows old, they increase in length, and approach from each side to the roof of the mouth. The whale, while feeding, swims with his mouth wide open, which admits a great quantity of water containing insects or small fish, on which he subsists. The whale-bone acts as a filter, or strainer, in retaining the little animals, while the water passes off at the corners of the mouth.

52. Before the whalers leave the fishing station, they cut the blubber into small pieces, and put it into close casks. Sometimes, however, when the ship has been very successful, there is a deficiency of casks. In that case, it is slightly salted, and packed away in the hold. But, as the ship must necessarily pass through a warmer climate, on her voyage homeward, the blubber, while packed in this manner, is liable to melt and be wasted, unless the weather should prove uncommonly cool.

[168]

53. When the vessel has arrived in port, the blubber is found to be melted. To separate the oil

from the *fritters*, or *fenks*, as the integuments and other impurities are called, the contents of the casks are poured into copper boilers, and heated. The heat causes a part of the latter to sink to the bottom, and the former is drawn off into coolers, where other extraneous matters settle. The pure or fine oil is then drawn off for sale. An inferior quality of oil, called *brown oil*, is obtained from the dregs of the blubber.

54. The spermaceti cachalot, or *Physeter Macrocephalus*, is an animal belonging to the norwal genus; although it is generally denominated the spermaceti whale. It is found in the greatest abundance in the Pacific Ocean, where it is sought by American and other whalers, for the sake of the oil and spermaceti. This animal is gregarious, and is often met with in herds containing more than two hundred individuals.

55. Whenever a number of the cachalot are seen, several boats, manned each with six men provided with harpoons and lances, proceed in pursuit; and, if possible, each boat strikes or fastens to a distinct animal, which, in most cases, is overcome without much difficulty. Being towed to the ship, it is deprived of its blubber, and the matter contained in the head, which consists of spermaceti combined with a small proportion of oil. The oil is reduced from the blubber, soon after it has been taken on board, in "try works," with which every ship engaged in this fishery is provided.

56. About three tons of oil are commonly obtained from a large cachalot of this species, and from one to two tons from a small one, besides the head-matter. The manner in which these two products are treated, when brought into port, has been described in the article on candle-making.

[169]

57. The Biscayans were the first people who prosecuted the whale fishery, as a commercial pursuit. In the twelfth, thirteenth, and fourteenth centuries, they carried on this business to a considerable extent; but the whales taken by them were not so large as those which have since been captured in the polar seas. At length, the whales ceased to visit the Bay of Biscay, and the fishery in that quarter was of course terminated.

58. The voyages of the English and Dutch to the Northern Ocean, in search of a passage to India, led to the discovery of the principal haunts of the whale, and induced individuals in those nations to fit out vessels to pursue these animals in the northern latitudes, the harpooners and part of the crews being Biscayans. The whales were found in the greatest abundance about the island of Spitzbergen, and were, at first, so easily captured, that extra vessels were sent out in ballast, to assist in bringing home the oil and whalebone; but the whales, retiring to the centre of the ocean, and to the other side to the Greenland seas, soon became scarce about that island.

59. The whale fishery was revived, as above stated, about the beginning of the seventeenth century; and, with the Dutch, it was in the most flourishing condition in 1680, when it employed about two hundred and sixty ships, and fourteen thousand men. The wars about the beginning of the nineteenth century, extending their baleful influence to almost every part of the ocean, annihilated this branch of business among the Dutch; and, in 1828, only a single whale-ship sailed from Holland.

60. The English whale fishery was, at first, carried on by companies enjoying exclusive privileges; but the pursuit was attended with little success. In 1732, Parliament decreed a bounty of twenty shillings per ton, on every whaler measuring more than two hundred tons; and, although this bounty was increased in 1749 to forty shillings, yet the English whale fishery has never been very flourishing.

[170]

61. The whale fishery has been carried on with greater success from the United States than from any other country. It was begun by the colonists, on their own shores, at a very early period; but the whales having abandoned the coasts of North America, these hardy navigators pursued them into the northern and southern oceans.

62. The number of American vessels now employed in pursuit of the spermaceti cachalot and the mystecetus, amounts to about four hundred, and the number of men to about ten thousand. The inhabitants of the island of Nantucket, and of the town of New-Bedford, are more extensively engaged in these fisheries than the people of any other part of the United States.

[171]



THE SHIPWRIGHT.

1. The earliest notice we have of the construction of a building to float on water, is that which relates to Noah's Ark. This was the largest vessel that has ever been built, and the circumstance proves that the arts, at that early period, had been brought to considerable perfection; yet, as several centuries had elapsed, after the flood, before the descendants of Noah had much occasion for floating vessels, the art of constructing them seems to have been measurably lost.

2. Early records, which perhaps are worthy of credit, state that the Egyptians first traversed the river Nile upon rafts, then in the canoe; and that, to these succeeded the boat, built with joist, fastened together with wooden pins, and rendered water-tight by interposing the leaves of the papyrus. To this boat was, at length, added a mast of acanthus, and a sail of papyrus; but, being prejudiced against the sea because it swallowed up their sacred river, which they worshipped as a god, they never attempted to construct vessels adapted to marine navigation. [172]

3. The Phœnicians, a nation nearly as ancient as the Egyptian, being situated directly on the sea, without the advantages of a noble river, were compelled to provide means for sailing on a wider expanse of water. It is said, however, that they first traversed the Mediterranean, and even visited distant islands, with no better means of conveyance than a raft of timber. This is rendered somewhat probable, from the fact, that the Peruvians, even at the present time, venture upon the Pacific Ocean on their *balza*, a raft made from a sponge tree of that name.

4. The vessels first constructed by the Phœnicians, were used for commercial purposes. They were flat-bottomed, broad, and of a small draught; and those of the Carthaginians and Greeks were similar in shape. The ships of war, in early times, were generally mere row-boats, in which the combatants rushed upon each other, and decided the combat by valor and physical strength.

5. By successive improvements, the ships of antiquity were, at length, brought to combine good proportion with considerable beauty. The prows were sometimes ornamented with the sculptured figures of heathen deities, and otherwise adorned with paint and gilding, while the sterns, which were usually in the form of a shield, were elaborately wrought in carved work. The approved length of a ship of war, was six or eight times its breadth; and that for mercantile purposes, four times the breadth; hence, the distinction of *long ships*, and *round ships*.

6. Both the long and round ships had a single mast, which could be taken down or elevated at pleasure. These vessels were, however, propelled with oars on occasions that required it; and the former, in their improved state, were properly galleys with one, two, or three banks of oars, which extended from one end of the vessel to the other. The rowers were all placed under the deck; and, in time of battle, the combatants contended above, being in part defended from the missiles of opposing foes by shields carried on the arm, and by screens and towers placed on the deck. The bow of each vessel was armed with a brazen or iron beak, with which the contending parties often stove in the sides of each other's vessels. [173]

7. The general size of vessels in the best days of antiquity, was not greater than that of our sloops and schooners; but there are instances on record, which prove that they occasionally equalled in capacity the largest of modern times. In the early ages, they were very small, and, for several centuries, were drawn upon the shore at the termination of every voyage. Stranding, however, became impracticable, after the increase in size, and the addition of the keel. The anchor and cable were, therefore, invented, to confine the ship at a suitable distance from the shore. At first, the anchor was nothing more than a large stone. Afterwards, it was wood and stone combined; and, finally, iron was the sole material.

8. The invasion of the Roman empire by the northern barbarians, caused the operations of war to be almost exclusively conducted on the land. This, together with the destruction of commerce during the general desolation of those ruthless incursions, and the barbarism of the conquerors, occasioned a retrogression, and, in some parts of Europe, nearly the total destruction of the art of building ships.

9. The active trade which arose in the Mediterranean, during the middle ages, and the naval enterprises connected with the Crusades, occasioned a revival of the art of constructing ships; yet, it did not advance beyond the condition in which the Carthaginians had left it, until about the middle of the fourteenth century. At this era, the inconsiderable galleys of former times began to be superseded by larger vessels, in which, however, oars were not entirely dispensed with. [174]

10. The great change in the general construction of vessels, arose from the discovery of the polarity of the magnet, and the application of astronomy to nautical pursuits; for, by these means, the mariner was released from his dependence on the sight of the land, in guiding his vessel on its course. Larger ships were therefore constructed, capable of withstanding more violent storms and loftier waves.

11. To the Italians, Catalans, and Portuguese, was ship-building most considerably indebted, in the early days of its revival. The Spaniards followed up their discovery of the New World with a rapid improvement in both the form and size of their ships; some of which even rated at two thousand tons burden. In more modern times, it is said, that the Spaniards and French are entitled to the credit of nearly all the improvements which have been made in the theory of the art, the English having never contributed essentially to advance it, although the greatest naval power of this or any other time.

12. In the United States, very great improvements have been made in the construction of vessels, since the commencement of the present century. Our builders, however, are less guided by scientific rules than by experience and a practised eye; yet, it is generally conceded, that our ships of war and first-rate merchantmen, are superior in swiftness and beauty to those of any other country.

13. In Europe, the first thing done towards building a vessel, is to exhibit it in three distinct views by as many separate drawings; but, in the United States, the builder commences by framing a complete wooden model of the proposed construction—the thing itself in miniature. From this practice of our naval architects, have arisen the superior beauty and excellence of our vessels. [175]

14. The timber generally used in the construction of American vessels, is live-oak, pine, chestnut, locust, and cedar. The trees of mature growth are chosen, and girdled in the beginning of winter, at which time they contain but little sap. When sufficiently dry and hardened, the trees are felled; and, after the timber has been roughly hewn, it is carefully stored in some dry, airy place, not much exposed to wind or sun.

15. In collecting ship-timber, the greatest difficulty is found in procuring the crooked sticks, which form the sides or ribs of the skeleton of a vessel. In countries where ship-timber has become an object of careful cultivation, this difficulty is anticipated by bending the young trees to the desired form, and confining them there, until they have permanently received the proper inclination. The timber is brought to market in its rough state, and sold by the foot.

16. The timber having been selected, the workmen proceed to fashion the various parts of the proposed vessel with appropriate tools, being guided in their operations by patterns, which have been made after the exact form of the various parts of the model. Much care is taken to avoid cutting the wood contrary to the grain, that its strength may not be impaired.

17. After all the parts of the frame have been made ready, they are put together. The several blocks of timber on which the vessel is raised, are called the *stocks*; and to these pieces, the foundation, called the *keel*, is temporarily fastened in an inclined position. The keel is inserted into the *stern-post* at one end, and into the *stem* at the other. The *floor-timbers* are next fixed in the keel, every other one being there firmly bolted and riveted. Each of these timbers is a branch and part of the body of a tree; and, when composing a part of a vessel, they bear the same relation to it as the ribs to the human body. With equal propriety, the keel has been compared to the vertebral column, or back-bone. [176]

18. The next step is to apply and fasten the planks, which serve not only to exclude the water, but to bind all the parts firmly and harmoniously together. Simple as this part of the operation may seem to be, it is the most difficult to be effected, and requires a pre-concerted plan as much as any other part of the fabric. When it is necessary to bend a plank at the bow or stern, it is heated by steam, and then forced into place with screws and levers. The planks are fastened with iron or copper bolts.

19. The planking having been finished, and several particulars attended to, which cannot be well understood from description, the vessel is ready for the work of the *caulker*; who carefully stops all the seams with oakum, and smears them with pitch. After the superfluous pitch has been cleared away with the *scrapers*, water is pumped into the hold, to ascertain if there is any leak.

20. The bottom of the vessel is next sheathed either with sheets of copper or pine boards, to protect it from the worms. The latter materials are employed when the planks have been fastened with iron since the copper would cause the bolt-heads to corrode, if placed against them. In either case, sheets of paper, soaked in hot pitch, are interposed between the planks and the

sheathing.

21. The vessel is now ready to be removed from the stocks to the water. This removal is called *launching*, which, in many cases, requires much skill in the preparation and successive management. If there is no permanent inclined plane in the slip, on which the vessel may glide into the water, a temporary one is prepared, consisting of two platforms of solid timber, erected one on each side of the keel, at a distance of a few feet from it, and extending from the stem into the water. Upon this double platform which is called the *ways*, is erected another set of timbers, and the space between these and the vessel is filled all along with wedges. The whole of this superstructure is called the *cradle*, and the extremities of it are fastened to the keel, at the bow and stern, with chains and ropes. [177]

22. Every thing having been thus prepared, the wedges are simultaneously driven on both sides. By this means, the vessel is raised from the stocks, and made to rest entirely on the cradle. After the *shores* have been all removed, the cradle, with its weighty burden, begins to move; and, in a moment, the vessel is launched upon its destined element.

23. Among the ancients, a launch was ever an occasion of great festivity. The mariners were crowned with wreaths, and the ship was bedecked with streamers and garlands. Safely afloat, she was purified with a lighted torch, an egg, and brimstone, and solemnly consecrated to the god whose image she bore. In our less poetic times, there is no lack of feasting and merriment; although the ceremony of consecration is different, the oldest sailor on board merely breaking a bottle of wine or rum over the figure-head—still, perchance, the image of father Neptune or Apollo.

24. The vessel, now brought to the wharf, is to be equipped. The mode of doing this, is varied according as it may be a ship, brig, hermaphrodite brig, schooner, or sloop. The masts are first erected, and these are supplied with the necessary apparatus of spars, rigging, and sails. The latter are furnished by the sail-maker, who is sometimes denominated the *ship's tailor*.



[178]

THE MARINER.

1. The business of the mariner consists in navigating ships and other vessels from one port to another. This is an employment that requires much decisive resolution; and Horace has well said, that "his breast must have been bound with oak and triple brass, who first committed his frail bark to the tempestuous sea." There is certainly nothing which speaks louder in praise of human ingenuity, than that art by which man is able to forsake the land, contend successfully with winds and waves, and reach, with unerring certainty, his destined port in some distant part of the world.

2. Nor are the skill and intrepidity exhibited in this arduous employment, more worthy of our admiration, than the wonderful advantages resulting from it; for, we are indebted to the exercise of this art, for those improvements in our condition, which arise from the exchange of the superfluities of one country for those of another, and, above all, for the interchange of sentiments, which renders human knowledge coextensive with the world. [179]

3. Ship-building is so intimately connected with the art of navigation, that the historical part of the former subject is equally applicable to the latter. It is, therefore, unnecessary to be particular

on this point. We shall merely supply some omissions in the preceding article.

4. The sailors of antiquity confined their navigation chiefly to the rivers, lakes, and inland seas, seldom venturing out of sight of land, unless, from their knowledge of the coasts ahead, they were certain to meet with it again in a short time. When they thus ventured from the land, or were driven from it by tempests, the stars and planets were their only guides.

5. The qualifications of a skilful pilot or master, even for the Mediterranean seas, in those days, required more study and more practical information, than are necessary to render a mariner a complete general navigator, in the present improved state of the science of navigation; for then he must needs be acquainted, not only with the general management of the ship, but also with all the ports, land-marks, rocks, quicksands, and other dangers, which lay in the track of his course. Besides this, he was required to be familiar with the course of the winds, and the indications that preceded them, together with the movements of the heavenly bodies, and the influence which they were supposed to exert on the weather. Nor was the ability to read the various omens which were gathered from the sighing of the wind in the trees, the murmurs of the waters, and their dash upon the shore, the flight of birds, and the gambol of fishes, a qualification to be dispensed with. [180]

6. A voyage, in ancient times, was a momentous undertaking, and was usually preceded by sacrifices to those gods who were supposed to preside over the winds and the waves. All omens were carefully regarded; and a very small matter, such as the perching of swallows on the ship, or an accidental sneeze to the left, was sufficient to delay departure. When, under proper auspices, a vessel or fleet had set sail, and had advanced some distance, it was customary to release a number of doves, which had been brought from home. The safe arrival of these birds at the houses of the voyagers, was considered an auspicious omen of the return of the fleet.

7. Having escaped the multiplied dangers of the sea, the sailors, on their return, fulfilled the vows which they had made before their departure, or in seasons of peril, offering thanks to Neptune, and sacrifices to Jupiter, or some other of their gods, to whose protection they may have committed themselves. Those who had suffered shipwreck, felt themselves under greater obligations of gratitude; and, in addition to the usual sacrifices, they commonly offered the garment in which they had been saved, together with a pictorial representation of the disaster. If the individual escaped only with life, his clothing having been totally lost, his hair was shorn from the head, and consecrated to the tutelary deity.

8. There is much that is beautiful in these simple acts of piety; and similar customs, with regard to shipwrecked mariners, are still in existence in the Catholic countries of the Mediterranean; but the worship of the heathen deities having been discontinued, a favourite saint, or perchance the true God, is substituted for them. Although such acts of piety may not avail to avert impending danger, yet their natural tendency doubtless is to inspire courage to meet it, when it may arise. [181]

9. The Carthaginians, for several centuries, were more extensively engaged in commerce, than any other people of antiquity; and, as they carried on their lucrative trade with other nations and their own colonies, by means of ships, they exceeded all others in the art of navigation. Not content with exploring every nook and corner of the Mediterranean, they passed the Pillars of Hercules, as the promontories of the Straits of Gibraltar were then called, and visited the Atlantic coasts of Europe, as far north as the Scilly Islands, then denominated the Cassorides. It is asserted by Pliny, that Hanno even circumnavigated Africa.

