HISTORY

OF

VEGETABLE SUBSTANCES,

USED IN THE

ARTS, IN DOMESTIC ECONOMY,

AND FOR THE

FOOD OF MAN.

ILLUSTRATED WITH ENGRAVINGS.

IN TWO VOLUMES.

VOL. I.

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To those who delight in the verdant forests, and in the richly waving fields, these volumes will be acceptable. The mechanic, the farmer, and the horticulturist, will find matters of especial interest to each, in their unpretending pages.

The descriptions and drawings are original, and from nature—and remarkable for fidelity. They contain also much valuable matter that is new and not elsewhere to be found.

JANUARY, 1833.

ADVERTISEMENT.

The subjects of this Volume (Timber Trees, and Fruits) *are complete in themselves, although they form only a portion of the matter intended to be treated of under the head of* "Vegetable Substances." *The remaining divisions of* Esculent Vegetables, Spices, Substances which are used for Clothing, &c., *are in hand.*

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VEGETABLE SUBSTANCES

USED IN

THE ARTS, AND IN DOMESTIC ECONOMY.

Part I.

TIMBER TREES.

Chapter I.

Timber is one of the most essential substances in the Arts; and, in every situation in which it has been found, mankind appear to have first resorted to it, for habitations, for domestic implements, for the means of transporting themselves and their property by land and by water, and for the formation of their weapons, whether to be used in war or in the chase. The varieties of timber in use among different nations are very many, and not a few of them are but little known in England. It will, therefore, be necessary here to confine our notice to some of the more important.

THE OAK.

In point of strength, durability, and general application, Oak claims the precedence of all timber; and to England, which has risen to the highest rank among the nations, mainly through her commerce and her marine, the oak, "the father of ships," as it has been called, is inferior in value only to her religion, her liberty, and the spirit and industry of her people.

Of the Oak (called *Quercus*, in Latin) there are fourteen species described by Linnæus. During the last fifty years, so much attention has been paid to this important tree by travellers distinguished for their researches in natural history, that a surprising addition has been made to the number of known species. Professor Martyn, in his edition of Miller's Gardener's Dictionary, enumerates twenty-six; Willdenow, who wrote in 1805, describes seventy-six; and Persoon, another eminent naturalist of the same date, enumerates eighty-two. At present we have more than a hundred and forty species described by different writers; and of these more than one half belong to America. Twenty-six species were discovered in North America by two indefatigable naturalists, father and son, named Michaux; and Humboldt and Bonpland have mentioned twenty-four others, which they found during the course of their travels in South America. Of the various species of oak, some may be classed with shrubs, others with the most majestic trees of the forest; some are evergreens, and others are *deciduous*, or lose their leaves during the winter. The species from which the best timber is derived, which is by far the most abundant in Britain, and a native of it, is the COMMON OAK (*Quercus robur.*)

The cut opposite exhibits the leaf, flower, and fruit (the type) of this tree. We shall introduce the same mode of illustration in other instances.

The oak timber imported from America is much inferior to that of the common oak of England: the oak from the central parts of continental Europe is also inferior, especially in compactness and resistance of cleavage. The knotty oak of England, the "unwedgeable and gnarled oak," as Shakspeare called it, —and in these two words described its leading properties better than all the botanists,—when cut down at a proper age, (from fifty to seventy years,)

Common Oak—Quercus robur.

is really the best timber that is known. Some timber is harder, some more difficult to rend, and some less capable of being broken across; but none contains all the three qualities in so great and so equal proportions; and thus, for at once supporting a weight, resisting a strain, and not splintering by a cannon shot, the timber of the oak is superior to every other. Excepting the sap wood, the part nearest the bark, which is not properly matured, it is very durable, whether in air, in earth, or in water; and it is said that no insects in the island will eat into the heart of oak, as they do, sooner or later, into most of the domestic and many of the foreign kinds of timber.

Important as the oak is now in the arts, there was a period in the history of Britain when it was valued principally for its acorns. It is not recorded that acorns

were ever used as human food in this country, though they were so used, and are still said to be, by the poorer peasants in the south of Europe. Cervantes, in his romance of Don Quixote, not only sets them before the goatherds as a dainty, but picks out the choicest as a dessert for the Countess herself. The oaks with edible acorns are not, however, of the same species as the English oak. The Italian oak, which Virgil represents as the monarch of the forest, and of the elevation of whose top, the stedfastness of whose roots, and of whose triumph in its greenness over the lapse of ages, he gives a splendid description in the second book of his Georgics, bore fruit which was used as food. The *Quercus ilex* (the evergreen oak), which is still common in Spain, in Italy, in Greece, in Syria, in the south of France, and on the shores of the Mediterranean, bears a fruit which, in its agreeable flavour, resembles nuts. It is a slow-growing tree, and is always found single, and not in clumps. There is another evergreen oak, *Quercus ballota*, very common in Spain and Barbary, of which the acorns are most abundant and nutritive. During the late war in Spain, the French armies were fortunate in finding subsistence upon the ballota acorns, in the woods of Salamanca. We are often startled by the assertions of ancient writers, that the acorn, in the early periods of society, formed the principal food of mankind. Much of our surprise would have ceased had we distinguished between the common acorn, and that of the Ilex, Ballota, and Esculus oaks. Some of the classic authors speak of the fatness of the primitive inhabitants of Greece and southern Europe, who, living in the forests which were planted by the hand of nature, were supported almost wholly upon the fruit of the oak. The Grecian poets and historians called these people *balanophagi* (eaters of acorns); but then the Greek word *balanos*,

which the Romans translated *glans* (acorn), applied also to such fruits as dates, nuts, beech-mast, and olives. These all contain large quantities of oil, which renders them particularly nutritive.

Whether the custom existed among the ancient Britons, or (as is more probable) was imported by the Saxons who came from the thick oak forests of Germany, it is certain that, during the time when they held sway in this country, the fattening of hogs upon acorns in the forests was accounted so important a branch of domestic economy, that, at about the close of the seventh century, King Ina enacted the *panage laws* for its regulation. The fruit of the oak then formed *gifts* to kings, and part of the dowries of queens. So very important was it, indeed, that the failure of the acorn crop is recorded as one of the principal causes of famine. One of the most vexatious acts of William the Conqueror, in his passion for converting the whole of the forests into hunting-grounds, was that of restricting the people from fattening their hogs; and this restriction was one of the grievances which King John was called upon to redress at the triumph of Runnemede, where his assembled subjects compelled him to sign *Magna Charta*. It is to be observed that swine's flesh was the principal food of most nations in the earlier stages of civilization; and this is to be attributed to the extreme rapidity with which the hog species multiply.

Up to a recent period, large droves of hogs were fattened upon the acorns of the New Forest, in Hampshire, under the guidance of swineherds, who collected the herds together every night by the sound of a horn. At the present time, the hogs of Estremadura are principally fed upon the acorns of the *Ballota* oak; and to this cause is assigned the great delicacy of their flesh.

The history of the importance of the oak as timber

nearly keeps pace with that of ship-building; and there is little doubt that, from the time of Alfred, who first gave England a navy capable of contending with her enemies upon the sea, to that of Nelson, (about nine hundred years afterwards,) in whom nautical skill appears to have been raised to the greatest possible height, the oak was the principal and essential material in ship-building. It is more than probable that the inferiority of some of our more recently built ships, and the ravages which the dry-rot is making among them, have arisen from the substitution of foreign oak for that of native growth. A writer in a recent number of the Quarterly Review has ascribed this evil to the substitution of a foreign species of oak, in our own plantations, instead of continuing the true native tree. In the same way, the real Scotch fir has been gradually superseded by a very inferior species, bearing the same name; and the reason in each case appears to have been, that the seed of the spurious kind is much more plentiful, and grows more easily, than that of the real species. We subjoin the passage to which we have alluded:—

"We may here notice a fact long known to botanists, but of which our planters and purveyors of timber appear to have had no suspicion, that there are two distinct species of oak in England, the *Quercus robur*, and the *Quercus sessiliflora;* the former of which affords a close-grained, firm, solid timber, rarely subject to rot; the other more loose and sappy, very liable to rot, and not half so durable. This difference was noticed so early as the time of Ray; and Martyn, in his *Flora Rustica*, and Sir James Smith, in his *Flora Britannica*, have added their testimonies to the fact. The second species is supposed to have been introduced, some two or three ages ago, from the continent, where the oaks are chiefly of this latter species, especially in the German forests, the timber

of which is known to be very worthless. But what is of more importance to us is, that, *de facto*, the impostor abounds, and is propagated vigorously in the New Forest and other parts of Hampshire, in Norfolk, and the northern counties, and about London; and there is but too much reason to believe that the numerous complaints that were heard about our ships being infested with what was called, improperly enough, *dry-rot*, were owing to the introduction of this species of oak into the naval dockyards, where, we understand, the distinction was not even suspected. It may thus be discriminated from the true old English oak: the acorn-stalks of the *Robur* are *long* and its leaves *short*, whereas the *Sessiliflora* has the acorn-stalks *short* and the leaves *long;* the acorns of the former grow singly, or seldom two on the same foot-stalk: those of the latter in clusters of two or three, close to the stem of the branch. We believe the Russian ships of the Baltic, that are not of larch or fir, are built of this species of oak; but if this were not the case, their exposure on the stocks, without cover, to the heat of summer, which, though short, is excessive, and the rifts and chinks, which fill up with ice and snow in the long winter, are enough to destroy the stoutest oak, and quite sufficient to account for their short-lived duration."

When the oak stands alone, it is a spreading rather than an elevated tree: in that situation the timber is also said to be more compact and firm, and the crooked arms of the trees are better adapted for ship-building than when the trees are close together. In thickly planted groups, the oak will reach an elevation of eighty or a hundred feet before it begins to decay; and in some of the choicer trees, forty, fifty, or even sixty feet may be found without a single lateral branch, and of such diameter that, even at the smaller extremity, they will square to eighteen inches or two feet. These are as well adapted for beams

and planking as the others are for crooked timbers; and, therefore, in order to secure a proper supply, not only for maritime, but for domestic purposes, it is desirable to have them in both situations.

The trunk of the detached oak acquires by far the greater diameter; some of the old hollow trees, most of which are of this description, having a diameter of as much as sixteen feet in the cavity, and still a shell of timber on the outside, sufficiently vigorous for producing leaves and even acorns. The age to which the oak can continue to vegetate, even after the core has decayed, has not been fully ascertained. But, in favourable situations, it must be very considerable. In the New Forest, Evelyn counted, in the sections of some trees, three hundred or four hundred concentric rings or layers of wood, each of which must have recorded a year's growth. The same celebrated planter mentions oaks in Dennington Park, near Newbury, once the residence of Chaucer, which could not have arrived at the size which they possessed in a less period than about three hundred years; and though he does not say upon what evidence the opinion is grounded, Gilpin notices, in his Forest Scenery, "a few venerable oaks in the New Forest, that chronicle upon their furrowed trunks ages before the Conquest."

Some out of the number of ancient oaks that are celebrated, it may not be uninteresting to mention: —One of the three in Dennington Park, the King's Oak, was fifty feet high before a bough or even a knot appeared, and the base of it squared five feet entirely solid; the Queen's Oak was straight as a line for forty feet, then divided into two immense arms, and the base of it squared to four feet; and Chaucer's Oak, said to have been planted by the poet, though inferior to the royal ones, was still a most stately tree. The Framlingham oak (Suffolk), used in the construction of the Royal Sovereign, was four feet nine inches

square, and yielded four square beams, each forty-four feet in length. An oak felled at Withy Park, Shropshire, in 1697, was nine feet in diameter, without the bark; there were twenty-eight tons of timber in the body alone; and the spread of the top, from bough to bough, was one hundred and forty-four feet. In Holt Forest, Hampshire, there was an oak, which, at seven feet from the ground, was thirty-four feet in circumference in 1759, and twenty years after, the circumference had not increased half an inch. Dr. Plott mentions an oak at Norbury, which was of the enormous circumference of forty-five feet; and when it was felled, and lying flat upon the ground, two horsemen, one on each side the trunk, were concealed from each other. The same author mentions an oak at Keicot, under the shade of which four thousand three hundred and seventy-four men had sufficient room to stand. The Boddington oak, in the Vale of Gloucester, was fifty-four feet in circumference at the base. The larger arms and branches were gone in 1783; and the hollow cavity was sixteen feet in its largest diameter, with the top formed into a regular dome; while the young twigs on the decayed top had small leaves about the size of those of the hawthorn, and an abundant crop of acorns. The hollow had a door and one window; and little labour might have converted the tree into a commodious, and rather a spacious room. The Fairlop oak in Essex, though inferior in dimensions to the last mentioned, was a tree of immense size,—being between six and seven feet in diameter, at three feet from the ground. Damory's oak in Dorsetshire was the largest oak of which mention is made. Its circumference was sixty-eight feet; and the cavity of it, which was sixteen feet long and twenty feet high, was, about the time of the Commonwealth, used by an old man for the entertainment of travellers, as an ale-house. The dreadful storm in the third year of

last century shattered this majestic tree; and in 1755 the last vestiges of it were sold as firewood. An immense oak was dug out of Hatfield bog. It was a hundred and twenty feet in length, twelve in diameter at the base, ten in the middle, and six at the smaller end where broken off.

Some oaks have been as celebrated for being the records of historical events, as others have been for their magnitude, although a part of the celebrity may no doubt be fabulous. Not a hundred years ago, the oak in the New Forest, against which the arrow of Sir William Tyrrel glanced, before it killed William Rufus, is said to have been standing, though in such a state of decay, that Lord Delaware erected a monument to indicate the spot. The Royal Oak at Boscobell, in which Charles the Second concealed himself after the defeat at Worcester, has disappeared; and though several trees were raised from its acorns, the race seems now to be lost to vegetable history. An oak of still more venerable pretensions now stands, or lately stood, at Torwood Wood, in Stirlingshire, under the shadow of which the Scottish patriot Wallace is reported to have convened his followers, and impressed upon them, not only the necessity of delivering their country from the thraldom of Edward, but their power of doing it, if they were so determined. Gilpin mentions one, more ancient even than this—Alfred's oak at Oxford, which was a sapling when that great monarch founded the University. This cannot, of course, be implicitly credited; but still the very mention of such things proves, that the oak can reach an age several times exceeding that of the longest lived of the human race.