10. The destruction of Carthage by the Romans, in the year before Christ 146, interfered with improvements in the art of navigation; and the invasion of the northern barbarians, several centuries afterwards, extinguished nearly all the knowledge which had been previously acquired; nor was it again revived, and brought to the state in which it existed in the most flourishing era of antiquity, until about the middle of the fourteenth century.

11. After the period just mentioned, improvements in this art followed each other in close succession. The chief cause of this rapid advance was the discovery of the polarity of the magnet, and the consequent invention of the mariner's compass. The power of the loadstone to attract iron, was early known to the Greeks and Chinese; but its property of pointing in a particular direction, when suspended, and left to move freely, was not suspected until about the year 1200 of our era.

12. At first, mariners were accustomed to place the magnetic needle on a floating straw, whenever they needed its guidance; but, in 1302, one Flavio Giaio, an obscure individual of the kingdom of Naples, placed it on a permanent pivot, and added a circular card. Still, it was nearly half a century after this, before navigators properly appreciated, and implicitly relied on this new guide. The compass did not reach its present improved state, until the middle of the sixteenth century. [182]

13. As soon as the reputation of this instrument had become well established, navigation assumed a bolder character; and the capacity of vessels having been enlarged to meet this adventurous spirit, oars were laid aside as inapplicable, and sails alone were relied upon, as means of propulsion.

14. Navigation, in the early days of its revival, was indebted to the Portuguese for many valuable improvements. To them, also, is the world under obligation for many splendid discoveries, among which was that of a passage by sea to India. This long-desired discovery was made in 1497, by Vasco de Gama, who had been sent out for the purpose by Emanuel, king of Portugal.

15. Five years before Vasco de Gama had found his way to India, by the way of the Cape of Good Hope, Columbus made his discovery of the New World. This great man had conceived or adopted the idea, that the form of our earth was spherical, in opposition to the generally received opinion, that it was an extended plane; and learning that India stretched to an unknown distance eastward, he supposed, that, by sailing in an opposite direction, the navigator would meet with its eastern extremity.

16. Pursuing this idea, he applied successively to the governments of several states and kingdoms for patronage to enable him to test its correctness; and having, at length, succeeded in obtaining three small vessels, with the necessary equipments, from Ferdinand and Isabella, sovereigns of Arragon and Castile, he proceeded on his proposed voyage, which resulted in the discovery of the American continent. [183]

17. These two great discoveries gave another powerful impulse to navigation; and inventions and improvements multiplied in rapid succession. The learned and ingenious, who at different times have turned their attention to the subject of navigation, have supplied the mariner with various means, by which he can direct his course on the deep with accuracy and certainty.

18. The instruments now employed in navigation, are the mariner's compass, the azimuth compass, the quadrant, the sextant, the chronometer, the half minute-glass, the log, and the sounding-line. In addition to these, the general navigator needs accurate maps and charts, lists of the latitude and longitude of every part of the world, the time of high water at every port, and a book of navigation, containing tables, to aid him in performing various calculations with facility; and, with a view to calculate the longitude by observation, he should be furnished with the Nautical Almanac, containing the places and declinations of the fixed stars and planets, and especially the distances of the moon from the sun and other heavenly bodies.

19. The mariner's compass, as has been before observed, is employed to indicate the various points of the horizon; but the magnetic needle varying more or less from the exact northern and southern direction, the azimuth compass is used, to show the degree of that variation. The quadrant and sextant are employed to ascertain the altitude and relative position of the heavenly bodies, that the mariner may determine the latitude and longitude in which his vessel may be. The chronometer is nothing more than a watch, designed to measure time with great accuracy. This instrument is used to determine the longitude. [184]

20. The log is used for ascertaining the velocity of the ship on the water. It consists of a quadrangular piece of wood, eight or nine inches long, to which is attached a small cord, having knots in it, at proper distances from each other. In the application, the log is thrown upon the water, where it will not be disturbed by the wake of the ship; and the cord, being wound upon a reel, passes from it as fast as the vessel moves in the water. The number of knots, which pass off every half minute, indicates the number of miles which the ship sails per hour; hence, in nautical language, *knots* and *miles* are synonymous terms. The sounding-line is a small cord, with several pounds of lead of a conical figure attached to it; and is employed in trying the depth of the water, and the quality of the bottom.

21. Navigation is either *common* or *proper*. The former is usually called coasting, as the vessel is either on the same or neighboring coast, and is seldom far from land, or out of sounding. The latter is applied to long voyages upon the main ocean, when considerable skill in mathematics and astronomy, together with an aptness in the use of instruments for celestial observations, are required in the captain or master.

22. The application of steam to the purposes of navigation, is one of the greatest achievements of modern science and art. The great utility of this agent is particularly conspicuous in our vast country, where large rivers and bays and mighty lakes are numerous, and where an energetic people and an active commerce require a rapid intercommunication. Steamboats are but little used on the great oceans; as merchandise can there be more cheaply and safely transported in vessels propelled by sails. Since the year 1839, two lines of steam packets have been running regularly between this country and Great Britain. They commonly occupy, in crossing the Atlantic, between twelve and fifteen days. [185]

23. The chief obstacle to the employment of steam, in long voyages, arises from the difficulty of generating a sufficient quantity of this agent, with the fuel which could be carried without overburdening the vessel; but a remedy for this inconvenience will probably be found, in improvements in the construction of steam-generators.

24. The power of confined steam acting by its expansive force, was discovered by the celebrated Marquis of Worcester, about the middle of the seventeenth century; but the first working steam-engine was constructed in 1705, by Thomas Newcomen, a blacksmith of Dartmouth, Devonshire, England. About the year 1769, James Watt, a native of Glasgow, added a great number of improvements of his own invention.

25. Steam navigation was first suggested in England, in 1736, by Jonathan Hulls. It was first tried in practice in France, in 1782, by the Marquis de Jouffroy, and nearly at the same time by James Rumsey, of Virginia, and John Fitch, of Philadelphia; but it was first rendered completely successful at New-York, in 1807, by Robert Fulton.

26. The sailors employed by the captain, to aid him in navigating his ship, are called a *crew*; and the individuals composing it are responsible to the captain, the captain to the owners, and the owners to the merchants, for all damages to goods, arising from negligence or bad management.

27. In England, ample provisions are made at Greenwich Hospital or by pensions, for seamen disabled by age or otherwise. These benefits, however, are extended only to those who have been engaged in the national service. This noble and politic institution is supported partly by public bounty, and in part by private donations, and a tax of sixpence per month, deducted from the wages of all the seamen of the nation. Marine Hospitals, for the temporary accommodation of seamen, suffering from disease, have been established in several cities of the continent of Europe, as well as of the United States.

[186]

28. Mariners have ever been a distinct class of men, and, in their general characters, very similar in every age of the world. Their superstitious regard of the many signs of good and bad luck, is nearly the same now, that it was two or three thousand years ago. In ancient times, they had their lucky and unlucky days; and now, very few sailors are willing to leave port on Friday, lest the circumstance bring upon them some disaster, before the conclusion of the proposed voyage.

29. Superstitions of this nature, however, are not confined to the navigators of the deep. Even in this country, where the inhabitants enjoy superior intellectual advantages, and boast a high degree of intelligence, thousands of persons who have never been on board of a ship, are still under the influence of such heathen notions, notwithstanding their pretended belief in Christianity, which, in all cases, when properly understood, would prevent the forebodings of evil, or expectations of good, from unimportant prognostics.

[187]



THE MERCHANT.

1. The word *merchant*, in its most extended application, signifies, a person who deals in merchandise. This definition, with some exceptions, agrees very well with general usage in this country; although, in England, the term is principally restricted to those dealers who export and import goods on their own account, either in their own or in chartered vessels. In the United States, dealers of this class are denominated *importing* and *exporting* merchants; or simply, *importers* and *exporters*.

2. Such merchants, both here and in Europe, are distinguished from each other by the kind of goods in which they traffic, or by the foreign country in which they have their chief correspondence; thus, one who deals in tobacco is called a tobacco-merchant; a wholesale dealer in wines is called a wine-merchant; a West India, East India, or Turkey merchant, exports goods to, and imports goods from, those respective countries.

[188]

3. The business of merchants, in foreign countries, is usually transacted by agents, called factors, or commission merchants, to whom goods are consigned to be sold, and by whom other articles of merchandise are purchased and returned according to order. Sometimes an agent, called a supercargo, accompanies the vessel; or the captain may act in this capacity. Goods, however, are often obtained by order, without the intervention of an agency of any kind.

4. Almost every sort of foreign merchandise is subject to the imposition of duties by the government of the country in which it is received. These duties are paid at the *Custom-House*, to persons appointed by the constituted authorities to collect them. As soon as a vessel from abroad has entered the harbor, it is visited by a custom-house officer, called a *Tide-Waiter*, whose business it is to see that no part of the cargo is removed, until measures have been taken to secure the customs.

5. Goods brought into the country by importers, are frequently sold, in succession, to several merchants of different grades, before they come to the hands of the consumers. Cloths or stuffs of different kinds, for instance, may be first sold by the bale to one merchant, who, in turn, may dispose of them by the package to another, and this last may retail them in small quantities to a greater number of customers.

6. Dealers in a small way, in cities and large towns, are frequently denominated shop-keepers; but those who do an extensive retail business, are usually called merchants or grocers, according as they deal in dry goods or groceries. In cities, the extensive demand for goods enables retailers to confine their attention to particular classes of articles; such as groceries, hardware, crockery, a few kinds of dry goods, or some articles of domestic manufacture; but in other places, where trade is more limited, the merchant is obliged to keep a more general assortment. [189]

7. The general retail merchant is compelled to transact business with a great number of wholesale dealers, to whom he pays cash in hand, or agrees to pay it at some future period, say, in four, six, nine, or twelve months. The people in his vicinity, in turn, purchase his goods on similar conditions, with this difference, that they often substitute for cash agricultural and other productions, which the merchant, at length, turns into ready money.

8. Barter, or the exchange of commodities, prevails to a great extent, in country places, in almost every part of the United States. In such exchanges, the currency of the country is made the standard of reference: for example; a merchant receiving from a customer twenty bushels of wheat, estimated at one dollar per bushel, gives in return twenty dollars' worth of goods, at his marked prices; or, in other words, he gives credit for the wheat, and charges the goods. On the same principle, merchants of the first class often exchange the productions of their own country for those of another.

9. Merchants, or store-keepers, as they are indifferently called in some places, whose location is distant from the seaboard, visit the city in which they deal once or twice a year, for the purpose of laying in their stock of goods; but, in order to keep up their assortment, they sometimes order small lots in the interim. Retailers more conveniently situated, purchase a smaller amount of goods at a time, and replenish their stores more frequently. [190]

10. Commerce, on the principles of barter, or a simple exchange of one commodity for another, must have been practised in the early days of Adam himself; although we have no positive record of the fact; for it cannot be imagined that the arts, which are stated in the Scripture to have flourished long before the flood, could have existed without commercial transactions. The period at which the precious metals began to be employed as a standard of value, or as a medium of commercial intercourse, is not known. They were used for this purpose in the time of Abraham, and probably many centuries before his day.

11. The earliest hint respecting the existence of trade between different nations, is to be found in the book of Genesis, where the transaction regarding the sale of Joseph to the Ishmaelites, or Midianites, is mentioned. These merchants, it appears, were travelling in a caravan to Egypt, then the most cultivated and refined part of the world. Their camels were loaded with balm, myrrh, and spices. The first of these articles was the production of Gilead; the second, of Arabia; and the last was probably from India; as in that country the finer spices are produced. If this were really the case, commerce, in its widest sense, was carried on much earlier than is generally supposed.

12. The fertility of Egypt, and its central position, made it an emporium of commerce; and there it flourished, in an eminent degree, long before it was cultivated in Europe and in Western Asia. For several ages, however, the Egyptians, on account of their superstitious prejudices against the sea, carried on no maritime commerce.

13. The Phœnicians were the first people who used the Mediterranean Sea, as a highway for the transportation of merchandise. Tyre and Sidon were their chief cities; and the latter was called a *great*, and the former a *strong* city, even in the time of Joshua, fifteen hundred years before the advent of Christ. These people, in their original association as a nation, possessed but a small territory; and, being surrounded by many powerful nations, they never attempted its enlargement on the land side. [191]

14. The settlement of the Israelites in the "Promised Land," circumscribed their limits to a very small territory, and compelled them to colonize a great number of their inhabitants. The colonies which they formed in the various countries bordering upon the Mediterranean and on the islands, enlarged the boundaries of civilization, and greatly extended their trade.

15. The Phœnicians continued their colonial system for many centuries after the period just mentioned, and even extended it to the Atlantic coasts of Europe. But the most distinguished of all their colonies was the one which founded the city of Carthage, on the northern coast of Africa, about the year 869 before Christ. Elissa, or, as she is otherwise called, Dido, the reputed leader of this colony, makes a conspicuous figure in one of the books of Virgil's *Æneid*.

16. Carthage, adopting the same system which had so long been pursued by the great cities of Phœnicia, rose, in a few centuries, to wealth and splendor. But, changing, at length, her mercantile for a military character, she ruled her dependent colonies with a rod of despotism. This produced a spirit of resistance on the part of her distant subjects, who applied to Rome for aid to resist her tyranny. The consequence of this application was the three "Punic wars," so renowned in history, and which terminated in the destruction of Carthage, in the year 146 before

the Christian era. During the first Punic war, Carthage contained seven hundred thousand inhabitants; but at its destruction, scarcely five thousand were found within its walls.

[192]

17. The period of the greatest prosperity of Tyre, may be placed 588 years before Christ, at which time the remarkable prophecies of Ezekiel concerning it were delivered. Soon after this, it was greatly injured by Nebuchadnezzar; and was finally destroyed by Alexander the Great, about the year 332 before Christ.

18. A new channel was opened to commerce by the monarch just mentioned, he having founded a city in Egypt, to which he gave the name of Alexandria. His object seems to have been, to render this city the centre of the commercial world; and its commanding position, at the mouth of the Nile, was well calculated to make it so; since it was easy of access from the west by the Mediterranean, from the east by the Red Sea, and from the central countries of Asia by the Isthmus of Suez.

19. The plans of Alexander were carried out with vigor by Ptolemy, who received Egypt as his portion of the Macedonian empire, after the death of his master; and, by his liberality, he induced great numbers of people to settle in the new metropolis for the purposes of trade. Far south, on the Red Sea, he also founded a city, which he called Berenice, and which he designed as a depôt for the precious commodities brought into his kingdom from India. From this city, goods were transported on camels across the country, to a port on the Nile; and thence they were taken down the river to Alexandria.

20. Ptolemy also kept large fleets both on the Mediterranean and on the Red Sea, for the protection of commerce, and the defence of his dominions; yet, the Egyptians, even under the Ptolemies, never attempted a direct trade to India. They, as the Phœnicians and their own progenitors had done for ages, depended upon the Arabian merchants for the productions of that country.

21. The Greeks, before their subjugation to the Roman power, had paid much attention to nautical affairs; but this had been chiefly for warlike dominion, rather than for commercial purposes. The city of Corinth, however, had become wealthy by the attention of its inhabitants to manufactures and trade; but it was destroyed by the same barbarian people who, about this time, annihilated Carthage. Both of these cities were afterwards favored by Julius Cæsar; but they never regained anything like their former importance.

[193]

22. Rome having, at length, obtained the complete dominion of the Mediterranean Sea, and the countries bordering upon it, as well as that of many others more distant, and less easy of access, became the great mart for the sale of merchandise of every description, from all parts of the known world. For the various commodities brought to the city, the Romans paid gold and silver; as they had nothing else to export in return. The money which they had exacted as tribute, or which they had obtained by plunder, was thus returned to the nations from which it had been taken.

23. The subjected provinces continued to pour their choicest productions into Rome, as long as she retained the control of the empire; and thus they contributed to enervate, by the many luxuries they afforded, the power by which they had been subdued. The *eternal city*, as she is sometimes called, in the days of her extensive dominion, contained about three millions of inhabitants; and, although this immense population was chiefly supplied by importations, the Romans never esteemed the character of a merchant. They despised the peaceful pursuits of industry, whilst they regarded it honorable to attack without provocation, and plunder without remorse, the weaker nations of the earth.

24. In the year 328 of the Christian era, Byzantium was made the seat of government of the Roman empire by Constantine, who, with a view of perpetuating his own name, called his new capital Constantinople. However necessary this removal may have been, to keep in subjugation the eastern provinces, it was fatal to the security of the western division. The rivalry between the two cities produced frequent contests for dominion; and these, together with the general corruption and effeminacy of the people themselves, rendered it impossible to resist the repeated and fierce invasions of the barbarous people from the northern parts of Europe.

[194]

25. These invasions commenced in the latter part of the fourth century; and, in less than two hundred years, a great portion of the inhabitants was destroyed, and the whole Western empire was completely subverted. The conquerors were too barbarous to encourage or protect commerce; and, like the arts of peace and civilization generally, it sunk, with few exceptions, amid the general ruin.

26. The empire of Constantinople, or, as it is usually called, the Eastern empire, continued in existence several centuries after the Western empire had been overrun; and commerce continued to flow, for a considerable time, through some of its former channels to the capital. At length, the Indian trade, which had so long been carried on chiefly through Egypt by the Red Sea, was changed to a more northern route, through Persia.