Since oak was so much in demand, it has become an object of great attention to planters; and the plants are carefully reared by nurserymen from the acorns. If the saplings are to be of considerable size when

planted out in their permanent situations, they are several times transplanted in the nursery. The deformed ones are cut down to the ground, and then a young, vigorous, straight shoot is made, instead of that which was deformed. Some of those who have paid considerable attention to the subject are, however, of opinion, that although transplanting probably accelerates the growth a little, the advantage thereby gained is more than compensated by the deterioration of the timber, which is neither so strong, nor so durable, as that sown by the hand of nature, or where it is to be allowed to remain without transplanting.

Of the various European oaks, the *Quercus pedunculata* is the most esteemed on the continent. It is a magnificent tree, considerably taller than our native oak. In the forests of Fontainebleau and of Compiègne there are at this day many trees of this species, the trunks of which measure from thirty to thirty-six feet in circumference at the base, and rise to the height of forty feet without a single branch. Beautiful as this species is, it produces, however, timber very inferior to our *Quercus robur*. It is probable that the species which is indifferently designated by French botanists *Quercus robur*, and *Quercus sessiliflora*, is, as stated in pages 6 and 7, a species entirely different from our real English oak; for the wood of the *Quercus pedunculata* is described by these writers as harder and more compact than that of the *robur* or *sessiliflora*. The *Quercus alba* of North America very much resembles the *Quercus pedunculata*. It is found in all the countries of the United States, from Florida up to Canada. It is the species chiefly used in shipbuilding, and for houses; and casks for liquors are principally made of it, as those of the red oak will only contain dry goods. Considerable quantities of this timber are imported into England. Parkinson

relates that the Indians extracted an oil from the acorns of this species, with which they prepared their food. The quercitron (*Quercus tinctoria*) is, after the white oak, commonly preferred for the construction of houses in the United States. The bark of this species affords a yellow dye, which is a considerable article of commerce; it is used for dyeing silk and wool. The quercitron is employed by the Americans in tanning leather, chiefly on account of its abundance; but the yellow colour which it imparts to skins is considered a defect, and is generally removed by a subsequent chemical process. In the United States, the bark of almost every sort of tree is used for tanning; the abundance with which it is procured rendering selection less necessary. In England, oak bark is almost exclusively applied to this purpose, as it contains the largest quantity of *tannin* of any known substance. The leaves of some trees may be so applied. The Chinese use the coarser leaves of the tea-tree in the preparation of leather.

A fine oak is one of the most picturesque of trees. It conveys to the mind associations of strength and duration, which are very impressive. The oak stands up against the blast, and does not take, like other trees, a twisted form from the action of the winds. Except the cedar of Lebanon, no tree is so remarkable for the stoutness of its limbs: they do not exactly spring from the trunk, but divide from it; and thus it is sometimes difficult to know which is stem and which is branch. The twisted branches of the oak, too, add greatly to its beauty; and the horizontal direction of its boughs, spreading over a large surface, completes the idea of its sovereignty over all the trees of the forest. Even a decayed oak,—

"————dry and dead,
Still clad with reliques of its trophies old,
Lifting to heaven its aged, hoary head,
Whose foot on earth hath got but feeble hold—"

—even such a tree as Spenser has thus described is strikingly beautiful ; decay in this case looks pleasing. To such an oak Lucan compared Pompey in his declining state.

The CORK OAK (*Quercus suber*) is not so large a tree as the common oak. There are several varieties : a broad leaved and a narrow leaved, which are evergreens ; besides other varieties which shed their leaves. The broad leaved evergreen is, however, the most common, and it is the one from which the cork of commerce is chiefly obtained. It is mentioned by Theophrastus, Pliny, and some other ancient naturalists as being well known in the days of the Greeks and Romans,—the latter of whom used it for a variety of purposes, and among the rest for the stopping of bottles. They used it for floats to their nets and fishing tackle; for buoys to their anchors; and when Camillus was sent to the Capitol, through the Tiber, during the siege by the Gauls, he had a life-preserver of cork under his dress.

The Cork Oak is indigenous, or at least abundant, in Portugal, Spain, part of the south of France, and Italy ; on the opposite coast of the Mediterranean, and the Levant. Spain and Portugal supply the greater portion of the cork which is consumed in Europe. The cork is the bark which the tree pushes outwards, as is common to all trees ; but here the outer bark is of larger quantity, and is more speedily renewed. When removed, there is a *liber*, or inner bark, below it, and from this the cork is reproduced in the course of a few years,—while the tree is said to live longer, and grow more vigorously, than if the cork were not removed. The first time that the cork is taken off, is when the tree is about fifteen years old. That crop is thin, hard, full of fissures, and consequently of little value ; and the

Cork Oak—Quercus suber.

second, which is removed about ten years after, is also of an inferior quality. After this, the operation is repeated once in eight or ten years, the produce being greater in quantity, and superior in quality, each successive time. According to Duhamel, a cork-tree thus barked will live a hundred and fifty years. The months of July and August are those which are chosen for removing the cork. The bark is cleft longitudinally, at certain intervals, down to the crown of the root, with an axe, of which the handle terminates in a wedge ; and a circular incision is then made from each extremity of the longitudinal cuts. The bark is then beaten, to detach it from the *liber* ; and it is lifted up by introducing the wedged handle, taking care to leave sufficient of the inner

laminæ upon the wood, without which precaution the tree would certainly die. The bark being thus removed, it is divided into convenient lengths ; and it is then flattened, and slightly charred, to contract the pores. This substance is the rough cork of commerce ; and it is thus fit to be cut into floats, stoppers, shoe-soles, and other articles of domestic use, by the manufacturer. The cork of the best quality is firm, elastic, and of a slightly red colour. Two thousand five hundred tons of cork were imported into the United Kingdom in 1827. Cork burned in vessels

Cork Tree in the Botanic Garden, Chelsea ; 1829.

of a particular construction gives the substance called *Spanish black.*

The Oak from which the nut-galls of commerce are procured (*Quercus infectoria*) is minutely described by M. Olivier, in his travels. The species is very common in Asia-Minor; but, till the time of this traveller, Europeans had very little information on the subject, although the galls were a considerable article of commerce. It is a shrub, seldom exceeding six feet in height; and it has not only been accurately described by M. Olivier, but was introduced by him into France, where it is cultivated as a garden shrub, and grows well in the open air.

The gall is a morbid excrescence produced by the puncture of a winged insect, to which Olivier has given the name of *Diplolepis Gallæ Tinctoriæ.* This excrescence is of a globular form, with an unequal and tuberculous surface. It is developed on the young shoots of the tree, and contains within it the eggs which the insect has deposited. The best galls are gathered before the transformation of the insect, because in that state they are heavier, and contain more of the tannin principle. When the insect has left them, they are pierced from the interior to the surface. The best galls come from Aleppo. The substance of which they are composed is peculiarly astringent; of which, according to Sir Humphry Davy, five hundred parts contain a hundred and eighty parts of soluble matter, principally formed of tannin and gallic acid. One hundred and seventy-four tons of galls were imported into the United Kingdom in 1827.

The instinct by which certain insects choose for the nests of their future offspring the substance of various vegetable bodies, is one of the most curious provisions in the economy of nature. After having pierced those bodies, they deposite their eggs, which, being hatched, produce *larvæ*, that are more or

less fatal to the vegetable substance to which they are attached. According to Virey, an irritation is produced by the introduction of these insects, that resembles a tumour and inflammation in an animal body. The cellular tissue swells ; the parts, which were naturally long, become round; and the flow of liquid matter produces a change of organization, from which results a complete change in the external form of the organ. In this way is the gall produced. The oak-apple is an excrescence of the same nature, though affected by a different species of insect. There are various insects possessing the instinct thus to deposite their eggs, that are furnished with an apparatus of the most curious construction, necessary for puncturing the branch, as is done by the parent; and for piercing a way out of the gall, as is done by the insect produced, after it has passed its larva state. Each species of insect chooses not only the particular vegetable, but the part of that vegetable which is best adapted for the reception of its larvæ; and in this way the same plant, for instance the oak, sometimes receives the nests of twenty different species of insects. A gall sometimes contains a single larva, sometimes many, and it is thus either called simple or compound. A late agreeable writer on Natural History has given us some sensible observations on the subject of galls, and the instincts of the little creatures that produce them:—

" The insect that wounds the leaf of the oak, and occasions the formation of the gall-nut, and those which are likewise the cause of the apple rising on the sprays of the same tree, and those flower-like leaves on the buds, have performed very different operations, either by the instrument that inflicted the wound, or by the injection of some fluid to influence the action of the parts. That extraordinary hairy excrescence on the wild rose, likewise the result

of the wounds of an insect (*Cynips rosæ*), resembles no other nidus required for such creatures that we know off; and these red spines on the leaf of the maple are different again from others. It is useless to inquire into causes of which we probably can obtain no certain results; but, judging by the effects produced by different agents, we must conclude, that, as particular birds require and fabricate from age to age very different receptacles for their young, and make choice of dissimilar materials, though each species has the same instruments to affect it, where, generally speaking, no sufficient reasons for such variety of forms and texture is obvious; so is it fitting that insects should be furnished with a variety of powers and means to accomplish their requirements, having wants more urgent, their nests being at times to be so constructed as to resist the influence of seasons, to contain the young for much longer periods, even occasionally to furnish a supply of food, or be a storehouse to afford it when wanted by the infant brood*."

Reaumur, the distinguished naturalist, in his Memoirs on Insects, has a most minute and interesting account of the admirable mechanism by which the genus *Cynips* (the insect which produces the gall-nut) conducts its remarkable operations. It is provided with a needle in a sheath, which has most surprising powers of extension, derived from the peculiar construction of the whole body of the insect, so much so that the needle can be extended to double the length of the animal itself; and thus, as we have seen, it forms a nest for its offspring, while the young, in the same manner, pierce their way out of the vegetable shell which has been their protection.

In Spain, in the southern provinces of France, and along the Mediterranean coasts of Africa, there is

* Journal of a Naturalist, page 109.

found in great plenty a small species of oak, called the Kermes (*Quercus coccifera*), which is remarkable for nourishing large quantities of a small insect (*Coccus ilicis*), which, being gathered, forms an article of commerce called kermes. The declivities of the Sierra Morena are covered with the kermes oak; and many of the inhabitants of the province of Murcia have no other mode of living than gathering the kermes. Latreille has united this insect to the cochineal family, which it resembles, not only in its form, but in producing a scarlet dye. Till the discovery of the cochineal insect upon certain species of the *Cactus* in South America, the kermes was the only substance used in dyeing scarlet, from the period of the disuse and loss of the *Murex* and *Buccinum*,—the shell-fish that produced the Tyrian purple of the Romans. The people of Barbary employ the kermes for dyeing the scarlet caps used by the natives in the Levant, and they prefer that of Spain to their own produce. In England, and in other countries where manufactures are extensively carried on, the cochineal has almost entirely superseded the use of the insect scarlet dye of Europe.

Though the TEAK TREE (*Tectona grandis*) be a tree of quite a different family from the oak, and a native of India, it is used in ship-building like the oak, and has some resemblance to it in its timber. It is a tree of uncommon size, with leaves twenty inches long, and sixteen broad, and bears a hard nut. The country ships in India, as well as many very fine ones that trade between India and this country, are built of it. A specimen was introduced into the Royal Gardens at Kew, about sixty years ago; but from the warmth of the climate of which it is a native, it can never become a forest-tree in this country.

Besides its value as timber, the teak has great beauty as a tree. It is found more than two hundred feet high, and the stem, the branches, and the leaves are all very imposing. On the banks of the river Irrawaddy, in the Birman empire, the teak forests are unrivalled; and they rise so far over the jungle or brushwood, by which tropical forests are usually rendered impenetrable, that they seem almost as if one forest were raised on gigantic poles over the top of another. The teak has not the broad strength of the oak, the cedar, and some other trees; but there is a grace in its form which they do not possess

Teak—Tectona grandis.

Chapter II.

THE PINE.

Although, in all or most of its species, not next to the oak in the strength or the durability of its timber, the Pine, perhaps, claims the second place among valuable trees. It is very abundant, its growth is comparatively rapid, and its wood is straight, elastic, and easily worked. Accordingly, as oak is the chief timber in building ships for the sea, pine is the principal one in the construction of houses upon land. It is "the Builder's timber:" and as, when the carpenter wants a post or a beam of peculiar strength and durability, he has recourse to the oak; so when the shipwright wishes to have a piece of timber that shall combine lightness with great length, as for a spar or mast, he makes use of the pine.

The distinct species of pines enumerated by the botanists are about twenty-one. None of these bear flat leaves, but a sort of spines, which, however, are true leaves. They are mostly, though not all, evergreens; but the appearance of the tree, as well as the quality of the timber, varies with the species, and also with the situation in which it grows. Generally speaking, the timber is the more hard and durable the colder the situation is, and the slower the tree grows; and in peculiar positions it is not unusual to find the northern half of a common pine hard and red, while the southern half, though considerably thicker from the pith to the bark, is white, soft, and spongy.