27. Soon after the commencement of the pretended mission of Mohammed, or Mahomet, in 609 of the Christian era, the power of the Arabians, since called Saracens, began to rise. The followers of the Prophet, impelled by religious zeal, and allured by plunder, in less than 150 years extended their dominion almost to the borders of China on the one side, and to the Mediterranean and Atlantic on the other. The trade of the East, of course, fell into their hands; and they continued to enjoy it, until they, in turn, were subdued by the Turks.

[195]

28. So great was the prejudice of the Christians against the followers of Mohammed, that, for a long time, it was considered heretical for the former to trade with the latter; but the Saracens having a vast extent of territory, and having control of the Mediterranean and Red Seas, as well as of the Persian Gulf, carried on an extensive trade among themselves.

29. The first European power which rose to commercial eminence, after the destruction of the Western empire, was the republic of Venice. This important city owed its origin to some fugitives, who fled for their lives to a number of small islands in the Adriatic Sea, during the invasion of Italy by the Huns, under Attila, in the year 452.

30. The houses first built by the refugees, were constructed of mud and seagrass; and, so insignificant were they in their appearance, that a writer of that period compares them to a collection of the nests of water-fowls. The number of these islands, on which so splendid a city was afterwards built, was, according to some, seventy-two; but, according to others, ninety, or even one hundred and fifty. For a considerable time, the distinction of rich and poor was not known; for all lived upon the same fish-diet, and in houses of similar form and materials.

31. In less than a century, the inhabitants of these islands had established a regular government; and, in the year 732, we find them venturing beyond the Adriatic into the Mediterranean, even as far as Constantinople, trading in silks, purple draperies, and Indian commodities. In 813, the French commenced trading to Alexandria, and, in a few years, the Venetians followed their example, in despite of the ecclesiastical prohibitions against intercourse with the followers of Mohammed. In the tenth century, Amalfi, Pisa, Genoa, and Florence, began to rival Venice in trade. [196]

32. The crusades, which, for two centuries from the year 1095, engaged so much of the attention of the Christian nations of Europe, greatly promoted the interests of the commercial cities of Italy; as the armies in these expeditions were dependent on them for provisions, and for the means of crossing the sea, which lay between them and the *Holy Land*. They also gave a new and powerful impulse to commerce in general, by giving the people, in the unrefined parts of Europe, a knowledge of the elegances and luxuries of the East.

33. In the thirteenth century, commerce and manufactures began to command considerable attention in Germany and the adjacent states; but as the seas and rivers were infested with pirates, and the roads with banditti, it became necessary for those engaged in commerce to adopt measures to protect their commodities, while on the way from one place to another. The citizens of Hamburg and Lubeck first united for this purpose; and the advantages of such a union of strength becoming apparent, many other cities soon entered into the confederation.

34. This association was denominated the *Hanse*, or league, and the cities thus united were called *Hanse Towns*. Most of the commercial towns in the northern parts of the continent of Europe, at length, became parties to the Hanseatic league. The number of these cities varied, at different periods; but in the days of the greatest prosperity of the association, it amounted to eighty-five.

35. Representatives from the different cities met triennially at Lubeck, where their common treasury and archives were kept. By this assembly, which was called a diet, rules for the regulation of commercial intercourse were made, and other business transacted, which related to the general welfare of the confederation. [197]

36. In the fourteenth century, the league, in all parts of Europe, attained a high degree of political importance, and developed that commercial policy which it had originated, and which has since been adopted by all civilized nations. The objects of the allied cities were now declared to be—to protect their commerce against pillage, to guard and extend their foreign trade, and, as far as possible, to monopolize it, to maintain and extend the privileges obtained from the princes of different nations, and to make rules or laws for the regulation of trade, as well as to establish the necessary tribunals for their due execution. The decisions of their courts were respected by the civil authorities of the countries to which their trade extended.

37. The treasury was chiefly supplied by duties on merchandise; and the great wealth thus acquired enabled the allied cities to obtain commercial privileges from needy princes, for pecuniary accommodations. The league, in defending its commerce, even carried on wars against kingdoms; and, at length, by its wealth and naval power, became mistress of the Northern seas, and rendered the different cities of the confederation in a great measure independent of the sovereigns of the countries in which they were situated.

38. The conduct of the Hanse Towns, at length, excited the jealousies of those sovereigns who had, for a long time, favored their union; and the princes of Europe generally, becoming acquainted with the value of commerce, both as means of enriching their people, and of filling their own coffers, combined against the association. In 1518, the governments of several states commanded all their cities to withdraw from the league, which soon after voluntarily excluded some others. After this the Hanse gradually sunk in importance, and finally ceased to exist in 1630. [198]

39. The trade to the East Indies continued to be carried on through Persia and Egypt, subject to the extortions of the Saracens, and the still severer exactions of the merchants of the Italian cities, until the route to those countries, by the Cape of Good Hope, was discovered.

40. The use of this new pathway of commerce, combined with the discovery of America, caused

an entire change in both the political and commercial state of Europe. A strong desire of visiting the remote parts of the world, thus laid open to the people of Europe, immediately arose, not only among the Portuguese and Spaniards, but also among other nations. Colonies were soon planted in the East and in the West; and the whole world may be said to have been inspired with new energy.

41. The Portuguese, being considerably in advance of the other Atlantic nations in the art of navigation, soon gained the entire control of the East India trade, and were thus raised to great eminence, prosperity, and power. Their dominions became extensive in Africa and Asia, and their navy superior to any that had been seen for several ages before.

42. In 1580, or eighty-three years after Vasco de Gama found his way, by the Cape, to Calicut, Portugal was subdued by Philip II., king of Spain. The Spaniards, however, were not enriched by the conquest; since their commercial energy and enterprise had been destroyed, by the vast quantities of the precious metals obtained from their American possessions.

43. In 1579, the people of Holland, with those of six neighboring provinces, being then subject to Spain, united, under the Prince of Orange, for the purpose of regaining their liberties. This produced a sanguinary war, which continued for thirty years, during which time the Dutch wrested from the Spaniards most of their Portuguese possessions in India, and, in addition to this, formed many other settlements in various places from the River Tigris even to Japan. Batavia, on the Island of Java, was made the grand emporium of trade, and the seat of the government of their East India possessions. [199]

44. The prosperity of the United Provinces increased with great rapidity; and, as they were but little interfered with by other nations in their Eastern dominions, they enjoyed, for half a century or more, almost the whole of the trade of the East. Besides this, they shared largely with the rest of the world in almost every other branch of trade. After the year 1660, other nations, by great exertions, succeeded in obtaining considerable shares of the commerce of the East; yet the Dutch still retain valuable possessions there.

45. The chief articles exported from Britain, in ancient times, were tin, lead, copper, iron, wool, and cattle; for which they received in return, gold, silver, and manufactured articles. But the commerce of the British Islands was inconsiderable, when compared with that of many kingdoms on the Continent, until the beginning of the eighteenth century.

46. When Elizabeth ascended the throne of England, in 1558, the circumstances of the nation required an extensive navy for its protection; and the great attention which the queen paid to this means of defence, gave animation to all maritime concerns. Under her patronage, several companies for trading in foreign countries were formed, which, at that time, and for a long period afterwards, were very beneficial to trade in general. In her reign, also, the colonial system of England had its origin, which contributed eventually, more than any thing else, to the commercial prosperity of that nation. Since the reign of this wise and judicious princess, the commerce and manufactures of Great Britain have been, with a few interruptions, steadily advancing; and, in these two particulars, she surpasses every other nation. [200]

47. The United States possess superior local advantages for trade, and embrace a population unsurpassed for enterprise and energy. Since the Revolution, the resources of our country have been rapidly developing. Our exports and imports are already next in amount to those of Great Britain and France and the extensive improvements which have been made by the different states, to facilitate internal intercourse, are increasing with great rapidity.

48. The banking system is very intimately interwoven with commercial affairs in general. Banks are of three kinds, viz., of *discount*, of *deposit*, and of *circulation*. The term *bank*, in its original application, signified a place of common deposit for money, and where, in commercial transactions, individuals could have the amount, or any part of the amount, of their deposits transferred to each other's accounts.

49. The term *bank* is derived from the Italian word *banco*, which signified a kind of bench, or table, on which the Jews were accustomed to place the money which they proposed to lend in the markets of the principal towns. The first bank was established in Venice, about the middle of the twelfth century; the Bank of Genoa, in 1345; the Bank of Amsterdam, in 1607; the Bank of Hamburg, in 1619; the Bank of Rotterdam, in 1635. These were all banks of mere deposit and transfer.

50. *Lending-houses* may be traced to a very ancient origin. They were, at first, supported by humane persons, with a view of lending money to the poor, on pledges, without interest. Augustus Cæsar appropriated a part of the confiscated effects of criminals to this purpose; and Tiberias, also, advanced a large capital, to be lent for three years, without interest, to those who could give security in lands equal to twice the value of the sum borrowed. [201]

51. In the early ages of Christianity, free gifts were collected and preserved by ecclesiastics, partly to defray the expenses of divine service, and partly to relieve the poor of the church; and the funds thus provided came, at length, to be called *montes pietatis*—mountains of piety. This appellation was afterwards applied to the *loaning-houses*, established in modern Italy in imitation of those of antiquity.

52. In course of time, the loaning-houses were permitted by the Roman pontiff to charge a moderate interest on a part of their capital, and, finally, upon the whole of it; still, they retained,

for a long period, the original denomination of *montes pietatis*. The receiving of interest on loans was declared lawful by the Pope, about the middle of the fifteenth century. Soon after this period, all the cities of Italy hastened to establish these institutions; and their example was, at length, followed in other parts of Europe.

53. But long before the Pope had granted this privilege, individuals were in the habit of loaning money at an exorbitant usury. These were principally Jews and merchants from Lombardy; hence, all persons in those countries, who dealt in money, came to be called *Lombard merchants*. The prohibitions of the Church against receiving interest were eluded, when necessary, by causing it to be paid in advance, by way of present or premium.

54. In the twelfth century, many of the dealers in money were expelled from England, France, and the Netherlands, for usurious practices; and, in order to regain possession of their effects, which they had, in their haste, left in the hands of confidential friends, they adopted the method of writing concise orders or drafts. Hence originated bills of exchange, so convenient in commercial transactions.

[202]

55. The Bank of England was established in the year 1694. Hitherto, the banks of deposit, and loaning-houses, were entirely distinct; but, in this institution, these two branches of pecuniary operations were united. It seems, also, that this was the first bank that issued notes, to serve as a medium of circulation, and to supply, in part, the place of gold and silver.

56. In the United States, banking institutions are very numerous. They are all established by companies, incorporated by the legislatures of the different states, or by the congress of the United States. The act which grants the privileges of banking, also fixes the amount of the capital stock, and divides it into equal shares. The holders of the stock choose the officers to transact the business of the corporation.

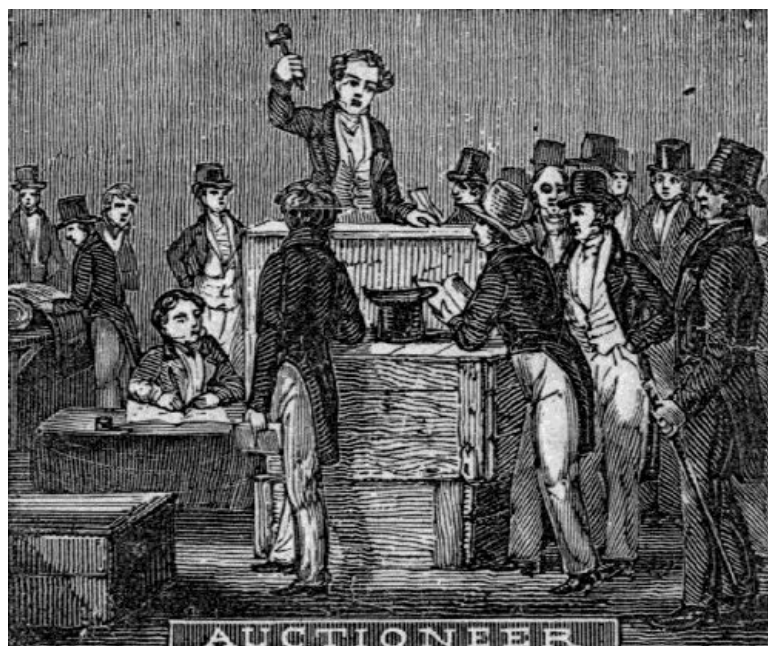
57. Our banks receive deposits from individual customers, loan money on notes of hand, acceptances, and drafts, issue notes of circulation, and purchase and sell bills of exchange. They are usually authorized, by their charters, to loan three times the amount, and to issue bank-notes to twice the amount, of the capital stock paid in. Few banking companies, however, exercise these privileges to the full extent, lest the bank be embarrassed by too great a demand for specie. As soon as a bank ceases to pay specie for its notes, it is said to be broken, and its operations must cease.

58. The Bank of North America was the first institution of this kind, established in the United States. It was incorporated by Congress, in 1781, at the suggestion of Robert Morris. In 1791, after the union of the states had been effected under the present constitution, the first Bank of the United States was incorporated, with a capital of ten millions of dollars. Most of the states soon followed this example; and, before the beginning of the present century, the whole banking capital amounted to near thirty millions of dollars.

[203]

59. The charter of the first Bank of the United States expired, by its own limitation, in 1811; and a new one, with a capital of thirty-five millions of dollars, was established in 1816, which also closed its concerns, as a national bank, in 1836, President Jackson having vetoed the bill for its recharter. In that year the number of banks was 567, and the bank capital \$251,875,292. In the year 1840, the number of banks had increased to 722, and their capital to \$358,442,692.

[204]



THE AUCTIONEER.

1. The Auctioneer is one who disposes of property at public sale to the highest bidder. The sale of property in this manner is regulated, in some particulars, by legislative enactments, which have for their object the prevention of fraud, or the imposition of duties.

2. In Pennsylvania, the present law provides for three classes of auctioneers, each of which is required to pay to the state a specified sum for a license. The first class pays two thousand dollars per annum; the second, one thousand; and the third, two hundred; and, besides this, one and a half per cent. on the amount of all their sales is required to be paid into the treasury of the state. To each class are granted privileges corresponding to the cost of the license. [205]

3. In the state of New-York, the number of auctioneers for the cities, villages, and counties, is limited by law; and all persons who would follow the business are compelled to give security for the faithful execution of its duties. The state requires a duty of one per cent. on all merchandise imported from beyond the Cape of Good Hope, one and a half per cent. on such as may be imported from other foreign countries, and two per cent. on wines and ardent spirits, whether foreign or domestic. The laws and usages regarding sales at auction, in most of the United States, are similar, in their general principles, to those of Pennsylvania or New-York.

4. A great amount of merchandise, both foreign and domestic, in our principal cities, is sold by auction; and the price which staple commodities there command is generally considered a tolerable criterion of their value at the time. It very frequently happens, however, that articles which are not in steady demand, are sold at a great sacrifice. Auctioneers seldom import goods, nor is it usual for them to own the property which they sell.

5. In all cases, before an auction is held, due notice is given to the public. This is usually done by the circulation of a printed hand-bill, by a crier, or by an advertisement in a newspaper; or all three of these modes may be employed to give publicity to one and the same sale.

6. Persons desirous of becoming purchasers at the proposed auction, assemble at the time appointed; and, after the auctioneer has stated the terms of sale, as regards the payment of whatever may be purchased, he offers the property to the persons present, who make their respective bids, he, in the mean time, *crying* the sum proposed. When no further advance is expected, he *knocks down* the article to the last bidder.

7. A mode of sale was formerly, and, in some cases is still, practised, in various parts of Europe, called *sale by inch of candle*. The things for sale are offered in the ordinary manner, as has been described in the preceding paragraph, and, at the same time, a wax-candle, an inch in length, is lighted. The purchasers bid upon each other, until the candle has been all consumed; and the last bidder, when the light goes out, is entitled to the articles or goods in question. [206]

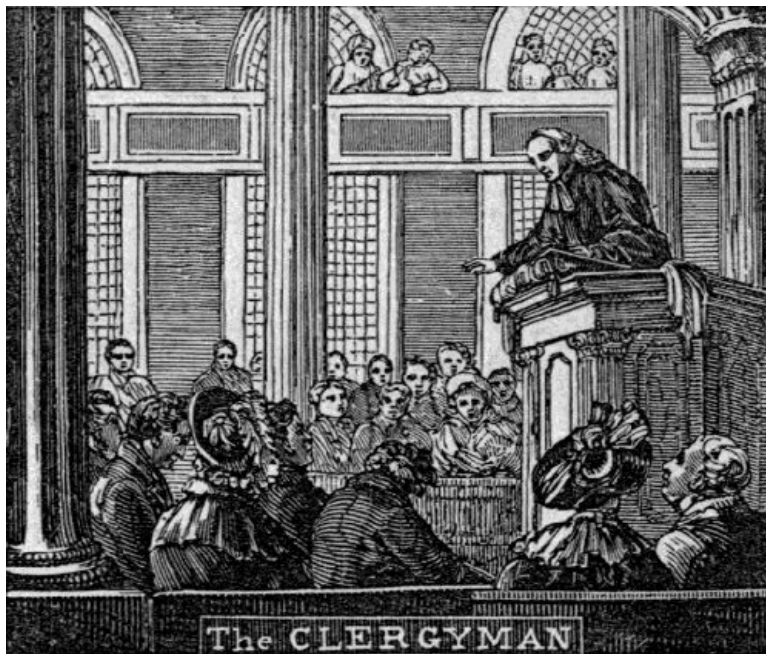
8. Auctioneers, in large cities, hold their sales at regular periods; sometimes, every day or evening. On extensive sales of merchandise, credits of two, three, four, six, or nine months, are commonly given. In such cases, the auctioneer often gives his own obligations for the goods, and receives in return those of the purchasers.