No account can be given of the first use of the different species of pines by the natives of the coun-

tries where they are indigenous. The cedar of Lebanon appears to have been used from the earliest periods of Syrian history. The Romans, and after them the Venetians, made use of the larch for architectural and household purposes, as well as in the construction of their galleys and vessels. The Norwegians and Danes constructed their first ships of the pines of the Scandinavian mountains. Upon the Gulph of Bothnia, near the borders of Lapland, at the bottom of one of the forests sloping towards a bay, Dr. Clarke saw a pine-vessel of forty-six tons, just launched, which had been built by the natives upon one of the wildest scenes of the coast, without the aid of docks, or any other convenience required by marine architects.* The people of the northern parts of Britain still make their boats, and the rudest of them even their cordage, of the pine; and though the timber of the pines of the New World be, upon the whole, less hard and durable than of those of Europe, it is employed for shipbuilding, as well as for domestic purposes. The pine found in the bogs of Ireland is of a very superior quality, and used by the inhabitants for many purposes. Some persons of rank in that country have halls and other apartments floored with bog-pine;—while, in several districts, it is the only timber of the peasants, who make of it their wooden utensils, and also their cordage. It is perfectly proof against the worm; and seems, in durability, almost to rival the cedar itself. From the greater ease with which it can be worked, and its aptitude to receive and retain paint, pine is now chiefly employed in the roofs, floors, and internal finishing of houses;—the European sort, where it has to bear a strain, or is exposed to wearing,—and the softer kinds, from America, for internal mouldings and ornaments.

* Travels in Scandinavia.

As is the case now with a great part of Canada, Norway, Sweden, the eastern shore of the Baltic, and some considerable tracts of the Highlands of Scotland, it is probable that, in very early ages, great part of Britain, with those islands towards the north, in which there is now hardly a shrub of any kind, were covered by pine forests. There has been much controversy amongst the learned whether the pine was indigenous to England. Cæsar expressly says that Britain had all the trees of Gaul, except the beech and fir. It is remarkable, however, that our names for the beech are derived from the Roman word *fagus;* but the fir has three names, which are purely British—this would seem to justify the conclusion, that the tree was not introduced by the Romans, but was originally British.* The fir is perpetually discovered in such of our mosses as were certainly prior to the time of the Romans; remains of the tree have been found, not only on the sides of Roman roads, but actually under them. But a more complete proof of the ancient existence of pine forests in England has been afforded by a minute examination of an extensive district called Hatfield Chase, in Yorkshire. This curious subject was investigated with great diligence by the Rev. A. De la Pryme, and the results of his researches were communicated to the Royal Society, in a paper published in their Transactions for 1701. Of this paper the following is the substance; and we have generally retained the author's own expressions.

The famous levels of Hatfield Chase were the largest chase of red deer that King Charles the First had in England, containing in all above 180,000 acres of land, about half of which was yearly drowned by vast quantities of water. This being sold to one

* Whitaker's History of Manchester.

Sir Cornelius Vermuiden, a Dutchman, he at length effectually dischased, drained, and reduced it to constant arable and pasture grounds, with immense labour, and at the expense of about 400,000*l*. In the soil of all or most of these 180,000 acres of land, of which 90,000 were drained, even in the bottom of the river Ouse, and in the bottom of the adventitious soil of all Marshland, and round about by the skirts of the Lincolnshire Wolds, unto Gainsbury, Bawtry, Doncaster, Baln, Snaith, and Holden, are found vast multitudes of the roots and trunks of trees, of all sizes, great and small, and of most of the sorts which this island either formerly did, or at present does, produce; as fir, oak, birch, beech, yew, thorn, willow, ash, &c., the roots of all or most of which stand in the soil in their natural position, as thick as ever they could grow, as the trunks of most of them lie by their proper roots. Most of the large trees lie along about a yard from their roots, (to which they evidently belonged, both by their situation and the sameness of the wood,) with their tops commonly north-east, though, indeed, the smaller trees lie almost every way, across the former, some over, and others under them; a third part of all being pitch trees, or firs, some of which are thirty yards in length or upwards, and sold for masts and keels of ships. Oaks have been found, of twenty, thirty, and thirty-five yards long, yet wanting many yards at the small end; they are as black as ebony, and very durable in any service they are put to. It is very observable, and manifestly evident, that many of those trees of all sorts have been burnt, but especially the pitch or fir trees, some quite through, and some all on a side; some have been found chopped and squared, some bored, others half split, with large wooden wedges and stones in them, and broken axe-heads, somewhat like sacrificing axes in shape; and all

this in such places and at such depths that they could never have been opened since the destruction of this forest till the time of the drainage. Near a large root, in the parish of Hatfield, were found eight or nine coins of some of the Roman emperors, but exceedingly consumed and defaced with time; and it is very observable, that on the confines of this low country, between Burningham and Brumby in Lincolnshire, are several great hills of loose sand, under which, as they are yearly worn and blown away, are discovered many roots of large firs, with the marks of the axe as fresh upon them as if they had been cut down only a few weeks. Hazel-nuts and acorns have frequently been found at the bottom of the soil of those levels and moors, and whole bushes of fir-tree apples, or cones, in large quantities together.

The author of this paper then goes on to shew that the Romans destroyed this immense forest, partly by cutting down the trees, and partly by burning them; and that these fallen trees dammed up the rivers, which, forming a lake, gave origin to the large turf-moors of that part of the country. The Romans themselves mention cutting down the British forests, as well for the purpose of making roads through the country, as to drive the natives out of their fastnesses.

In the peat-bogs of the bleakest districts of Scotland, the remains of pine trees are very abundant; and such is their durability, in consequence of the quantity of turpentine they contain, that, where the birch is reduced to a pulp, and the oak cracks into splinters, as it dries, the heart of the pine remains fresh, and, embalmed in its own turpentine, is quite elastic, and used by the country people in place of candles. In England, too, subterraneous beds of pines have been found; and though, in consequence of the greater warmth of the climate, these contain less turpentine, and are more decayed, the remains of the cones, or

seed-vessels, shew that they belong to the same species.

One of the most singular changes to which any country can be subjected, is that which arises from the formation of extensive masses of peat-earth. They are common in most of the colder parts of the world; and are known in Ireland (where they occupy nearly one-tenth of the surface) by the name of *bogs*, and in Scotland by the name of *peat-mosses*. These accumulations of a peculiar vegetable matter are a sort of natural chronicle of the countries in which they are found. In the northern parts of the island of Great Britain, and in many places of Ireland, especially in the central parts, between the Irish Sea and the Shannon, they point out that the soil and climate were once far superior to what the country now, in those situations, enjoys.

The era of the first commencement of these bogs is not known; but as in many of them, both in Ireland and Scotland, are found the horns and skulls of animals of which no live specimens now exist in the country, and have not been since the commencement of recorded history, their origin must be referred to very remote periods. Notwithstanding this, the formation of a peat-bog, under favourable circumstances, does not appear to be a very lengthened process; for George Earl of Cromarty mentions (Philosophical Transactions, No. 330) that near Loch Broaw, on the west of Rossshire, a considerable portion of ground had, between the years 1651 and 1699, been changed from a forest of barked and leafless pines, to a peat-moss or bog, in which the people were cutting turf for fuel.

The process, according to the Earl's description, which has been verified by the observations of others, is this:—The pines, after having stood for some time deprived of their bark, and bleaching in the rains,

which, in that country, are both heavy and frequent, are gradually rotted near their roots, and fall, generally, by the action of the south-west winds, which are the most violent in the British isles. After the trees have fallen, and have been soaked by the rains, they are soon covered by various species of *fungi*. When these begin to decay, the rain washes the adhesive matter into which they are reduced between the fallen tree and the ground, and a dam is thus formed which collects and contains the water. Whenever this takes place, the surface of the stagnant pool, or the moist earth, becomes green with mosses, and these mosses further retain the water. It is a property of those species of moss which grow most readily in cold and moist districts, to keep decomposing at the roots while they continue to grow vigorously at the tops. Cold and humidity, as has been said, are the circumstances in which the mosses that rot and consolidate into peat are formed; and when the mosses begin to grow, they have the power of augmenting those causes of their production. The mossy surface, from its spongy nature, and from the moisture with which it is covered, is one of the very worst conductors of heat; and thus, even in the warmest summers, the surface of moss is always comparatively cold. Beside the spongy part of the moss, which retains its fibrous texture for many years, there is a portion of it, and especially of the small *fungi* and *lichens* with which it is mixed, that is every year reduced to the consistency of a very tough and retentive mould. That subsides, closes up the openings of the spongy roots of the moss, and renders the whole water-tight. The retention of the water is further favourable to the growth of the moss, both in itself, and by means of the additional cold which it produces in the summer.

The following account of the conversion of forests

into bogs is said to be from the pen of Sir Walter Scott, and it is certainly characterised by that accuracy of observation and felicity of expression for which he is so remarkable:—

"Extensive forests, occupying a long tract of tolerably level ground, have been gradually destroyed by natural decay, accelerated by the increase of the bogs. The wood which they might have produced was useless to the proprietors; the state of the roads, as well as of the country in general not permitting so bulky and weighty an article to be carried from the place where it had grown, however valuable it might have proved had it been transported elsewhere. In this situation the trees of the natural forest pined and withered, and were thrown down with the wind, and it often necessarily happened that they fell into, or across, some little stream or rivulet, by the side of which they had flourished and decayed. The stream being stopt, saturated with standing water the soil around it; and instead of being, as hitherto, the drain of the forest, the stagnation of the rivulet converted into a swamp what its current had formerly rendered dry. The loose bog earth, and the sour moisture with which it was impregnated, loosened and poisoned the roots of other neighbouring trees, which, at the next storm, went to the ground in their turn, and tended still more to impede the current of the water; while the accumulating moss, as the bog earth is called in Scotland, went on increasing and heaving up, so as to bury the trunks of the trees which it had destroyed. In the counties of Inverness and Ross, instances may be seen, at the present day, where this melancholy process, of the conversion of a forest into a bog, is still going forward."

When a peat-bog or moss has begun to form, there is no limit to its increase, save the pressure of the water which it contains. In the part of

Ireland that has been mentioned—that is, from the county of Cavan to that of Kildare, a bog occupies the summit level instead of mountains, and is in some places at least fifty feet in thickness; and though there be partial islands of more firm soil in the extent of it, the highest grounds are composed of peat. In many parts of Scotland, too, the bogs occupy the summit levels, and are found with a river flowing from the one extremity to the eastern sea, and from the other to the western.

When these bogs are situated high, and have their surfaces sloping, they are comparatively compact, though at a little distance from the surface they always contain a great deal of moisture. But when they are on less elevated situations, and the surface is partially covered with grass, they are often of very soft consistence below, while the grass forms a tough skin on the surface. In Ireland these are called moving-bogs, and in Scotland quaking mosses. They are very perilous to travellers, and cannot in general be pastured by cattle.

In seasons which are very rainy, those bogs are apt to imbibe a greater portion of moisture than the surface can retain; but as the surface is not of a kind through which the water can percolate and escape quietly, a disruption takes place; and when, which is by no means unfrequently the case, the bog is situated on a base higher than the adjoining cultivated fields, it bursts, and covers them with a black deluge.

These burstings, or motions of bogs, are by no means unfrequent in Ireland, where there have been some of very recent occurrence; but one of the most singular is that of the disruption of the Solway Moss on the confines of England and Scotland, which took place on the 16th of December, 1772.

The Solway Moss occupied an extent of about

thirteen hundred acres, had a comparatively tough surface, or covering, but was very soft beneath, and vibrated very much when trod upon. So dangerous was its surface, that a number of the army of Sinclair, in the time of Henry VIII., were lost in it, more especially those who were on horseback; and it is said that the skeleton of a trooper and his horse, and the armour of the rider, were found, not long before the disruption of the moss. The Solway Moss stretched along an eminence, varying in height from fifty to eighty feet above the fertile plain which lay between it and the river Esk. The centre of the surface was comparatively flat, and consisted of very loose quagmires, interspersed with hummocks, or hassocks, of coarse grass. Previous to the 16th of December there had been very heavy rains, and the waters accumulated from their not being able to find vent. The surface rose, till the pressure of the water became too great for its strength, and then it burst with considerable noise, and descended into the plain, carrying ruin wherever it went. The time of the bursting was about eleven at night on the 15th, and the inhabitants of the farms and hamlets that were nearest to the moss were surprised in their beds by the unexpected visiter.

In the rate of its progress the eruption of this moss resembled those of the lavas of Etna and Vesuvius, which, when in a half consolidated state, creep over the plains, and cover them with ruin. In consequence of the slowness of its motion no lives were lost, but many of the people escaped with difficulty. It is much more easy to imagine than to describe the consternation into which the poor inhabitants of Eskdale were thrown by this event. They were a simple rustic people, not a little superstitious, and, therefore, when the dark and semi-fluid mass began to crawl along their plains,

awakening them from their sleep by its invasion, they could not but be alarmed. The attempts to escape from the houses led to new alarms ; for when the door was opened a torrent was ready to enter : and they to whom the visitation first came were, both from that visitation itself, and from ignorance of its real cause, in very great consternation. They, however, spread the alarm; and driving their cattle before them, and carrying their children and the most valuable and portable of their household articles, they roused their neighbours as they went. It was fortunate that the inhabitants were scattered over the country, for had they been collected into a village, there can be little doubt that the alarm and confusion would have occasioned the loss of many lives. But though the people themselves, and, generally speaking, their cattle escaped, they were, for the most part, obliged to leave their corn to be buried under the black deluge. When the morning dawned, the appearance of their homes was sadly changed. Instead of fields, and little hedge-rows, and cottage-gardens, with all the other interesting features of a rich and rural country, there was one black waste of peat earth. Some of the cottages had totally disappeared, others presented only the roof, the eaves of which were at least eight feet from the ground. When first seen, the extent that the moss covered was not less than two hundred acres. Successive torrents of rain that fell afterwards augmented the mischief, till ultimately the whole surface covered extended to at least four hundred acres. The highest parts of the moss had subsided to the depth of about twenty-five feet, and the height of the moss on the lowest parts of the country which it had invaded was, at least, fifteen feet.

The bursting of the Solway Moss resembled, to a certain extent, the letting out of a dam. Between it

and the cultivated plain, the bottom of the moss was lower than the general level of a sort of ridge that formed the boundary between them. But in this ridge there was one depression, not unaptly called the "Gap;" and through that the flood of moss and water descended. This gap was from 100 to 150 feet in width; and there can be no question that the resistance which the fluid met with in it tended to the safety of the people: for had the whole come upon them in a continued sheet, the danger and difficulty of escape would have been much greater.