9. This mode of sale is employed in the disposition of property taken by process of law for the payment of debts, in every part of the world, where the influence of European law has extended. It is used in preference to any other; because it is the most ready way of sale, and is moreover the most likely method to secure to the debtor something like the value of his property.

10. Executors and administrators often employ this convenient method of sale, in settling the estates of deceased persons; and they, as well as sheriffs and constables, *ex-officio*, or by virtue of their office, have a lawful right to act in the capacity of auctioneer, in performing their respective duties; and no tax is required by the state, in such cases.

11. The sale by auction was in use among the Romans, even in the early days of their city. It was first employed in the disposition of spoils taken in war; hence a spear was adopted as a signal of a public sale; and this continued to be the auctioneer's emblem, even after this mode of sale was extended to property in general. The red flag and spear, or rather the handle of that instrument, both emblematical of blood and war, are still employed for the same purpose. [207]

12. Several attempts have been made in the United States, to suppress sales of merchandise by auction; but these endeavors were unsuccessful, since experience had proved this mode of effecting exchanges to be prompt and convenient; and since some of the states had derived considerable revenue from the duties. So long as conflicting interests remain as they are, this mode of sale will be likely to continue.



THE CLERGYMAN.

1. The Lord Jesus Christ, our Saviour, during his visit of mercy to the world, chose from among his disciples twelve men, to be his especial agents in establishing his church. These men, in our translation of the New Testament, are denominated apostles. The grand commission which they received was, "Go ye into all the world, and preach my gospel to every creature."

2. The apostles commenced their noble enterprise on that memorable day of Pentecost, which next occurred after the ascension of their Master; and, in the city of his inveterate enemies, soon succeeded in establishing a church of several thousand members. The doctrines of Christianity soon spread to other cities and countries; and, before the close of that century, they were known and embraced, more or less, in every province of the Roman empire. [209]

3. The apostles, however, were not the only agents engaged in spreading and maintaining the doctrines of Christianity; for, in every church, persons were found capable of taking the supervision of the rest, and of exercising the office of the ministry. These were ordained either by the apostles themselves, or by persons authorized by them to perform the ceremony.

4. After the Church had passed through a great variety of persecutions, during a period of nearly three centuries, the Christians became superior in numbers to the pagans in the Roman empire. In the early part of the fourth century, a free toleration in religious matters was declared by Constantine the Great, who took the Church under his especial protection.

5. The Christians of the first and second centuries usually worshipped God in private houses, or in the open air in retired places, chiefly on account of the persecutions to which they were often subjected. It was not until the third century, that they ventured to give greater publicity to their service, by building churches for general accommodation. When the Cross had obtained the ascendancy, in the subsequent age, many of the heathen temples were appropriated to Christian purposes; and many splendid churches were erected, especially by Constantine and his successors.

6. In the middle ages, a great number of edifices were erected for the performance of divine worship, which, in loftiness and grandeur, had never been surpassed; and the greater part of these remain to the present day. Some of the most famous churches are, St. Peter's, at Rome; Notre Dame, at Paris; St. Stephen's, at Vienna; the church of Isaac, at St. Petersburg; the minsters at Strasburg and Cologne and St. Paul's, in London. [210]

7. Up to the time of the great change in favor of Christianity, just mentioned, the whole Church had often acted together in matters of common interest, through the medium of general councils; and this practice continued for several centuries afterwards. But the variance and dissensions between the Pope of Rome, and the Patriarch of Constantinople, combined with some other causes, produced, about the close of the ninth century, a total separation of the two great divisions of the Church.

8. At the time of this schism, the whole Christian world had become subject to these two prelates. The part of the Church ruled by the Patriarch, was called the *Eastern*, or *Greek Church*; and that part which yielded obedience to the Pope, was denominated the *Western*, or *Latin Church*. Many attempts have been since made to reunite these two branches of the Church; but these endeavors have hitherto proved unsuccessful.

9. The conquest of the Roman empire, so often mentioned in the preceding pages, was particularly injurious to the Church, especially that part of it subject to the Roman pontiff; since it nearly extinguished the arts and sciences, and since the barbarous conquerors were received

into the Church, before they had attained the proper moral qualifications. From these causes, chiefly, arose the conduct of the Church, in the middle ages, which has been so much censured by all enlightened men, and which has been often unjustly attributed to Christianity herself, rather than to the ignorance and barbarism of the times.

10. In the year 1517, while Leo X. occupied the papal chair, Martin Luther, of Saxony, commenced his well-known opposition to many practices and doctrines in the Church, which he conceived to be departures from the spirit of primitive Christianity. He was soon joined in his opposition by Philip Melancthon, Ulric Zuingle, and finally by John Calvin, as well as by many other distinguished divines of that century, in various parts of Europe. [211]

11. These men, with their followers and abettors, for reasons too obvious to need explanation, received or assumed the appellation of *Reformers*; and, on account of a solemn protest which they entered against a certain decree which had been issued against them, they also became distinguished by the name of *Protestants*. The latter term is now applied to all sects, of whatever denomination, in the western division of the Church, that do not acknowledge the authority of the Roman See.

12. The Protestant division of the Church is called by the Roman Catholics, the *Western schism*, to distinguish it from that of the Greek Church, which is termed the *Eastern schism*. The Protestants are divided into a great number of sects, or parties; and, although they differ from each other in many of their religious sentiments, they agree in their steady opposition to the Roman Catholics.

13. The ostensible object of the founders of all the churches differing from the Romish communion, has been, to bring back Christianity to the state in which it existed on its first establishment; and to prove their positions in doctrine and church government, they appeal to the Scriptures, and sometimes to the Christian writers of the first four or five centuries. The advocates of the "mother church," on the contrary, contend that, being infallible, she can never have departed from primitive principles, on any point essential to salvation.

14. As to the government of the several churches it is, in most cases, either Episcopal or Presbyterian. In the former case, three orders of clergymen are recognized; viz., *bishops*, *presbyters*, and *deacons*; and these three orders are supposed, by the advocates of episcopacy, to have been ordained by the apostles. This opinion is supported by the circumstance, that these orders are mentioned in the Scriptures; and also by the fact, supposed to be sustained by the primitive fathers, that they were uniformly established early in the second century. [212]

15. It is believed by Episcopalians, that these three orders of ministers were instituted in the Christian Church, in imitation of the Jewish priesthood; the bishop representing the high-priest; the presbyters, the priests; and the deacons, the Levites.

16. On the other hand, the advocates of the Presbyterian form of government, assert, that in the first century of the Church, bishop and presbyter were the same order of ministers, and that the former was nothing more than a presbyter, who presided in Christian assemblies, when met to consult on church affairs.

17. The deacons in the churches that have renounced episcopacy, are not classed among the clergy, but are chosen from among the private members, to manage the temporalities of the congregation, or church, to which they belong, to assist the minister, on some occasions, in religious assemblies, or to take the lead in religious worship in his absence. Under this form of government, therefore, there is recognized but one order of ministers, and every clergyman is denominated *presbyter*, *priest*, or *elder*.

18. The literary and religious qualifications required of candidates for orders have varied in different ages of the Church, according to the existing state of literature and religion; and the requirements in these two particulars are now different, in the several denominations. Nearly all, however, require the profession in the candidate, that he believes he is moved by the Holy Ghost to take upon him the office of the ministry. Some churches require a collegiate education, with two or three years of the study of divinity; but others, only such as is usually obtained in common schools, combined with a tolerable capacity for public speaking. [213]

19. The clergy in the Roman Catholic Church, is of two kinds; the one *regular*, comprehending all the religious who have taken upon themselves monastic vows; the other *secular*, comprehending all the ecclesiastics who do not assume these obligations. The latter, however, in common with the former, take a vow of perpetual celibacy.

20. It is the especial duty of clergymen, to preach the gospel, to administer the ordinances, and to enforce the discipline of that branch of the Church to which they belong. They are also expected to administer consolation to persons in distress of mind, arising from the complicated evils of this life, to unite persons by the bonds of matrimony, and, finally, in attending on the burial of the dead, to perform the last ceremony due from man to man.

21. Ministers of the gospel occupy an elevated stand in all Christian communities, both on account of the high tone of moral feeling which they generally possess, and on account of the interest which the people at large feel in the subject of religion. The work of the ministry is emphatically a work of benevolence; and no man can perform it with satisfaction to himself, or with acceptance to the people of his charge, if destitute of love to God and man.

22. In most of the kingdoms of Europe, some one of the several denominations is supported by legal enactments; but, in the United States, every branch of the Church enjoys equal favor, so far as legislation is concerned. In most cases, the institutions of religion are supported by voluntary contributions or subscriptions.

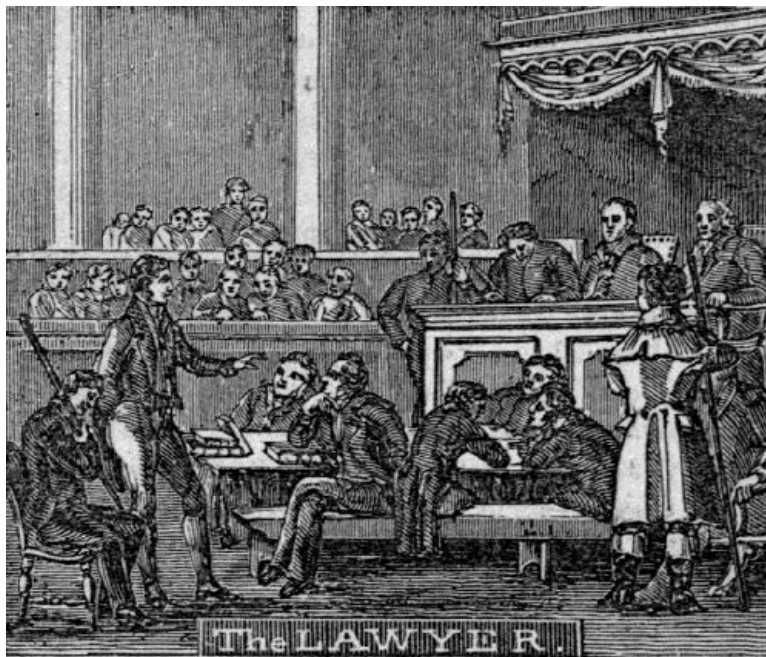
[214]

23. The salary received by ministers of the gospel, in the United States, is exceedingly various in the different denominations, and in the same denomination from different congregations. In some instances, they receive nothing for their services, in others, a liberal compensation.

24. It is but justice to this profession to remark, that, taking the ability of its members into account, there is no employment less productive of wealth; and this is so evidently the case, that some denominations distribute, annually, a considerable amount among the widows and orphans of those who have devoted their lives to the ministry.

25. The meagre support which the ministry usually receives, arises, in part, from the opinion too commonly entertained, that this profession ought to be one of benevolence exclusively, and that ministers should, therefore, be contented with a bare subsistence, and look for their reward in the consciousness of doing their duty, and in the prospect of future felicity. This is a very convenient way of paying for the services of faithful servants, and of relieving the consciences of those whose duty it is to give them a liberal support.

[215]



ATTORNEY AT LAW.

1. A lawyer is one who, by profession, transacts legal business for others, who, in this relation, are called *clients*. A lawyer is either an attorney or councillor, or both. The part of legal business, belonging peculiarly to the attorney, consists in preparing the details of the *pleadings* and the *briefs* for the use of the councillor, whose especial province it is to make the argument before the court. When the lawyer prepares his own case and makes the argument, as he generally does, he acts in the capacity of both attorney and councillor. In the court of chancery the lawyer is denominated *solicitor*, and in the admiralty court, *proctor*. Before a person is permitted to practise law in our courts, he is required to pass through a regular course of study, and afterwards undergo an examination before persons learned in the law.

[216]

2. This profession has its foundation in the numerous and complicated laws which have been adopted by men, to govern their intercourse with each other. These laws, as they exist in our country, may be divided into *constitutional* and *municipal*. Constitutional law is that by which the government of the United States, and those of the different states, have been established, and by which they are governed in their action. The Constitution of the United States is the supreme law of the land.

3. Municipal law embraces those rules of civil conduct prescribed by the supreme power of the state, or of the United States; and is composed of *statute* and *common* law. Statute law is the express will of the legislative part of the government, rendered authentic by certain forms and ceremonies prescribed by the Constitution.

4. Common law is a system of rules and usages, which have been applied in particular cases of litigation. It originated in the dictates of natural justice, and cultivated reason, and is found more particularly in the reports of the decisions of the courts of justice. The common law is employed

in cases which positive enactments do not reach, and in construing and applying positive enactments. The common law of England has been adopted by every state in the Union, except Louisiana.

5. The Constitution of the United States, and those of the several states, provides for three departments in their respective governments, viz., the legislative, the executive, and the judicial. It is the chief province of the first to enact laws, and of the second and third to see that they are duly executed.

6. The judicial power of the United States is vested in one *supreme court* and two inferior courts. The Supreme Court is now composed of seven justices who commence their session in the Capitol, at Washington, on the second Monday in January. The two inferior courts are the *District* and *Circuit Courts*. In the first of these presides a single judge; in the second, one of the justices of the Supreme Court, and the district judge. [217]

7. The judiciary of the United States takes cognisance of all cases which arise under the Constitution, laws, and treaties, of the United States, and likewise of those cases arising under the law of nations. It also embraces all cases of admiralty and maritime jurisdiction, as well as those controversies to which the government of the United States is a party, the controversies between two states, between a state and citizens of another state, between citizens of different states, and between a state or citizens thereof, and foreign states, citizens, or subjects.

8. The judicial systems of all the states correspond, in many respects, with each other. In all, the office of justice of the peace is similar. To these magistrates, the general police of the counties is chiefly committed, as they have authority to cause criminals, and other disturbers of the peace, to be arrested; and, if the offence is small, to fix the penalty; but, if the offence is too great to be brought within their jurisdiction, they commit the offenders to prison, to be reserved for trial before a higher tribunal.

9. In many of the states, the common magistrates of the county, or a select number of them, form a court, called County Sessions, which has a comprehensive jurisdiction in matters of police, and in regulating the affairs of the county; such as building courthouses, assessing county taxes, opening roads, and licensing taverns.

10. In Virginia, the County Sessions is an important court. Its jurisdiction extends to many criminal cases, and to those of a civil nature involving the amount of \$300. Although a great amount of business passes through these courts, the justices discharge all their duties without compensation. In most of the states, the common magistrates, in their individual or collective capacity, have jurisdiction over civil cases, varying in their greatest amount from thirteen to one hundred dollars, a right of appeal being reserved to a higher court. [218]

11. No definite qualifications are required by law or usage for practising in the magistrates' courts, accordingly, there are many persons who plead causes here, who do not properly belong to the profession of law; these are called *pettifoggers*, and the practice itself, by whomsoever performed, is called *pettifogging*. Lawyers of inferior abilities and acquirements are, also, frequently termed pettifoggers.

12. In all the states, a class of county courts is established, denominated Courts of Common Pleas, County Courts, District or Circuit Courts, which have original jurisdiction of civil actions at law, or indictments for crimes. Over these are established the Superior or Supreme Courts, or Courts of Error and Appeal, to which appeals are admitted from the inferior courts.

13. Civil cases are frequently decided on principles of equity; and, in some states, courts of chancery are established for this purpose. But, in most of the states, there are no decisions of this kind; or the same courts act as courts of law and equity, as is the case with the courts of the United States.

14. There are several other courts that might be mentioned; but enough has been said of these institutions, to give an idea of the extensive range of the profession of the law. It may be well to remark here, that few lawyers aspire to the privilege of practising in the supreme courts; since, to be successful there it would require not only great abilities, but more extensive reading than the profession generally are willing to encounter. [219]

15. When a client has stated his case in detail to his attorney, it is the province of the latter to decide upon the course most proper to be pursued in regard to it. If the client is the plaintiff, and litigation is determined upon, the attorney decides upon the court in which the case should be brought forward, and also upon the manner in which it should be conducted.

16. The suit having been brought, say into the County Court, it is tried according to law. If it involves facts or damages, it is canvassed before a jury of twelve men, who are bound by oath or affirmation to bring in their verdict according to the evidence presented by both parties. It is the business of the lawyers, each for his own client, to sum up the evidence which may have been adduced, and to present the whole in a light as favorable to his own side of the question as possible.

17. When the case involves points of law which must needs be understood by the jury, to enable them to make a correct decision, the advocates of the parties present their views with regard to them; but, if these happen to be wrong, the judge, in his charge to the jury, rectifies the mistake or misrepresentation. The case having been decided, each party is bound to submit to the

decision, or appeal, if permitted by law, to a higher tribunal.

18. Causes to be determined on legal principles only, are brought before the judge or judges for adjudication. In such cases, the advocates present the statute or common law supposed to be applicable, and then reports of similar cases, which may have been formerly decided in the same or similar courts. These reports are the exponents of the common law of the case, and are supposed, in most instances, to furnish data for correct decisions.

[220]

10. Besides the management of causes in public courts, the lawyer has a great mass of business of a private nature; such as drawing wills, indentures, deeds, and mortgages. He is consulted in a great variety of cases of a legal nature, where litigation is not immediately concerned, and especially in regard to the validity of titles to real estate; and the many impositions to which the community is liable from defective titles, render the information which he is able to afford on this subject, extremely valuable.

20. In the preceding account of this profession, it is easy to perceive that it is one of great utility and responsibility. It is to the attorney, that the oppressed repair for redress against the oppressor; and to him, the orphan and friendless look, to aid them in obtaining or maintaining their rights. To this profession, also, as much as to any other, the American people may confidently look for the maintenance of correct political principles.

[221]



THE PHYSICIAN.

1. Among the various avocations of men, that of the physician deserves to be placed in the foremost rank. The profession is founded in the multiplicity of diseases to which humanity is liable, and in the medical qualities of certain substances, which have been found to supply a remedy.

2. It is implied, though not expressly declared, in the Scriptures, that the diseases and other calamities pertaining to our earthly condition, originated in the fall of man from his pristine innocence; and the Grecian fable of Pandora's box appears to have originated in a similar tradition. It seems that Jupiter, being angry at Prometheus, ordered Vulcan to make a woman endowed with every possible perfection. This workman having finished his task, and presented the workmanship of his hands to the gods, they loaded her with presents, and sent her to Prometheus.

[222]

3. This prince, however, suspecting a trick, would have nothing to do with her; but Epimetheus was so captivated with her charms, that he took her to be his wife. The curiosity of Epimetheus led him to look into a box, given to her by Jupiter, which he had no sooner opened, than there issued from it the complicated miseries and diseases, which have since afflicted the family of man. He instantly shut the box; but all had flown, save Hope, which had not time to escape; and this is consequently the only blessing that permanently remains with wretched mortals.

4. Since the introduction of moral evil into the world, it cannot be supposed that man has ever enjoyed the blessing of uninterrupted health; and, as it is an instinct of our nature to seek for means of relieving pain, we may safely infer that medicinal remedies were applied in the earliest ages of the human race.

5. Among some of the ancient nations, the origin of diseases was attributed to the malignant influence of supernatural agents. This notion produced a corresponding absurdity, in the means of obtaining relief. Accordingly, idolatrous priests, astrologers, and magicians, were resorted to, who employed religious ceremonies, astrological calculations, and cabalistic incantations.

6. The healing art was cultivated at a very early period in Egypt; but it was crippled in its infancy by ordinances, enjoining, without discrimination, the remedies for every disease, and the precise time and mode of their application. The practice was confined to the priests, who connected with it the grossest superstitions.

7. We are informed by the most ancient historians, that the Chaldeans and Babylonians exposed their sick in places of public resort, and on the highways; and that strangers and others were required by law to give some advice in each case of disease. Amid the variety of suggestions which must necessarily have been given under such circumstances, it was expected that some would prove efficacious. This custom was well calculated to enlarge the boundaries of medical knowledge. [223]

8. The first records of medicine were kept in the temples dedicated by the Greeks to Esculapius, who, on account of his skill in medicine, was honored as the god of health. The name or description of the disease, and the method of cure, were engraved on durable tablets, which were suspended, where they could be readily seen by visitors.

9. But medicine did not assume the dignity of a distinct science, until the days of Hippocrates, who reckons himself the seventeenth from Esculapius in a lineal descent. This great man, who flourished about 400 years before the Christian era, is universally esteemed the "Father of Medicine." After his death, the science was cultivated by the philosophers of Greece, to whom, however, it owes but few improvements.

10. After the dismemberment of the Macedonian empire, learning retreated from contending factions to Egypt, where it was liberally fostered by the Ptolemies. Under their patronage, a medical school at Alexandria became eminent, and the healing art flourished beyond all former example. To the disciples of this school, is the world indebted for the first correct description of the human structure. Their knowledge on this subject was obtained from the dissection of the bodies of criminals, which had been assigned to them by the government.

11. The acquisitions of the Greeks in medical science at length became the inheritance of the Romans; but Rome had existed 535 years before a professional physician was known in the city. This inattention to the subject of medicine arose, chiefly, from an opinion, common to the semi-barbarous nations of those times, that maladies were to be cured by the interposition of superior beings. The sick, therefore, applied to their idolatrous priests, who offered sacrifices to the gods in their behalf, and practised over the body of the patient a variety of magical ceremonies. [224]

12. Sacrifices were especially offered to the gods in cases of pestilence; and, on one occasion of this kind, a temple was erected to Apollo, who was regarded as the god of physic; and, on another, Esculapius, under the form of a serpent, was conducted from Epidaurus, in Greece, and introduced, with great pomp, upon an islet in the Tiber, which was thenceforth devoted to his particular service.

13. Archagathus, a Greek, was the first who practised physic, as an art, at Rome; and he was soon followed by many more of his professional brethren. These pioneers of medicine, however, were violently opposed by Cato the Censor, who publicly charged them with a conspiracy to poison the citizens. But the patients under their care generally recovering, he began to regard them as impious sorcerers, who counteracted the course of nature, and restored men to life by means of unholy charms.

14. Cato having succeeded in producing a general conviction, that the practice of these physicians was calculated to enervate the constitutions, and corrupt the manners of the people, restrictions were laid upon the profession, and practitioners were even forbidden to settle at Rome. But after the people had become more vicious and luxurious, diseases became more frequent and obstinate, and physicians more necessary. The restrictions were, therefore, at length removed. [225]

15. Among the Roman writers on medicine, Celsus was the first who is worthy of consideration. He has been denominated the Roman Hippocrates, because he imitated the close observation and practice of that physician. His work, as well as that of his great prototype, is read with advantage, even at the present day. He flourished at or near the time of our Saviour.

16. In the second century of the Christian era, Galen, a Greek physician from Pergamus, and a disciple of the Alexandrian school, settled in Rome. He was learned in all branches of medicine, and wrote more copiously on the subject generally, than any other person amongst the ancients. For 1300 years, his opinions were received as oracular, wherever medicine was cultivated.

17. After the destruction of the Western empire by the barbarous nations, the science of medicine was cultivated only in the Greek empire, and chiefly at Alexandria, until it began to arrest the attention of the Arabians, in the seventh century. The works of several Greek philosophers and physicians were translated into Arabic, under the patronage of the caliphs, several of whom were zealous promoters of learning.

18. In the eighth century, the Caliph Almansur established, at Bagdad, a hospital for the sick, and

an academy, in which, among other branches of knowledge, was taught the medical art. But it was in Spain, that Arabian learning rose to the highest point, and produced the most successful results. The University of Cordova became the most celebrated in the world, and continued to maintain its reputation for a long series of years. Arabian medicine reached its greatest eminence, in the eleventh century, under Avicenna.

19. In the tenth century, this science began to be taught in the schools of other parts of Europe; but its professors derived their knowledge of the subject from the Arabian school, or from Arabic translations of the ancient authors; and this continued to be the case, until the conquest of Constantinople by the Turks, in 1453. At this time, many erudite Greeks fled into Italy, and carried with them the ancient writings. [226]

20. Before the general revival of this science in Europe, the cure of diseases was chiefly confided, in the western nations, to the priests and monks, who, however, generally relied more upon religious ceremonies, and the influence of sacred relics, than upon the application of medical remedies. The superstitions of those barbarous times, respecting the means of curing diseases, have not yet entirely disappeared, even from the most enlightened nations of Christendom.

21. The science of chemistry began to attract much attention about the beginning of the sixteenth century; and the many powerful medical agents which it supplied, at length produced a great change in the theory and practice of medicine. Many valuable medicines of the vegetable kind, were also obtained from America. The discovery of the circulation of the blood by William Harvey, in 1620, imparted a new impulse to medicine; but, like chemistry, it gave rise to many absurd and hurtful theories.

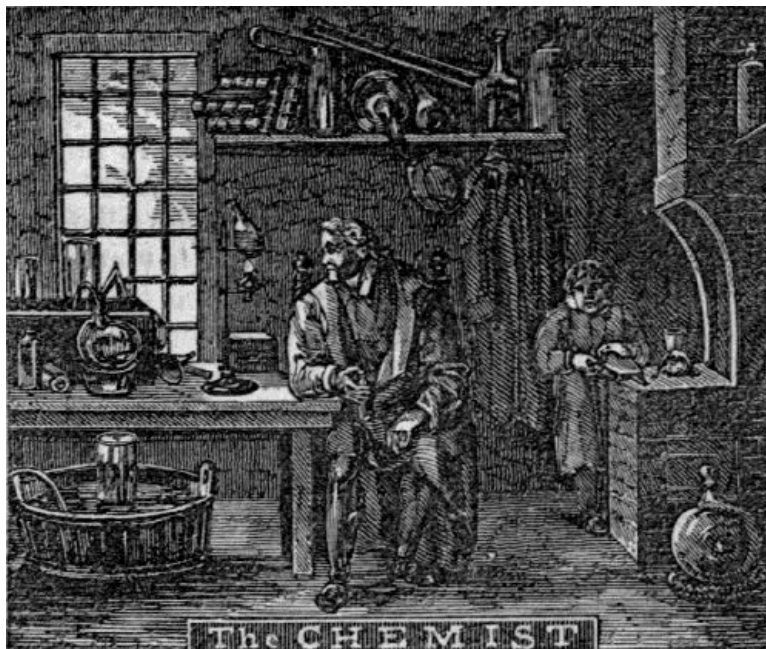
22. Researches in different branches of medicine were continued with ardor in the seventeenth century, in various parts of Europe; and numerous discoveries of importance were made, especially in anatomy. Many theories regarding the origin of diseases, and their treatment, were proposed, advocated, and controverted; but all these were overthrown by Stahl, Boerhaave, and Hoffman, three eminent theorists, in the early part of the eighteenth century. [227]

23. These distinguished men were followed by others of equal celebrity, in the same century, who, in part at least, exploded the doctrines of their predecessors. The present century, above all other periods, is remarkable for men eminent in this profession; and, although all do not exactly agree in opinion, yet, guided in their conclusions by a careful observation of facts, they are less under the influence of visionary theories than physicians of former times. Besides, many of the subjects of former controversy having been satisfactorily settled, there are now fewer causes of division and excitement among the medical profession.

24. Medical science comprises several branches, of which the following are the principal; viz., Anatomy, Surgery, Materia Medica, Chemistry, the Theory and Practice of Physic. On these subjects, lectures are given in several colleges and universities in Europe, and in the United States. In this country, an attendance on two regular courses of lectures entitles the student to the degree of Doctor of Medicine, provided he can sustain with sufficient ability, an examination before the professors, or, as they are usually termed, the medical faculty.

25. The degree of M. D. conferred by a college or university, is a passport to practice, in every state of the Union; and, in some states, none are permitted to attend the sick, professionally, without having first obtained a diploma conferring such degree. In other states, however, no legal restrictions are imposed on the practitioners of the healing art; or, they are licensed by a board of physicians, constituted by law for the purpose.

26. The practice of this profession is generally attended with great labor, and, in many cases, with much perplexity. Diseases are often stubborn or incurable, and effectually baffle the most skilful practitioner. In most cases, however, diseases are under the control of medical skill; and the high satisfaction which a benevolent physician feels, in relieving the sufferings of his fellow-creatures, may serve as a recompense for the many adverse circumstances which attend the profession. [228]



THE CHEMIST.

1. This globe, and every thing appertaining to it, is composed of substances, which exist either in a compound or simple state. It is the object of the scientific chemist to investigate the properties of these substances, and to show their action upon each other. By this science, therefore, compound bodies are reduced to the simple elements of which they are composed, or new combinations formed.

2. According to the preceding definitions, chemistry comprehends an immense variety of objects. It is scarcely possible to name a thing or phenomenon in the natural world, to which it does not directly or indirectly apply; even the growth of vegetables, and the preparation and digestion of our food, depend upon chemical principles.

[230]

3. The word chemistry is supposed to be of Egyptian origin, and, in its primary application, was the same with our phrase natural philosophy. Its meaning was afterwards restricted to the art of working those metals which were most esteemed. In the third century, it came to be applied to the pretended art of transmuting baser metals into gold. The science, in the latter sense of the word, was eagerly cultivated by the Greeks; and from them it passed to the Arabians, who introduced it into Europe under the name of alchemy.

4. The professors of the art were dignified with the appellation of alchemistic philosophers, and the leading doctrine of the sect was, that all metals are composed of the most simple substances; and that, consequently, base metals were capable of being changed into gold; hence, the chief object of their researches was the discovery of an agent, by which this great change was to be effected. The substance supposed to possess this wonderful property was called "the philosopher's stone;" the touch of which was to change every kind of metal into gold.

5. The greatest rage for alchemy prevailed between the tenth and sixteenth centuries. The writers on this subject who appeared during that period, are very numerous, most of whom are unintelligible, except to those initiated into the art. Many of them, however, display great acuteness, and an extensive acquaintance with natural objects. They all boast, that they are in possession of the philosopher's stone, and profess the ability of communicating a knowledge of making it to others.

6. Their writings and confident professions gained almost implicit credit, and many unwary persons were thus exposed to the tricks of impostors, who offered to communicate their secret for a pecuniary reward. Having obtained the sum proposed, they either absconded, or wearied out their patrons with tedious and expensive processes.

[231]

7. Chemists, for a long time, had supposed it possible to discover, by their art, a medicine which should not only cure, but prevent all diseases, and prolong life to an indefinite period, even to immortality. This notion gradually becoming prevalent, the word *chemistry* acquired a more extensive application, and embraced not only the art of making gold, but also that of preparing "the universal medicine." Some of these visionary men asserted, that the philosopher's stone was this wonderful panacea.

8. Few readers need be informed, that the researches for the philosopher's stone, and the universal remedy, were, at length, abandoned, as fruitless and visionary; yet the numerous experiments which had been instituted on these accounts, were attended with the incidental advantage of a considerable dexterity in the performance of chemical operations, together with the discovery of many new substances and valuable facts, which, without these strong incentives, would have remained, at least, much longer in obscurity.

9. Although none of the medicines, produced in the chemical laboratory, answered the chimerical expectations of the chemists, in curing all diseases, and in rendering the perishable body of man immortal, yet they proved sufficiently valuable in the healing art, to command the attention of the profession all over Europe. The adoption of chemical medicines, however, was, at first, everywhere opposed, either as unsafe remedies, or as being inferior in efficacy to those which had been used for so many centuries.

10. These prejudices having given way to the light of experience, chemical medicines came, at length, to occupy a conspicuous place in the *Materia Medica*; and their value within the present century has become still more manifest. One of the most useful branches of chemistry, therefore, is to make the various preparations used in the medical art. [232]

11. The most efficient agent in the introduction of chemical medicines, was Theophilus Paracelsus. This singular individual was born near Zurich, in Switzerland. Having studied chemistry under two masters, he commenced a rambling life, in pursuit of chemical and medical knowledge; and, having visited Italy, France, and Germany, where he met with many whimsical adventures, which contributed greatly to advance his reputation, he was elected, in 1527, to fill the chair of chemistry, in the University of Basle.

12. One of the first acts of this arrogant professor was to burn, with the utmost solemnity, while seated in his chair, the works of Galen and Avicenna, declaring to his audience, that if God would not impart the secrets of physic, it was not only allowable, but even justifiable, to consult the devil. He also treated his contemporaries with the same insolence, telling them, in a preface to one of his books, that "the very down on his bald pate had more knowledge than all their writers; the buckle of his shoes more learning than Galen and Avicenna; and his beard more experience than all their universities."

13. It could not be expected, that a man with such a temper could long retain his situation; and, accordingly, he was driven from it, in 1528, by a quarrel with those who had conferred the appointment. From this time, he rambled about the country, chiefly in Germany, leading a life of extreme intemperance, in the lowest company. Nevertheless, he still maintained his reputation as a physician, by the extraordinary cures occasionally effected by his powerful remedies; although his failures were equally conspicuous.

14. But the most signal failure of his remedies occurred in his own person; for, after having boasted for many years of possessing an elixir which would prolong life to an indefinite period, he died, in 1541, at Salzburg, with a bottle of his immortal catholicon in his pocket. The medicines on which Paracelsus chiefly relied, were opium, antimony, and various preparations of mercury. He has the merit of applying the last, especially, to cases in which they had not been before used; and upon this circumstance, his great reputation depended. [233]

15. We have been thus particular in noticing this individual, because he was the first who gave public lectures on chemistry in Europe, and because he gave the first great impulse in favor of chemical medicines. He also carried his speculations concerning the philosopher's stone and the universal remedy, to the greatest height of absurdity; and, by exemplifying their inutility and fallacy in his own person, he contributed more than any one else to their disrepute, and subsequent banishment from the science.

16. Researches for the philosopher's stone, and the universal remedy, having been, at length, relinquished, the chemical facts which had been collected became, in the general estimation, a heap of rubbish of little value. At this time, there arose an individual thoroughly acquainted with these facts, and capable of perceiving the important purposes to which they might be applied.