Pine is not the only timber found in those bogs, though it be the kind most frequently met with in a mountainous country,—more especially of those places where forests of pines are still growing, or which are favourable to their growth. Pines do not thrive in low situations, or by the banks of slow-running rivers. The timber which grows best in those situations (in cold countries) is alder, and it is consequently the timber most generally found in river-side peat; though, in consequence of the warmth, peat is not very apt to form in such situations. The greater accumulations of it are on higher grounds, and often on the summits of the mountains.

In some places, which are of intermediate height, there often appears a singular stratification in the bogs, which indicates a succession of changes of climate, all for the worse; and as the junctions of these strata are sometimes pretty well defined, it is difficult to account for them by any regular succession of seasons. We are thence led to conclude, that, after the one species was formed, a pause of some years at least must have taken place before the soil and climate were in a fit state for the production of the others. There may be exceptions; but in so far as our observation has gone, the oak forms in

those stratified bogs the lowermost timber. It is at the very bottom, reposing generally upon sand or clay, without any trace of vegetable mould, which appears to have been absorbed by the mosses, or incorporated with them into the very hard peat in which the oak is contained. It may be proper also to mention, that the roots of the oak are wholly contained in the moss, and do not, in any instance that we have seen, penetrate into the sand or clay. Some of the oaks that have been found in the peat mosses of Scotland are of large dimensions, and they are often met with in situations where oaks now grow with difficulty, and never attain any size; and hence, as the oak is not a native of very cold climates, we may conclude that the climate of those places must have been more genial at some former period than it is at present. Pines are not very generally found in the same bogs or mosses with oak; but when they are so, they occur about the same apparent period of the formation, and are to be traced only on the more elevated parts of the original surface on which the bog rests.

The stratum of peat in which the oak is contained is, as has been mentioned, of a compact texture, and some of it forms a fuel but little inferior to coal. About it there is often found a stratum, in which there is much more wood than that below; but the kinds are different. Birch and hazel are the prevailing woods in that second stratum: the timber is in general decayed; but the nuts of the hazel are in a state of considerable preservation; and some of the seeds that have been found at this depth have vegetated, though they had probably lain for several centuries in the peat earth, in which their outer coats must have been literally tanned. When there is a third stratum of wood, which is not often the case, the timber which it contains is chiefly alder, with

the twigs of the bog-myrtle (*Myrica Gale*). After these, the peat becomes of a very spongy nature, and contains no vegetable substance of larger dimensions than the steam of a heath, and not very often that. The smaller portions of peat which lie in dells, in countries not much elevated, contain in general only the twigs and the nuts of hazel. The fall of timber is not, however, essential to the formation of peat bogs, for, in many of them, the remains of trees have not been found.

Scotch Fir.—Pinus sylvestris.

The pines found native in Britain, whether buried in the earth, or growing on its surface, are all of one species,—the *Pinus sylvestris*, or wild pine—in this country usually termed the Scotch fir. This pine is very generally diffused. It is found in all the northern regions, and in elevated ones considerably to the south. The timber which it produces is called red deal, or yellow deal, according to the colour; and as deals are the form in which it is often conveniently im-

ported from Norway and the Baltic, the word *deal* has become the common name for all sorts of pine timber.

With the exception of cedar and larch, in respect of toughness and durability Scotch fir produces better timber than any of the pines. It is good, too, almost in proportion to the slowness of its growth. When it is cut directly to the centre, or right across the grain, as for breasts of violins, and the sounding-boards of other musical instruments, it is very beautiful, the little stripes formed by the annual layers being small and delicate, and in perfectly straight lines. This pine very often, though not in trees completely matured, contains sap-wood next the bark; and toward the pith it is a little spongy. The best part is that nearest the root; and the roots themselves are excellent for any purpose that their size and shape will answer. It has been mentioned, that pine timber is best in cold situations; it is also best on light soils, and when planted by nature. On strong clay it grows badly, and the timber is worth little; and on rich loams, though it grows rapidly, the timber is of inferior quality, and contains a great deal of sap-wood. At what time the sap-wood changes to durable wood has not been determined by very accurate observation; although most writers on vegetable physiology conceive that the ligneous matter is deposited in the second year. We have counted four or five annual layers of sap upon some trees, more than a dozen on others; and where trees have been much exposed to the mid-day sun, we have seen the whole southern half little better than sap-wood, while the northern half contained only a layer or two at the circumference.

Pines, and this pine in particular, occur in much more extensive forests, and with a far less admixture of other trees, than any other genus whatever. Immense districts in North America are covered with

them; and so are the mountains of Sweden and Norway, and the sandy tracts near the Baltic. In Poland also, upon each side of the river Memel, they grow in great abundance, so that Memel fir is imported into this country in large quantities.

Though the pine is not the timber that we last meet with on the confines of the snow, as we ascend high mountains, or at the verge of vegetation as we approach the pole, yet, after a certain elevation, and north of the latitude of about 55°, it is by far the most abundant timber, in Europe, in America, and in Asia. From the peculiar nature of the surface in Siberia,—the country which occupies the north of Asia,—from the intense cold, and lowness of the portion next to the sea, the forests in that part of the world are not very extensive, till we arrive at some distance from the Arctic ocean. In America, too, there are naked tracts between the sea, or the ice, or the polar land, or whatever may, on the part of the boundary that has not been explored, lie further north than discovery has yet reached. But, from the summit of the ridge that extends from the dreary shores of Labrador westward, across the country, till it subsides in the central marshes about Lake Winnipec, and on the south side of the vast estuary of the St. Lawrence, as far as the boundary of the United States, the land, before it began to be cleared by European settlers, was covered by one immense forest of pine; and much of the clearing has been accomplished by burning, or otherwise destroying the trees. On the south side of the St. Lawrence, the forest reached down to the water along the whole shore, and upon the islands; and advantage has been taken of this to send a great deal of the most accessible of the timber to the European market, and to distil into tar a good deal of that which was not so accessible.

The pine forests of the north of Europe are, how-

ever, the most valuable, especially on account of the quality of their timber. Once they abounded over the greater part both of the continent and the islands, but in the latter situations they have been exhausted somewhat wantonly. Not much more than a century, or a century and a half ago, there was an extensive pine forest in the north of Ireland, in that elevated part of the country which extends through the counties of Donegal and Tyrone, and separates the rivers that flow to the sea on the north, from those that flow south and east to Loughs Earn and Neagh. Hardly a vestige of that forest now remains, nor is there any very clear account of what became of it.

In the lowlands and rich soils of Scotland there perhaps never was an extensive pine forest; but there can be little doubt that upon the uplands the pine was once as general as it now is in the back settlements of Upper Canada. Of these forests many vestiges still remain. The fragment which lies farthest to the south-west is that of Rannoch, on the confines of the shires of Perth, Inverness and Argyle. The greater part of that forest has, however, been felled, and the timber was floated down the Tummel and the Tay, for a distance of at least sixty miles to Perth, from Rannoch. The roots that remain bleaching on the surface, and the occasional trees that are still found in sheltered situations, or in situations which are not accessible, afford evidence that the forest once extended eastward not only to the remaining woods of Mar, at the sources of the Dee and the Don, in the west part of Aberdeenshire, but to the shore of the sea along that bleak ridge in the northern part of the county of Mearns, which forms the southern boundary of the valley of the Dee, and in the very extensive peat moss, upon which pine is the submerged timber almost exclusively found. Further to the north, the pine forest appears once to have

reached much nearer to the sea; though in the lowlands of the shires of Aberdeen and Moray the chief evidence of it now is in the peat mosses or bogs: in these, however, it is abundant—so much so, that it forms an article of commerce, not only in the villages near which it is found, but in the city of Aberdeen. The sapwood is altogether gone; and, indeed, the principal remains are roots; but they contain a vast quantity of turpentine: this renders them much superior to any other wood for kindling fires; and in the country districts slips of them are used as a substitute for candles.

Along the shores of the Moray Firth, no remains of the forest are found above ground, on the slopes of the mountains that are nearest to the sea; but at what may be considered as the highest summit of the Grampians, amidst the immense mountains of Cairngorm, Brae Riach, and Ben-mhuic-dhu, there are very extensive forests in the glens or valleys of the rivers that flow northward to the Spey. The estate of Rothiemurchus, in that part of Scotland, consists almost exclusively of natural pine forests. In places where it can be removed, the timber of this forest is of great value, and forms the chief revenue of the proprietor of the estate. The surface has, generally speaking, a northern aspect; and, in consequence of the very high mountains which lie to the south, with at least some part of their summits covered with perpetual snow, the climate is very cold, so that the pine of Rothiemurchus is full of turpentine, and is of excellent quality. A considerable portion of the pine which is in the most accessible places has been cut down; but, differing from many other parts of Scotland, a succession springs up, and that forest appears to have still the power of continuing itself, and is, perhaps, the only pine forest in the island which has that power.

The Rothiemurchus pine is generally floated down the river Spey; and when it is once brought to that river, the passage of a raft is a matter of little difficulty at any season. In times of drought there is, however, a good deal of difficulty in getting the timber to the Spey; and, in order to accomplish that object, the workmen collect the trees in the *dell*, or den, build up a temporary dam, and wait the coming of a flood, which, in a country of so varied surface, is of frequent occurrence. When the flood comes, and the temporary dam is full of water, they break down the dyke, and away go the whole contents, thundering down to the Spey.

On the hills to the northward of the Spey, and just opposite to Rothiemurchus, there is a good deal of timber on the banks of the Dulnan; but in that part of the country the forest is decreasing. The timber there, however, is of good quality, though, perhaps, not altogether equal to that of Rothiemurchus.

The principal rivers by which timber is floated to the sea from the remains of the *Sylva Caledoniæ*, or Great Scottish Forest, beside the Tay and Spey, as has been mentioned, and the Dee, by which the timber of Mar is floated to Aberdeen, are the Ness and the Beauly, both in Inverness-shire. The pines on the Ness are to a considerable extent exhausted; and the trees that are now found in the remote places are, when cut, thrown into the small rivers, and float to Loch Ness. On the Beauly the forests are more extensive; and there are regular saw-mills about midway between the forest and the sea, at which the trees are cut into scantlings. To the mills the trees float down the river; and at one place they have to descend a cascade of at least forty feet in height. This they sometimes do with so much violence, that they are split to

threads. In that place, too, they have recourse to an artificial dam; but the dam is made of the trees themselves, which are left in a heap till the swelling of the river carries them away. Pines have not been found in Scotland at an elevation of more than 1500 or 2000 feet; and at even less than that, they are very stunted, if not sheltered in the ravines.

The immense Scandinavian forest, which occupies the slopes of the mountains, and banks of the rivers and arms of the sea, in all the central parts of Sweden and Norway, is one of the most considerable on the Continent. This forest consists for the most part of Scotch fir and spruce, the former yielding red or yellow deal, and the latter white. In very many places, both on the Swedish and the Norwegian side of the mountains, these forests are not accessible; and they are of value only when situated near the banks of a lake, an arm of the sea, or a river.

Dr. Clarke gives the following account of the extent of the pine-forests on the Swedish side of the Gulph of Bothnia:

"At Helsinborg, some fir trees of an astonishing length were conducted, by wheel-axes, to the water side. A separate vehicle was employed for each tree, being drawn by horses which were driven by women. These long, white, and taper shafts of deal timber, divested of their bark, afforded the first specimens of the produce of those boundless forests of which we had then formed no conception. That the reader may therefore be better prepared than we were for the tract of country we are now to survey, it may be proper to state, in the way of anticipation, that if he cast his eyes upon the map of Sweden, and imagine the Gulp of Bothnia to be surrounded by one contiguous unbroken forest, as ancient as the world, consisting principally of pine trees, with a

few mingling birch and juniper trees, he will have a general and tolerably correct notion of the real appearance of the country. If the sovereigns of Europe were to be designated each by some title characteristic of the nature of their dominions, we might call the Swedish monarch *Lord of the Woods*, because, in surveying his territories, he might travel over a great part of his kingdom, from sun-rise until sun-set, and find no other subjects than the trees of his forests. The population is everywhere small, because the whole country is covered with wood; yet, in the nonsense that has been written about the *Northern hive*, whose swarms spread such consternation in the second century before Christ, it has been usual to maintain that vast armies issued from this land. The only region with which Sweden can properly be compared is North America,—a land of wood and iron, with very few inhabitants, 'and out of whose hills thou mayest dig brass;' but, like America, it is also as to society in a state of infancy."

Except that the mountains are of less elevation, and that the climate is more moist, the eastern side of the Gulph of Bothnia does not differ much from the western, as described by Dr. Clarke.

The coast of Norway is more wild than that of Sweden, and the temperature is warmer in the same latitude, so that the pine forests extend rather farther to the north. Spruce is hardly found within the Arctic circle, but Scotch fir continues for nearly a degree more, even at considerable heights; and beyond that, straggling trees are to be met with in very sheltered places. The summit of the mountains on the north of the Gulph of Bothnia may be taken as the limit of the Scandinavian pines, as from thence to North Cape there is nothing to be met with but dwarf birch.

The principal rivers by which the pines of the Scandinavian mountains are brought to the sea, westward, for the purposes of commerce, are the Gotha in Sweden, and the Glomm in Norway.

The Gotha issues from the large lake of Wener, in the centre of the southern part of Sweden; and the lake receives many streams from the mountains, some of which are of great length, and pass through forests of the finest pines. By means of these the pine trees are easily conveyed to the lake, and thence by the Gotha to Gottenburgh. In former times, the timber was allowed to float down the cataract of Trollhætta, by which many of the trees were spoiled, as there is a succession of falls, and some of them as high as thirty feet. Saw-mills are now erected at Trollhætta, and the timber is conveyed to the river farther down, by a canal. The timber of the south of Norway is brought by the Glomm to the bay of Christiana, where a great quantity is exported. Dr. Clarke thus describes the process of sawing timber on the banks of the Dal, westward of the Gulph of Bothnia; and we believe it does not vary much all over Scandinavia:

"Between Meheda and Elfskarleby, about two English miles before we reached the latter place, we were gratified by a sight of some cataracts of the *Dal*, which we thought far superior to those of *Trollhætta*. The display of colours in the roaring torrent was exceedingly fine; rushing with a headlong force, it fell in many directions, and made the ground tremble with its impetuosity. The height of the fall is not forty feet, but the whole river being precipitated among dark, projecting rocks, gives it a grand effect; a swelling surf continues foaming all the way to a bridge, where another cataract, meeting the raging tide, adds greatly to its fury. Such is the commotion excited, that a white mist, rising above the fall, and over the banks of the torrent, rendered

it conspicuous long before we reached the river. Close to the principal cataract stood a sawing-mill, worked by an overshot wheel, so situate as to be kept in motion by a stream of water diverted from its channel for this purpose. The remarkable situation of the sawing-mills, by the different cataracts, both in Sweden and Norway, are among the most extraordinary sights a traveller meets with. The mill here was as rude and as picturesque an object as it is possible to imagine. It was built with the unplaned trunks of large fir trees, as if brought down and heaped together by the force of the river. The saws are fixed in sets, parallel to each other; the spaces between them in each set being adapted to the intended thickness for the planks. A whole tree is thus divided into planks, by a simultaneous operation, in the same time that a single plank would be cut by one of the saws. We found that ten planks, each ten feet in length, were sawed in five minutes, one set of saws working through two feet of timber in a single minute. A ladder, sloping from the mill into the midst of the cataract, rested there upon a rock, which enabled us to take a station in the midst of the roaring waters. On all sides of the cataract, close to its fall, and high above it and far below it, and in the midst of the turbulent flood, tall pines waved their shadowy branches, wet with the rising dews. Some of these trees were actually thriving upon naked rocks, from which the dashing foam of the torrent was spreading in wide sheets of spray."

In some parts of Sweden there are accidental fires, and the pines are also sometimes burned, in order to clear the soil for agriculture. In the account of his journey from Stockholm, northward, Dr. Clarke says, "As we proceeded to Hamrange, we passed through noble avenues of trees, and saw some fine lakes on either side of the road. Some of the forests had been

burned, by which the land was cleared for cultivation. The burning of a forest is a very common event in this country; but it is most frequent towards the north of the Gulph of Bothnia. Sometimes a considerable part of the horizon glares with a fiery redness, owing to the conflagration of a whole district, which, for many leagues in extent, has been rendered a prey to the devouring flames. The cause is frequently attributed to lightning; but it may be otherwise explained; and we shall have to notice some remarkable instances of these fires in the sequel."

Again, Dr. Clarke mentions that in Lapland, beyond Tornea, "some forests were on fire near the river, and had been burning for a considerable time. Mr. Tipping informed us, that these fires were owing to the carelessness of the Laplanders and boatmen on the rivers, who, using the *Boletus igniarius* (German tinder) for kindling their tobacco-pipes, suffer it to fall in an ignited state among the dry leaves and moss. They also leave large fires burning in the midst of the woods, which they have kindled to drive away the mosquitoes from their cattle and from themselves; therefore, the conflagration of a forest, however extensively the flames may rage, is easily explained. Yet Linnæus, with all his knowledge of the country and customs of the inhabitants, attributed the burning of the forests in the north of Sweden to the effects of lightning. During these tremendous fires, the bears, wolves, and foxes are driven from their retreats, and make terrible depredations among the cattle. A bear, having crossed the river, about a fortnight before we arrived, had killed in one night six cows and twelve sheep, the property of a farmer. We saw their former owner, and the place where all this slaughter had been committed, having landed to walk by the side of the river, while our boatmen were engaged in forcing the rapids. The farmer attributed

his loss to the burning of the opposite forest, which had compelled the bear to pass the river for food."

On the southern shores of the Baltic there are also extensive pine-forests. These are chiefly situated to the east of the Vistula, on the whole of the sandy tract that lies between the rich corn valley of that river and the flax and hemp valley of the Dwina, and stretches back into the central parts of Russia. The soil upon which this forest grows is almost wholly sand, and the surface is in consequence comparatively level, nor does any of it lie at a great elevation above the sea. The river Memel is the principal channel by which this timber is conducted to the sea, and Memel is the port at which it is chiefly disposed of. Much of the timber of Memel is exported in logs that are only squared by the axe; and masts and spars of Memel timber are much esteemed. In the *haafs* or low-lands on those shores of the Baltic, amber is found in greater abundance than in any other part of the world; and it is considered that this substance may be the turpentine of decayed pines changed by the length of time it has been buried in the earth.

The northern slopes of the Alps, and the secondary mountains in the south of Germany, abound in pines, and the Rhine and Danube (the principal upper branches of the latter rise in the Alps) are well adapted for conveying the timber to the lower districts, where it is valuable. The mode of conveying the timber on the Rhine in immense rafts is very curious. The following account of these rafts is by the Author of "An Autumn near the Rhine":—

"A little below Andernach, the little village of Namedy appears on the left bank, under a wooded mountain. The Rhine here forms a little bay, where the pilots are accustomed to unite together the small rafts of timber floated down the tributary rivers into the Rhine, and to construct enormous floats, which

are navigated to Dortrecht (Dort), and sold. These machines have the appearance of a floating village, composed of twelve or fifteen little wooden huts, on a large platform of oak and deal timber. They are frequently eight or nine hundred feet long, and sixty or seventy in breadth. The rowers and workmen sometimes amount to seven or eight hundred, superintended by pilots, and a proprietor, whose habitation is superior in size and elegance to the rest. The raft is composed of several layers of trees, placed one on the other, and tied together; a large raft draws not less than six or seven feet of water. Several smaller ones are attached to it, by way of protection, besides a string of boats, loaded with anchors and cables, and used for the purpose of sounding the river, and going on shore. The domestic economy of an East Indiaman is hardly more complete. Poultry, pigs, and other animals, are to be found on board, and several butchers are attached to the suite. A well-supplied boiler is at work night and day in the kitchen; the dinner hour is announced by a basket stuck on a pole, at which signal the pilot gives the word of command, and the workmen run from all quarters to receive their messes. The consumption of provisions in the voyage to Holland is almost incredible, sometimes amounting to forty or fifty thousand pounds of bread, eighteen or twenty thousand of fresh, besides a quantity of salted, meat, and butter, vegetables, &c., in proportion. The expenses are so great, that a capital of three or four hundred thousand florins (about 35,000*l.*) is considered necessary to undertake a raft. Their navigation is a matter of considerable skill, owing to the abrupt windings, the rocks, and shallows of the river; and some years ago the secret was thought to be monopolized by a boatman of Rüdesheim and his son."

These rafts are not of modern invention, and are

not confined to Europe. Evelyn, on the authority of Le Compte, says, that the timber-merchants of China transport immense trees or floats, upon which they build huts and little cottages, where they live with their families.

The following passage from Planchè's "Descent of the Danube," gives a description of the method of floating timber on a branch of that river; and the practice appears to be common in Germany:—

"At the mouth of the Erlaf, is a Rechen, or Grate, where the wood collects that is floated down this stream from the forests in the neighbourhood of Maria-Zell, in the Steyermark, near which it takes its rise. It is customary in Germany to place one of these gratings at the mouth of any tributary stream, or in the bed of any river where a line of demarcation is drawn naturally or artificially between two kingdoms, two provinces, or even two parishes; so that the branches and trunks of trees blown down by high winds, and swept away by inundations into the current, should not be carried beyond the frontiers, or boundaries, of the state or property to which they belong, and which derives from them no inconsiderable portion of its revenue.

"The timber, also, regularly felled by the woodcutters, is thrown thus carelessly on the mountain-streams of Germany, and floats down to the Rechen or Grate, where it is afterwards collected by its owners, who are thus saved the trouble and expense of land carriage; and the drifting property is protected from plunder by the severity of the laws relating to it."

In many parts even of Europe, the timber of pine forests is useless for purposes of commerce, from their inaccessible situations, and the consequent difficulty of transport. The rugged flanks and deep gorges of Mount Pilatus, in Switzerland, for instance, had been

covered with impenetrable forests for many centuries; till an enterprising individual conceived the daring idea of conveying the pines from the top of the mountain to the Lake of Lucerne, a distance of nearly nine miles, by means of an inclined plane, extending the whole distance. This extraordinary contrivance, which was completed in 1812, became an object of wonder to all Europe, and was called the Slide of Alpnach, from the name of the Commune in which it was situated. The Slide was a trough, formed of 25,000 pine trees, six feet broad, and from three to six feet deep; this was kept moist. Its length was 44,000 English feet. It had to be conducted in an undeviating line over the summits of rocks, or along their sides, or under-ground, or over deep gorges, where it was sustained by scaffoldings; and thus innumerable difficulties presented themselves in its construction. The perseverance of the engineer, M. Rupp, overcame all obstacles; and in eighteen months his work was finished. The trees descended from the mountain into the lake with an incredible rapidity. The larger pines, which were about one hundred feet long, ran through the space of eight miles and a third, in about six minutes. A gentleman, who saw this great work, informed us, that such was the velocity with which a tree of the largest size passed any given point, that he could only strike it once with a stick as it rushed by, however quickly he attempted to repeat the blow. The markets of the Baltic being opened by the peace, the speculation was abandoned as unprofitable; and the Slide of Alpnach fell into ruin.*

The advantages derived from planting pines in those upland and heathy parts of the country, which can scarcely be turned to any other profitable purpose, are very many. They form a shelter to the little patches of land that are susceptible of cultiva-

* See Edinburgh Philosophical Journal, 1820.

tion. The thinnings (for pines should be planted very close together at first) are well adapted for fuel, for palings, and many other domestic purposes. The leaves, as they fall off, destroy the heath and other hard plants, which are succeeded by mosses and grasses, the remains of which, when ploughed into the soil, make it susceptible of bearing crops either of grain or of green vegetables; and the timber at last, after paying all its expenses by the repeated thinnings, furnishes a better rent than could be obtained by any other means. In order to secure these advantages, it is necessary that the soil should be properly chosen; for we have seen instances in which, during thirty years, the average increase of the trees in height has hardly been an inch, while, in situations not particularly unfavourable, it might not be much less than thirty feet. It is fortunate, however, that those places which do not agree with the common pine are generally well adapted for the larch; and in the very instances to which we have alluded, a row of larches, planted simultaneously with the pines, are now of more feet in height than the pines are of inches. So that if the planter finds his pines will not thrive, which he can soon do by observing the turpentine exuding through the leaves and buds, and covering them like hoar frost, he ought immediately to root them out and replace them with larches. In like manner, when the larch exhibits this appearance on the leaves, and especially on the branches, it will never come to maturity. Care must be taken, however, not to mistake the *pollen* for this disease. The pollen appears only when the male flowers are in bloom; it has a tinge of yellow, and it seldom adheres to the leaves, and never to the branches; whereas the turpentine is white and efflorescent, adheres to the twigs and leaves, and cannot be shaken off without difficulty.

As an evidence of the advantages resulting from the cultivation of pines, we may mention a portion of Culloden Muir, near to the spot where the battle was fought, in 1746. It slopes to the north-east, and is exposed to the cold blasts of the Moray Firth. The subsoil is a deep bed of clay-and-sand gravel; and the surface, where not planted, very barren, with not more than an inch of mould, and that of the very worst quality. A portion was inclosed and planted, about seventy years ago, by the celebrated Lord President Forbes. The successive thinnings had more than repaid the enclosing and planting; and when the timber was cut down, about twenty years since, it yielded several times as much rent per acre, for every year it had stood, as the unplanted part of the muir let for at the time when it was cut down.

Large plantations of pines have been made in England during the last thirty years; and thus, some of our barren lands, which were formerly utterly worthless, had become valuable additions to the national wealth. Sometimes these plantations have been formed without due investigation; and through this, some species of fir, which are useless except for fuel, have been raised in large quantities. On the other hand, the properties of the several species have been accurately studied by some planters; and experiments, upon a large scale, have been made to determine the relative value of the various sorts. At Dropmore, in Buckinghamshire, a place which, thirty years ago, was a most desolate and barren heath, Lord Grenville has formed the most valuable fir plantations; and he has established a garden of the genus *pinus*, in which he has collected almost every known species from all quarters of the globe. The late Bishop Heber, who was honoured with the friendship of that justly venerated nobleman, had a commission from him to search out any new species of the pines of

India; and the following extract of a letter from this amiable prelate, addressed to his Lordship, giving an account of the pines of the Himalaya mountains, will show the solicitude with which he discharged his trust:—

"A visit which I paid to those glorious mountains, in November and December last, was unfortunately too much limited by the short time at my disposal, and by the advanced season, to admit of my penetrating far into their recesses; nor am I so fortunate as to be able to examine their productions with the eye of a botanist. But, though the woods are very noble, and the general scenery possesses a degree of magnificence such as I had never before either seen or (I may say) imagined, the species of pine which I was able to distinguish were not numerous. The most common is a tall and stately, but brittle, fir, in its general character not unlike the Scottish, but with a more branching head, which, in some degree, resembles that of the Italian pine. Another, and of less frequent occurrence, is a splendid tree, with gigantic arms and dark narrow leaves, which is accounted sacred, and chiefly seen in the neighbourhood of ancient Hindoo temples, and which struck my unscientific eye as very nearly resembling the cedar of Lebanon. But these I found flourishing at near nine thousand feet above the level of the sea, and where the frost was as severe at night as is usually met with at the same season in England. But between this, which was the greatest height that I climbed, and the limit of perpetual snow, there is doubtless ample space for many other species of plants, to some of which a Dropmore winter must be a season of vernal mildness."

The pines of the Himalaya mountains were found at the height of nine thousand feet above the level of the sea. The elevation at which the pine grows in

tropical countries is very remarkable. Humboldt describes the third zone of the Peak of Teneriffe, the region of firs, as at nine hundred toises of absolute height (about five thousand seven hundred and sixty feet); and he says that, in the Cordilleras of New Spain, under the torrid zone, the Mexican pines reach as high as two thousand toises (about twelve thousand eight hundred feet).