17. The name of this individual was John Joachim Becher. He published a work in 1669, entitled "*Physica Subterranea*," by which he gave a new direction to chemistry, by applying it to analyzing and ascertaining the constituent parts of material bodies; and his system is the foundation of the science, as it now exists.

18. George Ernest Stahl, a medical professor in the University of Halle, adopted the theory of Becher, and, after his death, edited the work just mentioned; but he so simplified and improved it, that he made it entirely his own; and, accordingly, it has always been distinguished by the appellation of the Stahlian theory. The principal work of Stahl, on this subject, was published in 1729; and, since that time, chemistry has been cultivated with ardor in Germany, and in other countries in the north of Europe. [234]

19. In France, chemistry became a fashionable study, about the middle of the eighteenth century. It had, however, been cultivated there by a few individuals, long before that period. Men of eminence now appeared in all parts of the kingdom, and discoveries in the science were made in rapid succession. Some attention was also paid to it in Italy and Spain.

20. In Great Britain, this subject attracted but little attention, except from a few individuals, until Dr. Cullen had become professor of the science, in the University of Edinburgh, in 1756. This accurate investigator of natural phenomena, succeeded in enkindling an enthusiasm for chemical investigations among the students; and the subsequent experiments of Dr. Black, Mr. Cavendish, Dr. Priestley, and Lavoisier, which resulted in the discovery of the constituent parts of air and water, diffused the same ardor through every part of the kingdom.

21. Lavoisier, the celebrated French chemist, having proved the Stahlian theory to be incorrect, founded another on the chemical affinities and combinations of oxygen with the various

substances in nature. This system has been generally adopted; since it explains a great number of phenomena more satisfactorily than any other ever proposed. The great chemical agent, in the Stahlian system, was supposed to be an inflammable substance, which was denominated by the theorist *phlogiston*. To distinguish, therefore, the new theory from the one which it superseded, it was called the pneumatic, or anti-phlogistic system.

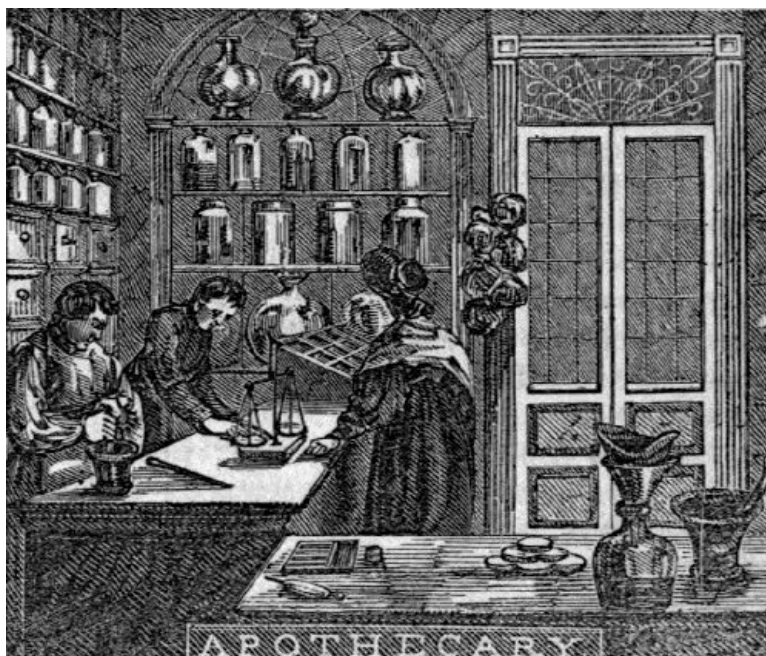
[235]

22. In 1787, a new technical nomenclature was devised, by the aid of which all the chemical facts are easily retained in the memory. Twelve or fifteen terms have been found sufficient for the foundation of a methodical language; and, by changing the terminations of these radicals, or by prefixing certain words or syllables, the changes that take place in bodies are clearly expressed. This valuable innovation originated with Lavoisier and three other French chemists.

23. In the present century, many important discoveries have been made in this science; and, among those who have been distinguished for their researches into its mysteries, Sir Humphrey Davy, of Great Britain, shines pre-eminent. In the United States, it has many able professors; among whom are Professors Hare and Mitchell, of Philadelphia, Torrey, Renwick, and Draper, of New-York, Henry, of Princeton, Beck, of Albany, Silliman, of New-Haven, and Johnson, of Middletown.

24. Chemistry is so extensive in its application, that we will not attempt to describe any of the operations of the laboratory. We, therefore, conclude this article by recommending this science to general attention; assuring the uninitiated, that it is beset with fewer difficulties than they are apt to suppose, and that every effort in the course will be attended with interesting facts and phenomena, which will abundantly reward the labor of investigation.

[236]



THE DRUGGIST AND APOTHECARY.

1. The druggist is a wholesale dealer in drugs, which, in commerce, embrace not only articles used or recommended by the medical profession, but also spices, dye-stuffs, and paints. The commodities of his trade are obtained from almost every quarter of the globe; but especially from the countries bordering upon the Mediterranean Sea, and from the East Indies and Spanish America.

2. The chemist looks to the druggist for most of the materials employed in his laboratory; and from him the apothecary, physician, and country merchant, obtain their chief supply of medicines. There are, however, but few persons in the United States, who confine themselves exclusively to this branch of business; for most of the druggists are also apothecaries, and sometimes operative or manufacturing chemists.

[237]

3. Medicinals, when they come into the warehouse of the druggist, are usually in a crude state; and many, or most of them, must necessarily undergo a variety of changes, of a chemical or mechanical nature, before they can be applied in practice. The art by which these changes are effected is called Pharmacy, or Pharmaceutics; and the books which treat of pharmaceutical operations are denominated Pharmacopœias, or Dispensatories.

4. The operations of Pharmacy, which depend upon chemical principles, are conducted chiefly by the operative chemist; but those which consist merely in mechanical reduction, or in mixing together different ingredients, to form compounds, belong properly to the vocation of the

apothecary.

5. The apothecary sells medicines in small quantities, prepared for application. Many of the standing compound preparations which have been authorized by the Pharmacopœias, and which are in regular demand, he keeps ready prepared; but a great proportion of his business consists in compounding and putting up the prescriptions of the physician, as they are needed by the patient.

6. In country places, where there are generally no apothecary-shops, the physicians compound and prepare their own prescriptions; but in cities, where these establishments are numerous, the medical profession prefer to rid themselves of this trouble. In most cases, however, they keep by them a few remedies, which can be applied in cases of emergency.

7. In Great Britain, the apothecary is permitted to attend sick persons, and administer medicines either according to his own judgment, or in conformity with the directions of the physician. He is, therefore, a physician of an inferior order; and, as his fees are more moderate than those of the regular profession, his practice is extensive among persons who, from necessity or inclination, are induced to study economy. [238]

8. The apothecaries in England, Scotland, and Ireland, are obliged to make up their standing medicines according to the formulas of the Dispensatories adopted in their respective countries; and their shops are subject to the visitation of censors, who have authority to destroy those medicines which they may consider unfit for use; so that unwholesome or inefficient remedies be not imposed upon the sick. The apothecaries' halls, in France, are also under the supervision of the medical faculty.

9. In the United States, there is no censorship of this kind established by the public authorities; yet the physicians are careful to recommend apothecaries, in whom they have confidence, to prepare their prescriptions. The professors in our medical schools are, also, particular in naming to their students those druggists whom they consider men of honor; and omit, at least, to name those who have been detected in selling adulterated medicines.

10. We have, also, an incorporated college of pharmacy both in New-York and Philadelphia, and in each of these, chemical and pharmaceutical lectures are delivered by regular professors. These institutions, although of recent origin, have exerted an important influence in reforming and preventing abuses in the preparation of medicines; and public opinion, especially in the cities, is beginning to render it important for students in pharmacy to obtain a degree from one of these colleges. Under the auspices of the institution at Philadelphia, is published a quarterly journal, devoted to pharmaceutical science.

11. A Pharmacopœia for the United States was formed at Washington, in 1820, by a delegation of physicians from the principal medical societies of the Union. A revision of this work is expected to be made every ten years. Dispensatories, as they exist in this country, are founded upon the Pharmacopœias, and may be properly considered commentaries upon them, since the former contain the whole of the latter, together with more minute descriptions of the sensible and real properties of the medicines, as well as their history and exact mode of preparation. [239]

[240]



THE DENTIST.

1. The human family is subject to a variety of diseases in the teeth, which generally cause the final destruction or loss of these important instruments, unless judicious remedies are applied in proper season. These remedies are administered by the dentist.

2. There are few persons, in proportion to the great mass of the people, who seem to be aware of the utility of dentistry; for, taking the United States together, not more than one person in a hundred ever resorts to the professors of this art, with the view of obtaining a remedy for any dental disease with which he may be afflicted. The common sentiment seems to be, that diseases of the teeth, and their final loss, at different periods of life, are inevitable inconveniences, to which we must submit with the same philosophy with which we meet other misfortunes. [241]

3. To enable readers who have never examined this subject, to comprehend its general nature, we will give a slight sketch of some of the irregularities and diseases to which the teeth are liable, and, as we proceed, speak of the remedies applied by the dentist.

4. Two sets of teeth regularly appear, at different periods of life; one in infancy, and the other, at a later period. The first set consists of twenty, and the second of thirty-two teeth; the former are called *infant*, and the latter *adult*; and all these, at the age of six or seven, are upon the jaws at the same time.

5. At the age just mentioned, the infant teeth begin to give way to those which lie deeper in the sockets, and which are designed to supersede the former. As the new teeth advance, the roots of the first are absorbed; and, after having been thus deprived of their support, they are easily removed; sometimes, by a slight pressure of the tongue.

6. In a majority of cases, the whole process is carried on by nature with the utmost regularity; but, as she is not uniformly successful in this operation, there is no other period at which the teeth of children require so much attention and care. Sometimes the second set rise in the socket without causing the absorption of the roots of the first. In such cases, the former approach in an improper direction; and, unless the latter are removed in season, deformity will be the consequence.

7. When, however, these precautions have been neglected, and the teeth stand in an irregular manner, they can sometimes be reduced to symmetry by the dentist, without occasioning much pain. When the front teeth are too much crowded by reason of the restricted dimensions of the jaw, the small teeth, situated next behind the eye, or canine teeth, are extracted, one on each side, to give room to the rest. [242]

8. From the ages of six to fifteen years, the teeth of children should be examined, at least once in six months, by a dentist, who, if skilful, can seldom fail of rendering these ornaments of the human countenance regular, healthy, and beautiful. It is customary in England and France, for the proprietors of seminaries of learning to employ a dentist to visit their establishments regularly, for the purpose of performing such operations, and of administering such remedies, as their pupils may require.

9. The teeth are composed of very hard bone and enamel. The latter is a substance exceeding in density any other in the body. It covers the crown of the teeth, and is thickest in those parts which are most exposed to forcible contact in mastication; but, in no place, is it more than the twelfth of an inch in thickness.

10. The most common disease of the teeth is *caries*, or decay, and almost every part of them is liable to be affected by it, but especially the sides of those in front, and the crowns of those on other parts of the jaws.

11. The disease begins its attack either on the enamel or on the bony portion, and gradually extends itself over the tooth, until it reaches the nerves which supply its natural cavity. These having become exposed to the sudden changes of temperature, and to the contact of extraneous substances in mastication, pain and inflammation are produced, and the extraction of the tooth very commonly becomes the only means of relief.

12. All persons are more or less subject to this disease, but some much more than others; and caries of a peculiar character has been so often traced through whole families, from one generation to another, that it is considered hereditary, as much as any other disease to which the system is liable. In many cases, caries seems to be the effect of some serious disease which affected the constitution, while the teeth were in the early stages of formation. [243]

13. Although the teeth of some individuals possess but little durability, and, when caries attacks them, go on rapidly to decay, in spite of all the aid which science and skill can afford, yet, there are comparatively but few instances in which seasonable and judicious treatment will not arrest the progress of the disease.

14. When the teeth are but slightly affected with caries, especially on the sides, a cure may be accomplished by the removal of the decayed portion. This is effected, by the most approved dentists, chiefly with small cutting instruments. Formerly, the file and the saw were employed for this purpose; and, by their indiscriminate and injudicious use, many teeth were ruined, and the art of dentistry itself brought into disrepute.

15. Notwithstanding the injuries which have been inflicted by the improper application of the saw and file, in some instances they are indispensable; and, in the hands of the scientific operator, they need not be feared. They are especially useful in preparing the way for the employment of

other instruments; for, in some cases, the affected part can with difficulty be reached by any other means. But filing the teeth for the purpose of improving their appearance, or for rendering the sides more accessible to the tooth-pick and brush, seems to be reprobated by the most intelligent part of the profession.

16. When the caries has penetrated far into the tooth, and, in its removal, a cavity of suitable form and dimensions can be produced, it is filled with some substance, with the view of protecting the bone from the action of extraneous agents. The dentist is careful to remove every particle of the decayed portion, and to render the cavity perfectly dry by repeated applications of lint or raw cotton, before he attempts to fill it. [244]

17. Gold is the only substance which possesses sufficient solidity to withstand the ordinary friction of mastication, and which, at the same time, is capable of resisting the chemical action of the substances that come in contact with it; yet lead and tin are frequently employed; and many have been made to believe that they answer as good, if not a better purpose, than gold itself. The durability of these metals, however, can never be depended upon, and they ought not to be employed, where the tooth is capable of resisting the mechanical force required to fill it properly with gold.

18. The metal is prepared for the use of the dentist by the gold-beater, in the manner described in the article which treats upon the business of the latter. The leaves, however, are not beaten so thin as those designed for the common purposes of the arts. The portion to be applied is cut from the leaf, and, after having been twisted a little, is forced into the cavity. The metal is rendered perfectly solid by means of instruments adapted to the purpose.

19. This operation, properly performed under favorable circumstances, generally renders the tooth as serviceable, to the end of life, as if it had never been diseased. The hopes of the patient, however, are sometimes disappointed by the unskilfulness of the operator, or by the general unhealthiness of the mouth, arising from tartar, other decayed teeth, or want of care in keeping them free from the lodgment of particles of food.

20. It is a common practice to have teeth extracted, when they are affected with pain; but this operation is not always necessary. In many cases, the nerve can be paralyzed, and the tooth plugged. By these means, teeth which, under the ordinary treatment, would be prematurely sacrificed, are often retained, for years, in a serviceable state. [245]

21. The next most destructive affection to which the teeth are liable, is the accumulation of *tartar*. This is an earthy substance, deposited from the saliva, and is more or less abundant in different individuals. This deposit is extremely troublesome, and generally does much injury to the mouth, even before those who suffer from it are aware of the mischief.

22. The tartar on the teeth of some individuals, is of a black or greenish color, and very hard; on those of others, brown or yellow, and not so firm. When it is first deposited, it is soft, and can be easily removed with a tooth-brush; but, if suffered to remain, it soon becomes indurated, and gradually increases in thickness about the neck of the teeth. The gums become irritated and inflamed. The sockets are next absorbed, and the teeth, being left without their natural support, either fall out, or become so loose, that they can be easily removed.

23. From this cause, old people lose their teeth, when, in many cases, they are perfectly sound; but comparatively very few are aware of the origin of this deprivation, or suppose that these valuable instruments can be retained in old age. The loss is attributed to the deleterious effects of calomel, or is imagined to be an evil inseparable from advanced age.

24. The affection of the gums, arising from causes just mentioned, is frequently called scurvy, and, like caries, produces fetor of the breath; but, when these two diseases are combined, as is frequently the case, they render it extremely offensive. Besides, the effluvia arising from these diseased parts give rise to many maladies which terminate fatally, if a remedy is not applied sufficiently early to save the patient. [246]

25. The obvious remedy for diseases arising from tartar, is the removal of their cause. This is effected by the dentist, with small sharp cutting instruments of a suitable form. To prevent the tartar from accumulating again, and to restore the gums to a healthy state, nothing more is generally requisite than the daily use of a stiff, elastic brush, and the occasional application of some approved dentrifice or astringent wash. Sometimes it may be necessary to scarify the gums, or to apply leeches to them.

26. The operations of dentistry, mentioned in the preceding part of this article, are those which relate to the preservation of the teeth; and, if performed in a proper manner, and under favorable circumstances, they will, in most instances, prove effectual. But, as few persons resort to the dentist, until the near approach of deformity, or until they are impelled by pain to seek relief, a great proportion of dental operations consists in inserting artificial teeth, and in extracting those which are past recovery.

27. When a tooth has gone so far to decay, that it cannot be cured by *stopping*, it should not be suffered to remain in the mouth, lest it infect the rest. Front teeth, however, when the roots remain sound, and firmly based in the sockets, ought not to be extracted, as upon the latter artificial teeth can be placed with great advantage. In such cases, the removal of the crown only is necessary.

28. The instruments commonly employed in extracting teeth, are the key, or turnkey, the forceps, the hook, and the graver, or punch. These are supposed to be sufficient to perform all the operations of this kind which occur in practice; and, although many attempts have been made to invent others which might answer a better purpose, yet those we have mentioned, in their improved state, are likely to continue in general use. [247]

29. It seems to be a common opinion, that any one can pull teeth, who has a turnkey, and sufficient physical strength to use it; accordingly, blacksmiths, barbers, and medical students, are the chief operators in this line of dental surgery. The many fatal accidents which must inevitably be the consequence, such as breaking the tooth or jaw-bone, are considered matters of course. These, however, seldom happen with skilful dentists; and it is to be regretted, that the latter are not always employed, where unskilfulness may produce such serious consequences.