The Silver Fir (*Pinus picea*), so called from two lines of white on the under side of the leaves, is a majestic tree, and grows with great rapidity. It is a native of the south of Europe and the Levant, the silver firs upon mount Olympus being the most magnificent trees in that country. Requiring a richer soil and a warmer climate than the pine and the larch, it cannot be so well cultivated in bleak situations as those species. The timber which it produces is softer and less durable than that of either of them; and, therefore, it is not so well adapted for general purposes: but its lightness renders it a very fit material for boats, and planks made of it are said to have the property of not shrinking. It has been introduced into this country as an ornamental tree, for more than a century; but it has not been hitherto, and probably never will be, extensively cultivated for profit. Nearly allied to the Silver Fir, though inferior to it as a grower, is the *Balm of Gilead Fir* (*Pinus balsamea*). It is a native of America; but although it has been in this country for more than a century and a half, the only place where it has grown, even to moderate dimensions, is Woburn Abbey.

Chapter III.

THE PINE.

Larch—Pinus larix.

The more modern botanists divide the *Pine* family into three genera,—*Pinus*, *Abies*, and *Cedrus*, to the last of which the larch belongs.

The Larch (*Pinus larix*) is, after the common pine, probably the most valuable of the tribe. Though a native of the mountains of more southern regions, it thrives uncommonly well in Britain; and as it grows more rapidly, and also in more varied soils than the other, it is, perhaps, better adapted for general cultivation. In the south, it attains an immense height; some single beams of larch, employed in the palaces

and public buildings of Venice being said to be one hundred and twenty feet long. Even in the plantations of the Duke of Athol, and other proprietors in Perthshire, some larches are at least one hundred feet high. The wild alternation of hill and valley in that county, with the general opening of the glens and exposure of the surface to the south, seem to afford the larch a situation something like its native locality in the Tyrolese and Dalmatian Alps: for though other trees, and some of them fast growing ones, such as the spruce, have been planted at the same time, the larch overtops them all; and in summer, when it is in the full luxuriance of its leaves, (which are a bright clover green,) it rises over the dark forest like an obelisk of beryl. The larch sheds its leaves, and is probably by that means saved from those keen blasts of the very early spring that prove destructive to pines. Even when naked it is an ornamental tree. The trunk is generally straight, tapering gradually to a point; the branches, which are rather small in proportion to the tree, taper up in the form of a perfect cone; and the whole is of a lively brown, streaked with a golden colour.

A few larches are said to have been introduced into this country in the early part of the seventeenth century, as rarities; but it only began to be cultivated as a forest-tree about the middle of the eighteenth century. Since that time it has been extensively planted, more especially in Scotland; and the success has been far greater, and far more uniform, than in the case of any other tree, not a native of the country. It appears that the quality of larch timber does not depend so much upon the maturity of the tree, and the slowness of its growth, as that of the pine,—as a fishing boat, built of larch only forty years old, has been found to last three times as long as one of the best Norway pine. It is not so buoyant, how

ever, nor so elastic; and as it does not dry so completely as pine, boards of it are more apt to warp. It is, however, much more tough and compact; and, what are very valuable properties, it approaches nearly to being proof, not only against water, but against fire. If the external timbers, and the principal beams of houses, were made of larch, fires would not only be less frequent, but they would be far less destructive; for, before a larch beam be even completely charred on the surface, a beam of pine, or of dry oak, will be in a blaze beyond the ordinary means of extinguishment. Larch, however, is heavier to transport and elevate, and also much harder to work, than pine; and as these circumstances are all against the profits of the builder, they probably prevent the introduction of this most safe and durable timber. The Venetian houses constructed of it show no symptoms of decay; and the complete preservation of some of the finest paintings of the great masters of Italy is, in some respects, owing to the panels of larch on which they are executed.

The objects for which larch timber seems preferable to every other, are chiefly these:—gates, palings, posts of all kinds that are inserted either in the earth or in water, wooden buildings, many agricultural implements, cottage furniture, bridges and gangways, carriages for transporting stones and all hard and rough materials, barrows for builders and road-makers, lighters, fenders, and embanking piles, lock and dock gates for canals and harbours, coal and lime waggons, vessels for carrying lime, pit-props, and hop-poles of the smaller thinnings. For all these purposes, and many minor ones, larch would come considerably cheaper than any timber now in use; and would, in the average of them, last at least thrice as long,—the saving to the public would thus be immense; and the lands upon which an abundant

supply might be raised in every county, are at present lying idle.

Spruce—Pinus abies.

The Norway Spruce Fir (*Pinus abies*) is probably the loftiest of the pine tribe in Europe. Though it has not reached so great an elevation in this country, it has been found in Norway, from one hundred and fifty to two hundred feet in height. The history of it in Britain reaches back for at least a hundred years; and as it grows very rapidly, forms excellent shelter, has a majestic appearance, and is always in leaf, it has been introduced more generally perhaps than the quality of the timber deserves. The timber is white, soft, and far from durable. The American spruces are, the Hemlock Spruce, the white, the black, and the red,—the colours of the latter referring to the bark, and not to the timber, that being of the same white colour in them all. The spruce which grows in this country is seldom used but for the coarsest purposes, in consequence of its

inferior qualities, and its knotty appearance from its large branches. As pillars for rustic cottages and porticoes—with the knobs of the branches left, and the bark on, or barked and painted green,—the small trunks, or large branches of the spruce, are very ornamental. Rough ladders are also sometimes made of it, but their strength is by no means equal to their weight.

The lofty and perfectly straight firs of Norway have long been celebrated throughout Europe, as furnishing masts for the largest ships. Milton, in his splendid description of Satan, in the First Book of Paradise Lost, alludes to this peculiar excellence:

> "His spear, to equal which the tallest pine
> Hewn on Norwegian hills, to be the mast
> Of some great ammiral, were but a wand."

The masts of our men of war are principally brought from Riga; but "the White Pine" (*Pinus strobus*) of North America is exclusively used for the masts of American shipping; and many fine trees are exported to this country for a similar purpose, principally from the district of Maine. Before the separation of her North American colonies from England, very severe ordinances were issued to prevent the cutting down of those firs adapted for masts, which were growing on the Crown Lands. These ordinances were issued as early as 1711.

At the beginning of the reign of Louis XVI., a pine was extensively planted in France, *Pinus laricio*, which has the peculiar property of growing well in a chalky soil. It is a very magnificent tree, but the timber is not so strong as that of the *Pinus sylvestris*. It has, however, been used in France for ship-building.

The Cedar of Lebanon (*Pinus cedrus*) would, if the rapidity of its growth were at all correspondent

Cedar of Lebanon—Pinus cedrus.

with its other qualities, be the most valuable tree in the forest. Its resistance to absolute wear is not indeed equal to that of the oak; but it is so bitter, that no insect whatever will touch it, and it seems to be proof against Time himself. We are told that the timber in the temple of Apollo at Utica was found undecayed after the lapse of two thousand years; and that a beam in the oratory of Diana, at Saguntum* in Spain, was fetched from Zante, two centuries before the Trojan war. Some of the most celebrated erections of antiquity were constructed of this tree. "Solomon raised a levy of thirty thousand men out of all Israel; and he sent them to Lebanon, ten thousand a month, by courses; and he had threescore and ten thousand that bore burthens, and fourscore thousand hewers in the mountains. And he covered the temple with beams and boards of cedar. And he built chambers against it, which rested on the house, with timber of cedar. And the cedar of the house

* Murveidro.

within was carved with knops and flowers: all was cedar, there was no stone seen." Thus writes the sacred historian, who mentions that the same monarch had a palace of cedar in the forest of Lebanon. Ancient writers notice that the ships of Sesostris, the Egyptian conqueror, one of them two hundred and eighty cubits long, were formed of this timber; as was also the gigantic statue of Diana in the temple at Ephesus. Some difficulty, no doubt, exists, with regard to the ancient history of this celebrated tree, —there being other trees, still named cedars, which, though somewhat resembling them, do not belong to the pine family at all; as the white cedar, which is a cypress; and the red, which is a juniper.

In addition to the durability of its timber, the cedar is, in its appearance, the most majestic of trees; and when it stands alone in a situation worthy of it, it is hardly possible to conceive a finer vegetable ornament. Its height in this country has seldom equalled the taller of the larches, though it has nearly approached to it; but the very air of the tree impresses one with the idea of its comparative immortality. There is a firmness in the bark and a stability in the trunk, in the mode in which that lays hold of the ground, and in the form of the branches and their insertion into the trunk, not found in any other pine, scarcely in any other tree. The foliage, too, is superior to that of any other of the tribe, each branch being perfect in its form: the points of the leaves spread upwards into beautiful little tufts; and the whole upper surface of the branch, which droops in a graceful curve toward the extremity, having the semblance of velvet. The colour is also fine; it is a rich green, wanting the bluish tint of the pine and fir, and the lurid and gloomy one of the cypress.

The description of the cedar of Lebanon by the prophet Ezekiel is fine and true:—"Behold the As-

syrian was a cedar in Lebanon, with fair branches, and of an high stature; and his top was among the thick boughs. His boughs were multiplied, and his branches became long. The fir trees were not like his boughs, nor the chesnut trees like his branches; nor any tree in the garden of God like unto him in beauty."

Whether the cedars of Lebanon were thinned to exhaustion by the fourscore thousand axes of the King of Israel, or whether they have decayed in consequence of some variation of climate, or other physical change in the country, it is impossible to say; but modern travellers represent that very few now exist, though some are of immense bulk—about thirty-six feet in circumference, and quite undecayed.

The cedar of Lebanon, though it has been introduced into many parts of England as an ornamental tree, and has thriven well, has not yet been planted in great numbers for the sake of its timber. No doubt it is more difficult to rear, and requires a far richer soil than the pine and the larch; but the principal objection to it has been the supposed great slowness of its growth, although that does not appear to be very much greater than in the oak. Some cedars, which have been planted in a soil well adapted to them, at Lord Carnarvon's, at Highclere, have grown with extraordinary rapidity. Of the cedars planted in the royal garden at Chelsea, in 1683, two had, in eighty-three years, acquired a circumference of more than twelve feet, at two feet from the ground, while their branches extended over a circular space forty feet in diameter. Seven-and-twenty years afterwards the trunk of the largest one had increased more than half a foot in circumference; which is probably more than most oaks of a similar age would do during an equal period. The surface soil in which the Chelsea cedars throve so well is

not by any means rich; but they seem to have been greatly nourished from a neighbouring pond, upon the filling up of which they wasted away.

Cedar of Lebanon, in the Royal Garden at Chelsea.

Various specimens of the cedar of Lebanon are mentioned as having attained a very great size in England. One planted by Dr. Uvedale, in the garden of the manor-house at Enfield, about the middle of the seventeenth century, had a girth of fourteen feet in 1789; eight feet of the top of it had been blown down by the great hurricane in 1703, but still it was forty feet in height. At Whitton, in Middlesex, a remarkable cedar was blown down in 1779. It had attained the height of seventy feet; the branches covered an area one hundred feet in diameter; the trunk was sixteen feet in circumference at seven feet from the ground, and twenty-one feet at the insertion of the great branches twelve feet above the surface. There were about ten principal branches

or limbs, and their average circumference was twelve feet. About the age and planter of this immense tree its historians are not agreed, some of them referring its origin to the days of Elizabeth, and even alleging that it was planted by her own hand. Another cedar, at Hillingdon, near Uxbridge, had, at the presumed age of 116 years, arrived at the following dimensions: its height was fifty-three feet, and the spread of the branches ninety-six feet from east to west, and eighty-nine from north to south. The circumference of the trunk, close to the ground, was thirteen feet and a half; at seven feet it was twelve and a half; and at thirteen feet, just under the branches, it was fifteen feet eight inches. There were two principal branches, the one twelve feet and the other ten feet in girth. The first, after a length of eighteen inches, divided into two arms, one eight feet and a half, and the other seven feet ten. The other branch, soon after its insertion, was parted into two, of five feet and a half each.

Michaux, in his splendid work on the Forest-trees of North America, has described fourteen species of pine, which are found in the extensive woods of that vast country. The most valuable of these are, the "Long-leaved Pine" (*Pinus Australis*), from which the turpentine and tar of America are principally produced; the "White Pine," much used in ship-building; the "Hemlock Spruce" (*Abies Canadensis*), the timber of which is not good, but which affords bark nearly as excellent for tanning as that of the oak; and the "American Silver Fir" (*Abies balsamifera*), from which is procured the resinous substance known as Canada balsam.

The principal exportation of deals from America, not only to Europe, but to the West India colonies, is of the timber of the white pine. Extensive as are

the woods of the United States, this species of timber has been almost entirely consumed in the thickly-peopled districts; so that those who are engaged in the business of cutting down the trees have to pass the greater part of their time in remote forests, where the white pine is still found. United in small bands, they penetrate into the woods in the depth of winter, having previously in the summer visited the same places to prepare a stock of hay for their oxen. They build themselves huts, roofed with bark; and though the ground is covered five or six feet deep with snow, and the mercury in the thermometer is sometimes eighteen or twenty degrees below the freezing point, they apply themselves with the utmost courage and perseverance to felling the trees. Cutting them into logs about eighteen feet long, they convey them, in the district of Maine, by means of their oxen, which are admirably trained, to the bank of the Kennebeck river, where they roll them upon the ice. Before the spring, when the frost breaks up, many thousands of these logs are thus collected. They are then carried down the current to Wenslow, about one hundred miles from the sea, at which place, the logs being previously marked, the owners are enabled to select the produce of their respective labours. The timber is here sold to the proprietors of numerous saw-mills established on the Kennebeck, between Wenslow and the coast; and from this point comes most of the American white deal which we use in England.*

A great quantity of fir timber is brought to Great Britain from our North American colony of New Brunswick. The timber trade with this thriving colony has been somewhat forced, and is now very dull. In 1824, the exports of timber from New Brunswick to England, and the ships built at St. John's, amounted in value to more than half a mil-

* See Michaux, vol. i., Art. *Pinus strobus.*

lion sterling. The mode of cutting the fir in the remote woods of New Brunswick is very curious, and is well described in a little work, entitled, "Sketches of the Maritime Colonies of British America," by J. M'Gregor, published in 1828.

"The timber trade, which, in a commercial as well as political point of view, is of more importance in employing our ships and seamen, than it is generally considered to be, employs also a vast number of people in the British colonies, whose manner of living, owing to the nature of the business they follow, is entirely different from that of the other inhabitants of North America.

"Several of these people form what is termed a 'lumbering party,' composed of persons who are all either hired by a master lumberer, who pays them wages, and finds them in provisions, or of individuals who enter into an understanding with each other, to have a joint interest in the proceeds of their labour. The necessary supplies of provisions, clothing, &c., are generally obtained from the merchants on credit, in consideration of receiving the timber which the lumberers are to bring down the rivers the following summer. The stock deemed requisite for a '*lumbering party*' consists of axes, a cross cut saw, cooking utensils, a cask of rum, tobacco and pipes, a sufficient quantity of biscuit, pork, beef, and fish; peas and pearl barley for soup, with a cask of molasses to sweeten a decoction usually made of shrubs, or of the tops of the hemlock tree, and taken as *tea*. Two or three yokes of oxen, with sufficient hay to feed them, are also required to haul the timber out of the woods.

"When thus prepared, these people proceed up the rivers, with the provisions, &c., to the place fixed on for their winter establishment; which is selected as near a stream of water, and in the midst of as much pine timber, as possible. They commence by

clearing away a few of the surrounding trees, and building a camp of round logs, the walls of which are seldom more than four or five feet high; the roof is covered with birch bark or boards. A pit is dug under the camp to preserve any thing liable to injury from the frost. The fire is either in the middle or at one end; the smoke goes out through the roof; hay, straw, or fir branches are spread across or along the whole length of this habitation, on which they all lie down together at night to sleep, with their feet next the fire. When the fire gets low, he who first awakes, or feels cold, springs up and throws on five or six billets; and in this way, they manage to have a large fire all night. One person is hired as cook, whose duty it is to have breakfast ready before daylight; at which time all the party rise, when each takes his '*morning*,' or the indispensable dram of raw rum immediately before breakfast. This meal consists of bread, or occasionally potatoes, with boiled beef, pork, or fish, and tea sweetened with molasses; dinner is usually the same, with pease-soup in place of tea; and the supper resembles breakfast. These men are enormous eaters, and they also drink great quantities of rum, which they scarcely ever dilute. Immediately after breakfast, they divide into three *gangs:* one of which cuts down the trees, another hews them, and the third is employed with the oxen in hauling the timber, either to one general road leading to the banks of the nearest stream, or at once to the stream itself; fallen trees and other impediments in the way of the oxen are cut away with an axe.

"The whole winter is thus spent in unremitting labour: the snow covers the ground from two to three feet from the setting in of winter until April; and in the middle of fir forests, often till the middle of May. When the snow begins to dissolve in

April, the rivers swell, or, according to the lumberer's phrase, the '*freshets come down.*' At this time all the timber cut during winter is thrown into the water, and floated down until the river becomes sufficiently wide to make the whole into one or more rafts. The water at this period is exceedingly cold; yet for weeks the lumberers are in it from morning till night, and it is seldom less than a month and a half, from the time that floating the timber down the streams commences, until the rafts are delivered to the merchants. No course of life can undermine the constitution more than that of a lumberer and raftsman. The winter snow and frost, although severe, are nothing to endure in comparison to the extreme coldness of the snow water of the *freshets ;* in which the lumberer is, day after day, wet up to the middle and often immersed from head to foot. The very vitals are thus chilled and sapped; and the intense heat of the summer sun, a transition which almost immediately follows, must further weaken and reduce the whole frame. To stimulate the organs, in order to sustain the cold, these men swallow immoderate quantities of ardent spirits, and habits of drunkenness are the usual consequence. Their moral character, with few exceptions, is dishonest and worthless. I believe there are few people in the world on whose promises less faith can be placed than on those of a lumberer. In Canada, where they are longer bringing down their rafts, and have more idle time, their character, if possible, is of a still more shuffling and rascally description. Premature old age, and shortness of days, form the inevitable fate of a lumberer. Should he even save a little money, which is very seldom the case, and be enabled for the last few years of life to exist without incessant labour, he becomes the victim of rheumatisms and all the miseries of a broken constitution.

But, notwithstanding all the toils of such a pursuit, those who once adopt the life of a lumberer seem fond of it. They are in a great measure as independent, in their own way, as the Indians. In New Brunswick, and particularly in Canada, the epithet 'lumberer' is considered synonimous with a character of spendthrift, and villainous and vagabond principles. After selling and delivering up their rafts, they pass some weeks in idle indulgence; drinking, smoking and dashing off, in a long coat, flashy waistcoat and trowsers, Wellington or Hessian boots, a handkerchief of many colours round the neck, a watch with a long tinsel chain and numberless brass seals, *and an umbrella*. Before winter they return again to the woods, and resume the pursuits of the preceding year. Some exceptions, however, I have known to this generally true character of lumberers. Many young men of steady habits, who went from Prince Edward's Island, and other places, to Miramichi, for the express purpose of making money, have joined the lumbering parties for two or three years, and, after saving their earnings, returned and purchased lands, &c., on which they now live very comfortably."

The 'lumberers' of New Brunswick, and those who cut down the timber of the woods of the United States, select the firs of proper girth and quality with especial care. It is stated by Mr. M'Gregor, that not one tree in ten thousand is fit for purposes of commerce. These thinnings, therefore, of the woods of North America do not produce the destruction of timber which now forms a subject of complaint in that country of forest-trees. The indiscriminate clearings of the agricultural settlers, and the conflagrations which occasionally take place, are the causes which, in a few centuries, may render North America no longer an exporting country for timber.

Sometimes the forests are injudiciously set on fire by the settlers, to save the labour of cutting and partially burning; but by such indiscriminate conflagration, the land is not properly cleared, and a very strong and noxious plant, called the fire-weed, instantly springs up, exhausting all the fertility of the ground. Sometimes these conflagrations extend over the whole face of a country, producing the most fearful destruction of life and property. The spectacle of a burning forest, according to the accounts of those who have witnessed it, is most sublime. The flames leap from tree to tree, and rushing up to their tops, throw out immense volumes of fire from the thick clouds of smoke that hang over the burning mass, while the falling trees come down with the most tremendous crash. One of the most destructive of these fires took place a few years ago in New Brunswick. We extract an account of this calamity from Mr. M'Gregor's work:—

"In October 1825, upwards of a hundred miles of the country, on the north side of Miramichi river, became a scene of the most dreadful conflagration that has perhaps ever occurred in the history of the world. In Europe, we can scarcely form a conception of the fury and rapidity with which the fires rage through the American forests during a dry hot season; at which time the underwood, decayed vegetable substances, fallen branches, bark, and withered trees are as inflammable as a total absence of moisture can render them. When these tremendous fires are once in motion, or at least when the flames extend over a few miles of the forest, the surrounding air becomes highly rarefied, and the wind naturally increases to a hurricane. It appears that the woods had been, on both sides of the north-west branch, partially on fire for some time, but not to an alarming extent, until the 7th of October, when it came on

to blow furiously from the north-west, and the inhabitants on the banks of the river were suddenly alarmed by a tremendous roaring in the woods, resembling the incessant rolling of thunder; while, at the same time, the atmosphere became thickly darkened with smoke. They had scarcely time to ascertain the cause of this phenomenon, before all the surrounding woods appeared in one vast blaze, the flames ascending more than a hundred feet above the tops of the loftiest trees, and the fire, like a gulph in flames, rolling forward with inconceivable celerity. In less than an hour, Douglastown and Newcastle were enveloped in one vast blaze, and many of the wretched inhabitants, unable to escape, perished in the midst of this terrible fire."

A Miramichi paper, published on the 11th of October, at the scene of this fearful conflagration, contains some interesting particulars, from which it appears that several hundred lives were lost in Newcastle, Douglastown, and Fredericton; that nearly all the 'lumberers' in the woods perished; that in many parts of the country the cattle were all destroyed; and that the loss of property in the towns was immense, as the fire rushed upon the inhabitants with such inconceivable rapidity, that the preservation of their lives could be their only care.

Two new species of pine, of more gigantic dimensions than any that have hitherto been described in Europe or America, have been found by Mr. David Douglas, a most enterprising botanist, who was sent out by the Horticultural Society of London in 1825, to explore the west coast of North America. He returned from that country in the autumn of 1827, bringing with him a rich addition to the known catalogue of plants. These pines are:—

1. *Pinus Douglasii.*—This pine grows to the

height of two hundred and thirty feet, and is upwards of fifty feet in circumference at the base. It has a rough corky bark, from an inch to twelve inches thick. The leaves resemble those of the spruce, and the cones are small. The timber is of good quality, and very heavy. This pine was found by Mr. Douglas on the banks of the Columbia, where it forms extensive forests, extending from the shores of the Pacific to the Stoney Mountains.

2. *Pinus Lambertiana**.—This species of pine was discovered in Northern California, where it is dispersed over large tracts of country, but does not form dense forests like most of the other pines. It is a very majestic tree; and one specimen which, in consequence of its having been blown down, Mr. Douglas was enabled to measure, was two hundred and fifteen feet in length, fifty-seven feet nine inches in circumference at three feet from the root, and seventeen feet five inches at one hundred and thirty-four feet. It is probably the largest single mass of timber that ever was measured by man, though some of the growing specimens of the same pine were evidently of greater elevation. The trunk of the *Lambertiana* is straight, and clear of branches for about two-thirds of the height. The bark is uncommonly smooth, and the whole tree has a most graceful appearance. The cones resemble those of the Weymouth pine, but are much larger, being on an average at least sixteen inches in length. The seeds are eaten roasted, or pounded into cakes. The tree bears a considerable resemblance to the spruces; and, as is the case with them, its turpentine is of a pure amber colour, and the timber soft, white, and light. One singular property of this tree is, that

* The name of this pine was given to it as a tribute to Lambert, the author of a most splendid work on the genus *Pinus*.

when the timber is partly burned, the turpentine loses its peculiar flavour, and acquires a sweetish taste. It is used by the natives as a substitute for sugar.

TIMBER TREES ALLIED TO THE PINES, IN THEIR APPEARANCE OR THEIR USES.

The principal of these are the *Yew*, the *Cypress*, the *Juniper*, and the *Arbor vitæ;* these, like the pines, all belong to the natural order of *Coniferæ*, or cone-bearing trees; and they have the common characters of being mostly evergreens, and the wood being resinous or bitter: but there are some distinctions—the pine, the cypress, the juniper, and the arbor vitæ, are *monœcius* or *one-housed*—that is, have the male and female flower on the same plant; while the juniper and the yew are *diœcius* or *two-housed*—have the male flowers on one tree and the females on another.

The YEW TREE (called *Taxus*) is a tree of no little celebrity, both in the military and the superstitious history of England. The common yew is a native of Europe, of North America, and of the Japanese Isles. It used to be very plentiful in England and Ireland, and probably also in Scot-

land. Cæsar mentions it as having been abundant in Gaul; and much of it is found in Ireland, imbedded in the earth. The trunk and branches grow very straight; the bark is cast annually; and the wood is compact, hard, and very elastic. It is, therefore, of great use in every branch of the arts in which firm and durable timber is required; and, before the general use of fire-arms, it was in high request for bows: so much of it was required for the latter purpose, that ships trading to Venice were obliged to bring ten bow staves along with every butt of Malmsey. The yew was also consecrated—a large tree, or more, being in every churchyard; and they were held sacred. In funeral processions the branches were carried over the dead by mourners, and thrown under the coffin in the grave. The following extract from the ancient laws of Wales will show the value that was there set upon these trees, and also how the consecrated yew of the priests had risen in value over the reputed sacred misletoe of the Druids:—

"A consecrated yew, its value is a pound.
"A misletoe branch, threescore pence.
"An oak, sixscore pence.
"Principal branch of an oak, thirty pence.
"A yew tree, (not consecrated) fifteen pence.
"A sweet apple, threescore pence.
"A sour apple, thirty pence.
"A thorn tree, seven pence halfpenny. Every tree after that, fourpence."

By a statute made in the 5th year of Edward IV. every Englishman, and Irishman, dwelling with Englishmen, was directed to have a bow of his own height made of *yew*, *wych-hazel*, *ash*, or *awburne*—that is, laburnum, which is still styled "awburne saugh," or awburne willow, in many parts of Scotland. His skill in the use of the long bow was the proud

distinction of the English yeoman, and it was his boast that none but an Englishman could bend that powerful weapon. It seems that there was a peculiar art in the English use of this bow; for our archers did not employ all their muscular strength in drawing the string with the right hand, but thrust the whole weight of the body into the horns of the bow with the left. Chaucer describes his archer as carrying "a mighty bowe;" and the "cloth-yard shaft," which was discharged from this engine, is often mentioned by our old poets and chroniclers. The command of Richard III. at the battle which was fatal to him, was this:

"Draw, archers, draw your arrows to the head."

The bowmen were the chief reliance of the English leaders in those bloody battles which attended our unjust contests for the succession to the crown of France. Some of these scenes are graphically described by Froissart.