30. In the cut, at the head of this article, is represented a dentist, about to extract a tooth for a lady, who may be supposed to be in a state of alarm at the sight of the instruments; but he, having thrown his right hand, which holds them, behind him, shows the other containing nothing, with the view of allaying her fears. The manner in which teeth are extracted, needs no description, since it is an every-day operation in all parts of the world.

31. One of the chief sources of income to this profession, is the insertion of artificial teeth; for, although few are willing to expend much to prevent the loss of their teeth, many will incur great expense in supplying the deficiencies, after they have occurred. So perfectly and neatly is this operation performed, by some dentists, that it is difficult to distinguish between teeth which are natural, and those which are artificial.

32. The materials for artificial teeth were formerly found chiefly in the teeth and tusks of the hippopotamus, and in the teeth of some domestic animals; but, within a few years, a mineral composition, called porcelain, has come into great repute, since it is very beautiful, and is entirely proof against the most powerful acids. [248]

33. Surgical operations upon the teeth were performed in ancient Greece and Rome, many of which were similar to those of the present day. The extraction of teeth must have been practised at a period of antiquity to which the records of medicine do not reach. The operation is recommended by Hippocrates, who describes many of the diseases to which the teeth are liable. He also mentions the practice of fixing the teeth by means of gold wire, and gives several formulas for making dentrifices.

34. Celsus, a Roman writer on medicine, who flourished about the beginning of the Christian era, seems to have been the first author who described the method of extracting teeth, and the first who notices the removal of tartar by means of cutting instruments, as well as filling carious teeth with lead and other substances, with the view of preventing further decay. Soon after this period, false teeth, of bone and ivory, were introduced. Actius, a writer of the fourth century, is the first who mentions the operation of filing the teeth.

35. The return of barbarism to Europe, nearly extinguished the knowledge of dentistry. As a branch of surgery, however, it was revived by the Arabian writer, Albucasis, in the tenth century; but, for many hundred years after this period, it received but little attention from men of science, the operations of surgery being confined chiefly to the barbers.

36. The first modern work on the diseases of the teeth was published at Lyons, in 1581. This was followed by many other publications on the same subject, in the succeeding century. In the year 1700, it began to be required in France, that all persons who intended to practise dentistry in that country, should undergo an examination, to test their qualifications. From this period is dated the establishment of the dental art as a distinct branch of medical practice.



THE TEACHER.

1. Education, in antiquity, was entirely a matter of domestic concern. In countries where priestly or royal despotism prevailed, schools for the benefit of the sons of the great, and for the priests, were established. Moses, the Jewish lawgiver, was educated in a priestly school in Egypt, and Cyrus, at a seminary belonging to the Persian court. In Palestine, the Scriptures were taught in the schools of the prophets; and, at later periods, in the synagogues, and in the schools of the Rabbis, reading, committing to memory the sacred books, and hearing explanations of their meaning, constituted the chief exercises.

2. In the Grecian cities, boys and girls were taught reading, writing, and arithmetic in private schools; and, after having completed the primary course, those who aspired to higher degrees of knowledge, resorted to the instructions of the philosophers and sophists. This system was commenced as early as 500 years before the advent of Christ. [250]

3. Two hundred years after this period, the Romans began to have primary schools for boys, in the cities; and, from the time of Julius Cæsar, who conferred on teachers the right of citizenship, they possessed the higher institutions of the grammarians and the rhetoricians. In the former of these, were taught the Latin and Greek languages; and in the latter, young men of talent were prepared, by exercises in declamation, for speaking in public.

4. Children, among the Greeks and Romans, were accompanied to school by slaves, who, from the performance of this duty, were called *pedagogues*; but, after slaves and freedmen had made acquirements in literature and science, they were frequently employed as tutors; hence the term, at length, came to imply a teacher of children, and it is still used in reference to this employment, although we usually connect with it the idea of pedantry.

5. Until the time of Vespasian, who commenced his reign in the year 70 of the Christian era, the schools were sustained entirely by private enterprise. That emperor instituted public professorships of grammar and rhetoric with fixed salaries, for the purpose of educating young men for the public service; and, in A.D. 150, Antoninus Pius founded imperial schools in the larger cities of the Roman empire. The most celebrated place for the cultivation of science, in the ancient world, was Athens; and, to this city, students from all parts of Europe resorted, even as late as the ninth century.

6. Christianity, by degrees, gave a new turn to education; and, in the East, it came gradually under the influence of the clergy. Schools were instituted in the cities and villages for catechumens, and, in some places, those of a higher grade, for the education of clergymen. Of the latter kind, that in Alexandria was the most flourishing, from the second to the fourth century. [251]

7. From the fifth century, these higher institutions began to decline, and others, called cathedral or episcopal schools, seem to have taken their place. In these, besides theology, were taught *the seven liberal arts*—grammar, logic, rhetoric, arithmetic, geometry, astronomy, and music; of which the three first were called the *trivium*, and the four last the *quadrivium*. The text-book employed was the Encyclopædia of Marcianus Capella, of Africa. This compendium was published at Rome, A.D. 470; and, although a meagre production, it maintained its reputation in the schools of Europe more than 1000 years.

8. The imperial schools established by Antoninus Pius, declined, and finally became extinct, in the confusion that followed the irruption of the barbarians; but their places were supplied by the parochial and cathedral schools just mentioned. These, however, were surpassed, in the sixth

century, by the *conventual* schools, which were originally designed to prepare persons for the monastic life, but which soon began to be resorted to by laymen.

9. These schools were connected with the convents belonging to the order of St. Benedict, and served as the chief glimmering lights during the darkest period between ancient and modern civilization, in Europe. They flourished in Ireland, England, France, and Germany, from the sixth to the eleventh century. The teachers of these seminaries were called *scholastici*, and from them the scholastic philosophy derived its origin and name.

10. In the year 789, Charlemagne, king of the Franks, issued a decree for the improvement of the schools of his empire, and for increasing their number. Not only every bishop's see and every convent, but every parish, was to have its school; the two former for the education of clergymen and public officers, and the latter for the lower classes of people. This monarch instituted an academy of learned men, to whom he himself resorted for instruction, and whom he employed to educate his children, and a select number of the sons of the nobility and distinguished persons. [252]

11. The encouragement which these schools had received from government was soon discontinued after the death of this monarch, and his school establishment declined like that of Alfred the Great, which was commenced in the ninth century, on a scale of equal liberality. The designs of the English monarch were frustrated by the invasions of the Danes.

12. In the mean time, the Jewish rabbis had schools in Syria and in Northern Africa, as well as in Europe, which contributed to the preservation of ancient learning. Arabian schools were also established, in the ninth century, by the followers of Mohammed, in their Eastern and African caliphates, and in their Moorish dominions in Spain. Through these institutions, the mathematical and medical sciences were again revived in Europe.

13. The cathedral and conventual schools continued, for a long time, the principal institutions for education in Europe; and from them proceeded many eminent men. By degrees the light of science began to shine more brightly; teachers of eminence appeared in different places, who collected around them a great number of scholars; and a new kind of schools arose, the heads of which assumed the name of *rectores*.

14. In Paris, several of these teachers gave instructions in various branches, but chiefly in rhetoric, philosophy, and theology. The schools thus collected under different masters, were, in 1206, united under one rector; and, on this account, the whole mass of teachers and scholars was denominated *universitas*. Universities, in other parts of Europe, arose in a similar manner, and some of them, about the same time. Those of Oxford and Cambridge, according to some writers, were established about the year 1200; and the two first of these institutions in Germany were founded at Prague and Vienna, the former in 1348, and the latter in 1365. [253]

15. The division of the students into four *nations* was an essential feature in the early universities. It arose from the circumstance that the pupils coming from different countries, spoke different languages. Those whose language was the same or similar, would naturally associate together, and attend the instructions of the same teachers. This division into nations is supposed to have grown up at Paris, previous to the formal union of the several schools under one rector.

16. The first teachers, from whose exertions the universities originated, commenced their public instructions without permission from established authority. Subsequently, the state and university were careful to prevent all persons from giving lectures, who were not well qualified for the employment. Examinations were therefore instituted to determine the capabilities of students. Those who were found competent, received a formal permission to teach, accompanied with certain symbols in the spirit of the age.

17. The first academical degree was that of *baccalaureus*, the second, *licentiatus*; and the third *magister*. The last of these entitled the student to all the privileges of his former teachers, and constituted him one of the *facultas artium*—*the faculty of the seven liberal arts*, since called the philosophic faculty. The other faculties were those of theology, law, and medicine. The first of these was instituted at Paris in 1259, and the two last, in 1260. The faculties elected *deans* from among their number, who, with the *procuratores*, or heads of the four nations of students, represented the university. These representatives possessed the power of conferring degrees in the different departments of literature and science. [254]

18. Among the public institutions of the early universities were the colleges, (*collegia*), buildings in which students, especially those who were poor, might live together, under superintendents, without paying for their lodging. In some cases, they received their board, and frequently other allowances, gratis. These institutions were commenced at Paris; but here, as well as in other places, they did not continue the asylums of the necessitous only. In France and England, the buildings of universities are composed chiefly of these colleges, in which the students reside, and in which the business of instruction is mainly carried on.

19. The teachers in the universities were at first paid for their services by the students. At a later period, the magistrates of the town or city where the institution was located, made presents to eminent scholars, to induce them to remain. This practice finally led to the payment of regular salaries. From and after the fourteenth century, universities were not left to grow up of themselves as formerly, but were expressly established by public authorities or by the popes.

20. The inactivity and luxury of the clergy, had led to the neglect of the old seminaries of

learning. The universities were therefore necessary, not only to revive the taste for science and literature, but also to form a new body of teachers. These institutions, however, at length became subject to undue clerical influence, since the monks obtained admission into them as teachers, and then labored to increase the importance of their several orders, as well as the power of the Roman pontiff.

[255]

21. The monks, also, connected, with their convents, popular schools, and undertook the education of the children in the cities. But their method of instruction was exceedingly defective, since the intelligent investigation of the subjects studied was little encouraged, and since the memory of the pupils was brought into requisition to the almost entire exclusion of the other faculties of the mind.

22. In the lower parish schools, the children were not permitted to learn to write, the monks being desirous of confining to the clergy the practice of this art, which was very lucrative before the invention of printing. The art was called *ars clericalis*; and, for a long time, the privilege of establishing writing schools for the children of citizens, was a matter of negotiation between the magistrates and the clergy.

23. But the citizens becoming, at length, more independent, the magistrates themselves began to superintend the education of youth. *Trivial* schools were established, in which the *trivium*, and reading and writing, were taught; but for these, as well as for the cathedral and parish schools, which had been neglected for some time by the higher clergy, itinerant monks and students were employed as teachers.

24. The elder pupils of the highest class frequently wandered from one school to another, under the pretence of pursuing their studies, sometimes taking with them younger scholars, whom they compelled to beg or steal, in order to supply their wants. As late as the sixteenth century, Luther complains that these *vacantivi* (or idlers) were the persons chiefly employed as schoolmasters in Germany.

25. A pious fraternity, called Jeronimites, consisting of clergymen and laymen, who lived together, and occupied themselves partly in mechanic arts, and partly in the instruction of youth, exerted considerable influence on education in general. They first established themselves in Italy, and afterwards in the Netherlands, on the Rhine, and in Northern Germany.

[256]

26. Much was done during the last half of the fourteenth century, and in the one hundred years that followed, to encourage the study of the ancient classics. The attention of literary men was turned to these interesting remains of antiquity by the arrival of many learned Greeks, who had fled from Turkish oppression, and who had brought with them the ancient writings.

27. These treasures of former civilization were unfolded to the modern world by the art of printing, which was invented in 1441; and the reformation, which commenced in 1517, also aided the advancement of education. The corporations of the German cities in which the reformed religion was received, founded seminaries, called *gymnasia*, and *lyceums*, with permanent professorships. A vast amount of property, belonging to the convents and the Church, was confiscated by the governments, and appropriated chiefly to the promotion of education.

28. The schools in the countries which adhered to the Roman Catholic religion, however, continued in nearly the same state, until the Jesuit schools arose, towards the end of the sixteenth century. These, on account of the ability with which they were conducted, soon gained the ascendancy, and for a long time maintained their reputation; but they, at length, degenerated, and finally became extinct, on the suppression of the order of Jesuits in 1773.

29. Italy, Spain, and Portugal, have, for a long time, been inactive in relation to education, it being left entirely to the clergy, and the efforts of the people in their individual capacity. Much has been done in Austria, within fifty years, to advance this important interest. Under the late emperor, professorships were constituted, in the universities and cathedral seminaries, for the instruction of teachers; and gymnasia, common and Sunday schools, were established in almost every part of the kingdom.

[257]

30. The general organization of schools in France, in the eighteenth century, was similar to that of most other Catholic countries. The government did nothing for the education of the people at large; and the Church, which possessed a large proportion of the property of the nation, left the people in total ignorance; whence may have arisen much of the atrocity which marked the early part of the revolution.

31. During the popular reign, the education of youth was declared to be under the care of the state, and many schools, called *polytechnic*, were established. Napoleon, also, afterwards instituted several military schools, and contemplated the introduction of a system of general education. With this view, he instituted an imperial university, which was to have the supreme direction of instruction in France; but his designs were but partially carried into effect.

32. When the Bourbons were again restored to the throne of France, they, with the clergy, labored to restore the old order of things; and, to keep the common people from becoming dangerous, the Lancasterian schools, established in 1816, were abolished. Efficient measures, however, have been lately adopted by Louis Philip to establish schools of different grades throughout his kingdom.

33. In England and Ireland, although the middling and higher classes are comparatively well

educated, no system of general instruction has ever been established for the benefit of the common people. Much, however, has been accomplished by charity and Sunday schools; the former of which were commenced in 1698, and the latter in 1812. Besides these, there are numerous charitable foundations on which many persons of limited means have been educated at the higher institutions. [258]

34. In Scotland, more liberal provisions have been made for general education. The system was commenced in the reign of William and Mary, when, by an act of Parliament, every parish was required to maintain a school. The people have so far improved their privileges, that nearly all of the inhabitants of that part of Great Britain can read and write.

35. The government of Russia, during the last and present century, has directed some attention to the promotion of education. According to the decrees of the Emperor Alexander, schools of different grades were to be established throughout the empire; but these decrees have been yet only partially executed.

36. In no part of the world has the education of all classes of people been more encouraged than in the United States. This has arisen chiefly from the circumstance, that a remarkable proportion of the colonists were persons of education. This was particularly the case with those of New-England, where the instruction of youth, from the very beginning of the settlements, was made a matter of public concern.

37. The principle of making public provision for this purpose, thus early adopted, has never been deserted; on the contrary, it has become so deeply interwoven with the social condition of the people of New-England, that there are few families in that part of the Union, which are not within reach of a public school; and, in every state where the influence of the people from that section of the country is predominant, public schools have been organized by legal provisions, and a fund has been provided, by which at least a part of the expense of supporting them is paid. [259]

38. In all the states in which these primary institutions are established by legislative enactments, they are kept in operation, in country places, between six and nine months of the year. A *master* is employed in the winter, and a *mistress*, in the summer: the former receives for his services from ten to fifteen dollars per month, and the latter, from seventy-five cents to two dollars per week, together with boarding. The teachers, however, during their engagement are compelled to reside in the different families of the *district*, their stay at each place being determined, with scrupulous exactness, by the number of children sent to the school.

39. From the low salaries received for these important services, and the short periods for which engagements are made, it is evident, that teaching a district school cannot be pursued as a regular employment. These schools are, therefore, supplied by persons who, during the rest of the year, follow some other business; or by students, who rely, in part or entirely, on their own exertions to defray the expenses of their academical, collegiate, or professional education.

40. These schools are, no doubt, institutions of great value; but, in the states where they have been established, they are evidently much overrated. They fail in accomplishing the ends for which they have been instituted, through the extreme tenacity with which the people adhere to ancient and defective methods of instruction, the frequent change of teachers, and the small compensation allowed for the services of competent instructors.

41. In the cities and populous towns or villages, the public schools are kept up during the whole of the year, and the system of instruction is generally better than that pursued in the country. In New-York, Philadelphia, Baltimore, and in some other cities, the Lancasterian plan of mutual instruction, with many modifications, is preferred, principally on account of its cheapness. [260]

42. Select-schools and private academies are, also, very numerous. These are located chiefly in the cities and populous towns, and are supported entirely by fees for tuition received from the parents or guardians of the pupils. These institutions do not differ essentially from those of a private nature in similar situations in other parts of the United States, where common schools are not established by law.

43. In the Southern states, wealthy families often employ private tutors. Sometimes two, three, or more families, and even a whole neighborhood, unite for the purpose of forming a school; and, to induce a teacher to commence or continue his labors among them, an adequate amount is made up beforehand by subscription. South of Pennsylvania, Delaware, and the Ohio River, such engagements are commonly made for a year, as, in that section of the Union, the opinion prevails, that a teacher can do but little towards improving his pupils in a much shorter time.

44. The literary institutions which are next above the common schools, and which are established by legislative authority, are the academies, of which there are between five and six hundred in the United States. Some of these have been founded by the funds of the state in which they are located, some, by the union of a few spirited individuals, or by private bequests.

45. The course of instruction pursued in these seminaries of learning varies considerably from each other. In some of them, it is confined chiefly to the common branches of education; in others, the course is pretty extensive, embracing natural and moral philosophy, chemistry, belles lettres, and a sound course of mathematics, together with Latin, Greek, and some of the modern languages. One great object in these institutions is to prepare students for college. The teacher who has charge of an academy is called the *principal*, while the teacher who may aid him in his labors is denominated the *assistant* or *usher*. [261]

46. The highest institutions of learning among us are the colleges and universities. Between these, however, there seems to be but little difference, since the course of studies is nearly or quite the same in both, and since the charters obtained from the legislatures grant to both similar powers of conferring honorary degrees. The whole number of these establishments in the United States is about eighty.

47. The principal teachers in the colleges are denominated *professors*, who confine their labors to communicating instructions in particular branches of literature or science. These are aided by assistants called *tutors*. The latter are generally young men, who devote two or three years to this employment, before entering upon the practice of a profession. The number of professors and tutors in the several colleges varies according to their amount of funds, and number of students.

END OF VOL. I.

Transcriber's Notes:

Obvious spelling and punctuation errors and inconsistencies were repaired, but period spellings retained (e.g. "grisly bear," "lama," "pistachoes," "hommony").

Negotiat- and negotiat-, whale-bone and whalebone, ancles and ankle, color- and colour-, endeavor- and endeavour-, favor- and favour-, labor- and labour-, neighbor- and neighbour-, were retained as in original.

Contents page, Preface page number reads "7" but actually appears on page "vii"; retained.

Contents page, "Soapboiler" changed to more frequent "Soap-Boiler."

P. ix, "removed from the ignorance," original reads "ignora ce."

P. 16, "south-western parts," hyphen added for consistency within text.

P. 47, "maltster checks," original reads "malster."

P. 53, "render the wine palatable," original reads "palateable."

P. 66, Illustration at start of "Manufacturer of Cloth" chapter has no caption in original.

P. 101, "sewn together to form hats," original reads "sown."

P. 174, "released from his dependence," original reads "dependance."

P. 185, "Thomas Newcomen," original reads "Newcomer."

P. 249, Illustration at start of "Teacher" chapter has no caption in original.

P. 249 and 252, "rabbis," original reads "rabbies."

*** END OF THE PROJECT GUTENBERG EBOOK POPULAR TECHNOLOGY; OR, PROFESSIONS
AND TRADES. VOL. 1 (OF 2) ***

Updated editions will replace the previous one—the old editions will be renamed.

Creating the works from print editions not protected by U.S. copyright law means that no one owns a United States copyright in these works, so the Foundation (and you!) can copy and distribute it in the United States without permission and without paying copyright royalties. Special rules, set forth in the General Terms of Use part of this license, apply to copying and distributing Project Gutenberg™ electronic works to protect the PROJECT GUTENBERG™ concept and trademark. Project Gutenberg is a registered trademark, and may not be used if you charge for an eBook, except by following the terms of the trademark license, including paying royalties for use of the Project Gutenberg trademark. If you do not charge anything for copies of this eBook, complying with the trademark license is very easy. You may use this eBook for nearly any purpose such as creation of derivative works, reports, performances and research. Project Gutenberg eBooks may be modified and printed and given away—you may do practically ANYTHING in the United States with eBooks not protected by U.S. copyright law. Redistribution is subject to the trademark license, especially commercial redistribution.

START: FULL LICENSE
THE FULL PROJECT GUTENBERG LICENSE
PLEASE READ THIS BEFORE YOU DISTRIBUTE OR USE THIS WORK

To protect the Project Gutenberg™ mission of promoting the free distribution of electronic works, by using or distributing this work (or any other work associated in any way with the phrase "Project Gutenberg"), you agree to comply with all the terms of the Full Project Gutenberg™ License available with this file or online at www.gutenberg.org/license.

Section 1. General Terms of Use and Redistributing Project Gutenberg™ electronic works

1.A. By reading or using any part of this Project Gutenberg™ electronic work, you indicate that you have read, understand, agree to and accept all the terms of this license and intellectual property (trademark/copyright) agreement. If you do not agree to abide by all the terms of this agreement, you must cease using and return or destroy all copies of Project Gutenberg™ electronic works in your possession. If you paid a fee for obtaining a copy of or access to a Project Gutenberg™ electronic work and you do not agree to be bound by the terms of this agreement, you may obtain a refund from the person or entity to whom you paid the fee as set forth in paragraph 1.E.8.

1.B. “Project Gutenberg” is a registered trademark. It may only be used on or associated in any way with an electronic work by people who agree to be bound by the terms of this agreement. There are a few things that you can do with most Project Gutenberg™ electronic works even without complying with the full terms of this agreement. See paragraph 1.C below. There are a lot of things you can do with Project Gutenberg™ electronic works if you follow the terms of this agreement and help preserve free future access to Project Gutenberg™ electronic works. See paragraph 1.E below.

1.C. The Project Gutenberg Literary Archive Foundation (“the Foundation” or PGLAF), owns a compilation copyright in the collection of Project Gutenberg™ electronic works. Nearly all the individual works in the collection are in the public domain in the United States. If an individual work is unprotected by copyright law in the United States and you are located in the United States, we do not claim a right to prevent you from copying, distributing, performing, displaying or creating derivative works based on the work as long as all references to Project Gutenberg are removed. Of course, we hope that you will support the Project Gutenberg™ mission of promoting free access to electronic works by freely sharing Project Gutenberg™ works in compliance with the terms of this agreement for keeping the Project Gutenberg™ name associated with the work. You can easily comply with the terms of this agreement by keeping this work in the same format with its attached full Project Gutenberg™ License when you share it without charge with others.

1.D. The copyright laws of the place where you are located also govern what you can do with this work. Copyright laws in most countries are in a constant state of change. If you are outside the United States, check the laws of your country in addition to the terms of this agreement before downloading, copying, displaying, performing, distributing or creating derivative works based on this work or any other Project Gutenberg™ work. The Foundation makes no representations concerning the copyright status of any work in any country other than the United States.

1.E. Unless you have removed all references to Project Gutenberg:

1.E.1. The following sentence, with active links to, or other immediate access to, the full Project Gutenberg™ License must appear prominently whenever any copy of a Project Gutenberg™ work (any work on which the phrase “Project Gutenberg” appears, or with which the phrase “Project Gutenberg” is associated) is accessed, displayed, performed, viewed, copied or distributed:

This eBook is for the use of anyone anywhere in the United States and most other parts of the world at no cost and with almost no restrictions whatsoever. You may copy it, give it away or re-use it under the terms of the Project Gutenberg License included with this eBook or online at www.gutenberg.org. If you are not located in the United States, you will have to check the laws of the country where you are located before using this eBook.

1.E.2. If an individual Project Gutenberg™ electronic work is derived from texts not protected by U.S. copyright law (does not contain a notice indicating that it is posted with permission of the copyright holder), the work can be copied and distributed to anyone in the United States without paying any fees or charges. If you are redistributing or providing access to a work with the phrase “Project Gutenberg” associated with or appearing on the work, you must comply either with the requirements of paragraphs 1.E.1 through 1.E.7 or obtain permission for the use of the work and the Project Gutenberg™ trademark as set forth in paragraphs 1.E.8 or 1.E.9.

1.E.3. If an individual Project Gutenberg™ electronic work is posted with the permission of the copyright holder, your use and distribution must comply with both paragraphs 1.E.1 through 1.E.7 and any additional terms imposed by the copyright holder. Additional terms will be linked to the Project Gutenberg™ License for all works posted with the permission of the copyright holder found at the beginning of this work.

1.E.4. Do not unlink or detach or remove the full Project Gutenberg™ License terms from this work, or any files containing a part of this work or any other work associated with Project Gutenberg™.

1.E.5. Do not copy, display, perform, distribute or redistribute this electronic work, or any

part of this electronic work, without prominently displaying the sentence set forth in paragraph 1.E.1 with active links or immediate access to the full terms of the Project Gutenberg™ License.

1.E.6. You may convert to and distribute this work in any binary, compressed, marked up, nonproprietary or proprietary form, including any word processing or hypertext form. However, if you provide access to or distribute copies of a Project Gutenberg™ work in a format other than “Plain Vanilla ASCII” or other format used in the official version posted on the official Project Gutenberg™ website (www.gutenberg.org), you must, at no additional cost, fee or expense to the user, provide a copy, a means of exporting a copy, or a means of obtaining a copy upon request, of the work in its original “Plain Vanilla ASCII” or other form. Any alternate format must include the full Project Gutenberg™ License as specified in paragraph 1.E.1.

1.E.7. Do not charge a fee for access to, viewing, displaying, performing, copying or distributing any Project Gutenberg™ works unless you comply with paragraph 1.E.8 or 1.E.9.

1.E.8. You may charge a reasonable fee for copies of or providing access to or distributing Project Gutenberg™ electronic works provided that:

- You pay a royalty fee of 20% of the gross profits you derive from the use of Project Gutenberg™ works calculated using the method you already use to calculate your applicable taxes. The fee is owed to the owner of the Project Gutenberg™ trademark, but he has agreed to donate royalties under this paragraph to the Project Gutenberg Literary Archive Foundation. Royalty payments must be paid within 60 days following each date on which you prepare (or are legally required to prepare) your periodic tax returns. Royalty payments should be clearly marked as such and sent to the Project Gutenberg Literary Archive Foundation at the address specified in Section 4, “Information about donations to the Project Gutenberg Literary Archive Foundation.”
- You provide a full refund of any money paid by a user who notifies you in writing (or by e-mail) within 30 days of receipt that s/he does not agree to the terms of the full Project Gutenberg™ License. You must require such a user to return or destroy all copies of the works possessed in a physical medium and discontinue all use of and all access to other copies of Project Gutenberg™ works.
- You provide, in accordance with paragraph 1.F.3, a full refund of any money paid for a work or a replacement copy, if a defect in the electronic work is discovered and reported to you within 90 days of receipt of the work.
- You comply with all other terms of this agreement for free distribution of Project Gutenberg™ works.

1.E.9. If you wish to charge a fee or distribute a Project Gutenberg™ electronic work or group of works on different terms than are set forth in this agreement, you must obtain permission in writing from the Project Gutenberg Literary Archive Foundation, the manager of the Project Gutenberg™ trademark. Contact the Foundation as set forth in Section 3 below.

1.F.

1.F.1. Project Gutenberg volunteers and employees expend considerable effort to identify, do copyright research on, transcribe and proofread works not protected by U.S. copyright law in creating the Project Gutenberg™ collection. Despite these efforts, Project Gutenberg™ electronic works, and the medium on which they may be stored, may contain “Defects,” such as, but not limited to, incomplete, inaccurate or corrupt data, transcription errors, a copyright or other intellectual property infringement, a defective or damaged disk or other medium, a computer virus, or computer codes that damage or cannot be read by your equipment.

1.F.2. LIMITED WARRANTY, DISCLAIMER OF DAMAGES - Except for the “Right of Replacement or Refund” described in paragraph 1.F.3, the Project Gutenberg Literary Archive Foundation, the owner of the Project Gutenberg™ trademark, and any other party distributing a Project Gutenberg™ electronic work under this agreement, disclaim all liability to you for damages, costs and expenses, including legal fees. YOU AGREE THAT YOU HAVE NO REMEDIES FOR NEGLIGENCE, STRICT LIABILITY, BREACH OF WARRANTY OR BREACH OF CONTRACT EXCEPT THOSE PROVIDED IN PARAGRAPH 1.F.3. YOU AGREE THAT THE FOUNDATION, THE TRADEMARK OWNER, AND ANY DISTRIBUTOR UNDER THIS AGREEMENT WILL NOT BE LIABLE TO YOU FOR ACTUAL, DIRECT, INDIRECT, CONSEQUENTIAL, PUNITIVE OR INCIDENTAL DAMAGES EVEN IF YOU GIVE NOTICE OF THE POSSIBILITY OF SUCH DAMAGE.

1.F.3. LIMITED RIGHT OF REPLACEMENT OR REFUND - If you discover a defect in this electronic work within 90 days of receiving it, you can receive a refund of the money (if any) you paid for it by sending a written explanation to the person you received the work from. If you received the work on a physical medium, you must return the medium with your written

explanation. The person or entity that provided you with the defective work may elect to provide a replacement copy in lieu of a refund. If you received the work electronically, the person or entity providing it to you may choose to give you a second opportunity to receive the work electronically in lieu of a refund. If the second copy is also defective, you may demand a refund in writing without further opportunities to fix the problem.

1.F.4. Except for the limited right of replacement or refund set forth in paragraph 1.F.3, this work is provided to you 'AS-IS', WITH NO OTHER WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PURPOSE.

1.F.5. Some states do not allow disclaimers of certain implied warranties or the exclusion or limitation of certain types of damages. If any disclaimer or limitation set forth in this agreement violates the law of the state applicable to this agreement, the agreement shall be interpreted to make the maximum disclaimer or limitation permitted by the applicable state law. The invalidity or unenforceability of any provision of this agreement shall not void the remaining provisions.

1.F.6. INDEMNITY - You agree to indemnify and hold the Foundation, the trademark owner, any agent or employee of the Foundation, anyone providing copies of Project Gutenberg™ electronic works in accordance with this agreement, and any volunteers associated with the production, promotion and distribution of Project Gutenberg™ electronic works, harmless from all liability, costs and expenses, including legal fees, that arise directly or indirectly from any of the following which you do or cause to occur: (a) distribution of this or any Project Gutenberg™ work, (b) alteration, modification, or additions or deletions to any Project Gutenberg™ work, and (c) any Defect you cause.

Section 2. Information about the Mission of Project Gutenberg™

Project Gutenberg™ is synonymous with the free distribution of electronic works in formats readable by the widest variety of computers including obsolete, old, middle-aged and new computers. It exists because of the efforts of hundreds of volunteers and donations from people in all walks of life.

Volunteers and financial support to provide volunteers with the assistance they need are critical to reaching Project Gutenberg™'s goals and ensuring that the Project Gutenberg™ collection will remain freely available for generations to come. In 2001, the Project Gutenberg Literary Archive Foundation was created to provide a secure and permanent future for Project Gutenberg™ and future generations. To learn more about the Project Gutenberg Literary Archive Foundation and how your efforts and donations can help, see Sections 3 and 4 and the Foundation information page at www.gutenberg.org.

Section 3. Information about the Project Gutenberg Literary Archive Foundation

The Project Gutenberg Literary Archive Foundation is a non-profit 501(c)(3) educational corporation organized under the laws of the state of Mississippi and granted tax exempt status by the Internal Revenue Service. The Foundation's EIN or federal tax identification number is 64-6221541. Contributions to the Project Gutenberg Literary Archive Foundation are tax deductible to the full extent permitted by U.S. federal laws and your state's laws.

The Foundation's business office is located at 809 North 1500 West, Salt Lake City, UT 84116, (801) 596-1887. Email contact links and up to date contact information can be found at the Foundation's website and official page at www.gutenberg.org/contact

Section 4. Information about Donations to the Project Gutenberg Literary Archive Foundation

Project Gutenberg™ depends upon and cannot survive without widespread public support and donations to carry out its mission of increasing the number of public domain and licensed works that can be freely distributed in machine-readable form accessible by the widest array of equipment including outdated equipment. Many small donations (\$1 to \$5,000) are particularly important to maintaining tax exempt status with the IRS.

The Foundation is committed to complying with the laws regulating charities and charitable donations in all 50 states of the United States. Compliance requirements are not uniform and it takes a considerable effort, much paperwork and many fees to meet and keep up with these requirements. We do not solicit donations in locations where we have not received written confirmation of compliance. To SEND DONATIONS or determine the status of compliance for any particular state visit www.gutenberg.org/donate.

While we cannot and do not solicit contributions from states where we have not met the solicitation requirements, we know of no prohibition against accepting unsolicited donations from donors in such states who approach us with offers to donate.

International donations are gratefully accepted, but we cannot make any statements concerning tax treatment of donations received from outside the United States. U.S. laws alone swamp our small staff.

Please check the Project Gutenberg web pages for current donation methods and addresses. Donations are accepted in a number of other ways including checks, online payments and credit card donations. To donate, please visit: www.gutenberg.org/donate

Section 5. General Information About Project Gutenberg™ electronic works

Professor Michael S. Hart was the originator of the Project Gutenberg™ concept of a library of electronic works that could be freely shared with anyone. For forty years, he produced and distributed Project Gutenberg™ eBooks with only a loose network of volunteer support.

Project Gutenberg™ eBooks are often created from several printed editions, all of which are confirmed as not protected by copyright in the U.S. unless a copyright notice is included. Thus, we do not necessarily keep eBooks in compliance with any particular paper edition.

Most people start at our website which has the main PG search facility: www.gutenberg.org.

This website includes information about Project Gutenberg™, including how to make donations to the Project Gutenberg Literary Archive Foundation, how to help produce our new eBooks, and how to subscribe to our email newsletter to hear about new eBooks.