In the account of the battle of Blanchetacque (the passage of the Somme), just before the battle of Crecy, Froissart says: "The Frenchmen defended so well the passage at the issuing out of the water, that they (the English) had much to do. The Genoese did them great trouble with their cross-bows. On the other side, the archers of England shot so wholly together that the Frenchmen were fain to give place to the Englishmen."*

At Crecy—"There were of the Genoese cross-bows about a fifteen thousand, but they were so weary of going a foot that day, a six leagues, armed with their-cross bows, that they said to their constables, 'We be not well ordered to fight this day, for we be not in the case to do any great deeds of arms;

* Lord Berners' Froissart: Ed. 1812. Vol. i. chap. 127.

we have more need of rest.' The words came to the Count d'Alençon, who said, 'A man is well at ease to be charged with such a sort of rascals, to be faint and fail now at most need.'" A storm then ensues, which, and its passing away, are described in Froissart's own singular style. He then continues thus:—"When the Genoese were assembled together, and began to approach, they made a great leap and cry to abash the Englishmen; but they stood still, and stirred not for all that. Then the Genoese again the second time made another leap and a fell cry, and stepped forward a little; and the Englishmen removed not one foot. Thirdly, again they leapt and cried, and went forth till they came within shot. Then they shot fiercely with their cross-bows. Then the English archers stept forth one pace, and let fly their arrows so wholly, and so thick, that it seemed snow. When the Genoese felt the arrows piercing through heads, arms, and breasts, many of them cast down their cross-bows, and did cut their strings, and returned discomfited. When the French king saw them fly away, he said, 'Slay these rascals, for they shall lett and trouble us without reason.' Then ye should have seen the men of arms dash in among them, and killed a great number of them; and ever still the Englishmen shot where as they saw thickest press. The sharp arrows ran into the men of arms, and into their horses; and many fell, horse and men, in the midst of the Genoese; and when they were down, they could not relieve again, the press was so thick that one overthrew another."*

At Poitiers—"Then the battle began orance and the battles† of the Marshals of Fpointed to proached, and they set forth that were appointed to break the array of the archers. They entered a horse-

* Lord Berners' Froissart: Ed. 1812. Vol. i. chap. 130.
† Corps de bataille.

back into the way where the great hedges were on both sides, set full of archers. As soon as the men of arms entered, the archers began to shoot on both sides, and did slay and hurt horses and knights; so that the horses, when they felt the sharp arrows, they would in no wise go forward, but drew aback, and flang and took on so fiercely that many of them fell on their masters, so that for press they could not rise again, in so much that the Marshals' battle could never come at the prince. . . . . True to say, the archers did their company that day great advantage; for they shot so thick that the Frenchman wist not on what side to take heed."*

At the battle of Aljabarota, in Portugal, fought in the early part of Richard the Second's reign, between the Kings of Portugal and Castile, the former aided by John of Gaunt, with an English force, and the latter by volunteers from France and Béarn, the English archers distinguished themselves greatly: indeed they chiefly contributed to win the battle, one of the bloodiest even of that time, by the total impossibility of bringing the horses to advance, or even stand fast under the arrows. Thus Froissart describes the encounter:—

"The same Saturday was a fair day, and the sun was turned towards even-song. Then the first battle (of the Spaniards) came before Aljabarota, where the King of Portugal and his men were ready to receive them. Of these French Knights there were a two thousand spears, as fresh and well ordered men as could be devised; and, as soon as they saw their enemies, they joined together like men of war, and approached in good order till they came within a bow-shot; and, at their first coming, there was a hard rencounter, for such as desired to assail, to win grace and praise, entered into the strait way, where

* Lord Berners' Froissart: Ed. 1812. Vol. i. chap. 162.

the Englishmen by their policy had fortified them. And, because the entry was so narrow, there was great press, and great mischief to the assailants; for such English archers as were there shot so wholly together that their arrows pierced men and horses, and when the horses were full of arrows they fell upon one another. . . . . There were many of the Lords and Knights of France and Béarn taken and slain, and all their companies that were entered within the strait; their horses were so hurt with the archers that they fell on their masters, and one upon another. There these Frenchmen were in great danger, for they could not help one another, for they had no room to enlarge themselves or to fight at their will."*

It is to be observed that long after the introduction of fire-arms in the fourteenth century, the bow continued to be a principal instrument of war. The bow was used at Agincourt and at Flodden.

The use of the bow as a weapon of war, or of the chase, has ceased in this country; but archery is still followed as an amusement; and though some of the foreign woods have more elasticity, the best bows of native growth are certainly those made of the yew-tree.

The yew has often attained a very great size in each of the three kingdoms, though the specimens now remaining in Scotland and Ireland be but few. In the first of those countries, Queen Mary's yew at Crookstone was much celebrated, though probably more on account of the princess with whose history it was connected, than any peculiarity in its own magnitude. The trunk of a large yew, found by

* Lord Berners' Froissart: Ed. 1812. Vol. ii. chap. 34. It is singular that Mariana does not notice the presence of an English or French force, but states the negociation with John of Gaunt to have been subsequent to the battle. *Historia de Espana*, lib. xviii. cap. 9.

Pennant in the churchyard of Fortingal, in Perthshire, though wasted to the outside shell, and with only a few leaves at one point, is quoted by him as being fifty-six feet and a half in circumference, or about eighteen feet in diameter.

The yew tree at Mucruss abbey, in Ireland, has a trunk about six feet and a half in circumference, and fourteen feet high, which terminates in a head that fills the area of the cloisters.

In England and Wales, some very large specimens are mentioned. According to Evelyn, the Crowhurst yew was thirty feet in circumference; that at Braburne churchyard, in Kent, was nearly twenty feet diameter, although it had been dismantled by storms; and at Sutton, near Winchester, there was, as Evelyn quaintly says, "such another monster." At Hedsor, in Buckinghamshire, there was lately, if there be not still, one in health and vigour, full twenty-seven feet in diameter. In the woods of Cliefden, near Hedsor, there are some extraordinary remains of these trees, whose roots, apparently of vast age, twine about the chalk rocks in the most fantastic shapes.

Considering the immense size to which the yew grows, and the strength, durability, and even beauty of its timber, one cannot help regretting that, when those great trees shall have yielded, as yield they must, to the destructive power of time, there should not be a succession. It is true that, in consequence of the great improvement of the iron manufacture, and the cheapness of that article, it can be applied to many purposes for which the great strength of the yew was well adapted.

The custom of clipping yews into fantastic shapes was much practised in the sixteenth and seventeenth centuries. Some of our churchyards still have their yew-trees thus cut into the pretended likenesses

of birds and beasts. At Bedfont, in Middlesex, there are two celebrated trees, whose branches are annually shaped into something like the form of a peacock, with a date shewing when this piece of useless labour was first performed. We think it is 1708. The Romans, as we learn from Pliny's letters, cut their evergreens into the fantastic shapes of birds and beasts. Lord Bacon, with his wonted good sense, protested against this practice, which was the fashion of his time. "I, for my part," he says in his Essays, "do not like images cut out in juniper and other garden stuff; they be for children."

Cypress—Cupressus sempervirens.

Of the CYPRESS, of which there are twenty-two species, it will be necessary to mention only two,—the Evergreen Cypress (*Cupressus sempervirens*), and the White Cedar (*Cupressus thyoides*). Of the first, there are two varieties, the upright and the spreading,—the last growing to the larger size, and being consequently the more valuable, as a timber tree. It

is a native of the south eastern countries of Europe, of the Levant, of China, and of several other parts of Asia. It thrives best in a warm, sandy, or gravelly soil; and though it has not been much cultivated in England as a timber tree, yet it seems well adapted for many situations in the southern parts of the kingdom. It is true that, in the early stages of its growth, it has been supposed to fall a victim to the keen frosts of our climate; yet Evelyn says, that he had upwards of a thousand cypress trees in his garden, and did not lose more than three or four of them during the uncommonly severe winters of 1663 and 1665.

Of all timber, that of the cypress is generally supposed to be the most durable, superior even to that of the cedar itself. The doors of St. Peter's Church at Rome, which had been formed of this material in the time of Constantine, shewed no sign of decay when, after the lapse of eleven hundred years, Pope Eugenius IV. took them down to replace them by gates of brass. In order to preserve the remains of their heroes, the Athenians buried them in coffins of cypress; and the chests or coffins in which the Egyptian mummies are found are usually of the same material. Cypress is a handsome timber. Though hard, it is elastic; and, therefore, would answer well for musical instruments. For furniture, it would be equal even to mahogany; for, though not so beautiful in its colour, it is stronger, resists the worm equally, and its odour repels insects from whatever may be contained in a cabinet or chest made of it. For building, there is no timber superior to the cypress, which lasts almost as long as stone itself; accordingly, where it is found in great abundance, it is very much used for that purpose. The cypress is reputed to live to a great age; and, though the precise period has not been ascertained, the fact of its being planted over the graves of the dead, and carried in funeral processions, as an emblem of im-

White Cedar—Cupressus thyoides.

mortality, is a proof that its duration must be very considerable.

The White Cedar is a native of America, where it grows to a considerable size; but it grows slowly, being eighty years old before it is fit for timber, and even then, though it answers well for hoops, small boats, roofing, and some other purposes, it does not appear very worthy of cultivation as a timber tree. But it is hardy, and forms a good variety in clumps of evergreens.

Of the Juniper, there are twenty-two species, of which only the Barbadoes juniper, Barbadoes cedar, the Bermuda cedar, and the Red cedar, rise to be large trees.

The Barbadoes Cedar (*Juniperus Barbadensis*) grows to be a large tree, and is used for ship-building and other purposes; but, being a native of the tropical regions, it cannot be cultivated with profit as a forest tree in England. The Bermuda juniper also attains a considerable size; its timber is more red than that of the former; and, as it is a native of

colder regions, it thrives better in England. It is very abundant in the islands after which it is named, and forms there one of the most valuable timber trees. The wood is close-grained, and has a strong odour, highly offensive to insects; it is, therefore, well adapted for furniture in warm climates.

The Red Cedar (*Juniperus Virginiana*) is a native of North America, the West India islands, and Japan. In Jamaica, it grows to a very large size, and forms one of the best timber trees in the island. It is close and firm, though easily split; the internal wood is dark red, and the odour of it is very strong, so that it answers well for the internal parts of cabinet-work, as well as for the wainscoting of rooms.

The common juniper is a shrub found in most of the cold parts of Europe. It seldom (with the exception of a variety found in Sweden) deserves to be called a tree; but the wood that it does produce is compact and fragrant; and the berries, which take two years to grow, are employed in the arts.

SUBSTANCES, EXTRACTED FROM THE PINES AND THE KINDRED TRIBES, AND MADE USE OF IN THE ARTS.

There are very few of this numerous order of trees that, in addition to their timber, do not afford some substance valuable to man.

The common pine yields *turpentine* by incision into the living tree; and *tar* is made by distilling billets of the wood in an oven. This tar, being boiled to evaporate the water, forms *pitch*. The goodness of the timber determines the goodness of the extract;—that of Norway being better than that of Scotland or of Canada, although, from the inferior value of the timber in the latter place, tar may be procured much cheaper. It is probable that tar and pitch may be obtained from the whole family of the pines,

for they are nothing more than the turpentine mixed with a certain quantity of charcoal and empyreumatic oil and acid, formed during the process of distillation.

The collection of turpentine forms an important operation in North America, and this produce of the pine is a considerable article of commerce. In the United States the business is confided principally to negroes, and each slave has the charge of from three to four thousand trees. The process lasts all the year, although the incisions are not made in the trees till the middle of March, and the flow of the turpentine generally ceases about the end of October. The first operation is that called 'boxing;' which is to form a hole or sort of cup at the root of the tree, holding about a pint and a half. An incision is then made in the trunk; and the liquid which flows into the box is turpentine, called in commerce *pure dipping*. These boxes are emptied five or six times during the season; and it is estimated that 250 boxes will produce a barrel weighing 320 pounds. *Scraping*, an inferior species of turpentine, is the deposite made by the sap on the bark of the tree, as it trickles down into the box. This is collected in the autumn. The British imports of turpentine amounted, in 1827, to 12,000 tons.

In the United States *tar* is manufactured from the dead wood of the *Pinus Australis*. The tar of the north of Europe is, as we have said, very superior. The process of making this important article of commerce, in Norway, is thus described by Dr. Clark:—

"The inlets of the Gulph (of Bothnia) every where appeared of the grandest character; surrounded by noble forests, whose tall trees, flourishing luxuriantly, covered the soil quite down to the water's edge. From the most southern parts of Westro-Bothnia, to the northern extremity of the gulph, the inhabitants are occupied in the manufac-

ture of tar; proofs of which are visible in the whole extent of the coast. The process by which the tar is obtained is very simple: and as we often witnessed it, we shall now describe it, from a tar-work which we halted to inspect upon the spot. The situation most favourable for this process is in a forest near to a marsh or bog; because the roots of the fir, from which tar is principally extracted, are always the most productive in such places. A conical cavity is then made in the ground (generally in the side of a bank or sloping hill); and the roots of the fir, together with logs or billets of the same, being neatly trussed into a stack of the same conical shape, are let into this cavity. The whole is then covered with turf, to prevent the volatile parts from being dissipated, which, by means of a heavy wooden mallet, and a wooden stamper, worked separately by two men, is beaten down and rendered as firm as possible above the wood. The stack of billets is then kindled, and a slow combustion of the fir takes place, without flame, as in making charcoal. During this combustion, the tar exudes; and a cast-iron pan being at the bottom of the funnel, with a spout, which projects through the side of the bank, barrels are placed beneath this spout, to collect the fluid as it comes away. As fast as the barrels are filled, they are bunged and ready for immediate exportation. From this description, it will be evident that the mode of obtaining tar is by a kind of distillation *per descensum*; the turpentine, melted by fire, mixing with the sap and juices of the fir, while the wood itself, becoming charred, is converted into charcoal. The most curious part of the story is, that this simple method of extracting tar is precisely that which is described by Theophrastus and Dioscorides; and there is not the smallest difference between a tar-work in the forests of Westro-Bothnia, and those of ancient Greece. The Greeks made stacks

of pine; and, having covered them with turf, they were suffered to burn in the same smothered manner; while the tar, melting, fell to the bottom of the stack, and ran out by a small channel cut for the purpose."

From the larch is obtained what is called *Venice turpentine :* it is procured by incision into the tree; and from it the transparent oil of turpentine is distilled. The larch yields a gum and a manna; and a species of fungus that grows upon it in Siberia has a rind which the natives make use of in dyeing red; while the body of the fungus is used as a soap. The common, or Strasburgh turpentine is obtained chiefly from the silver fir; Burgundy pitch from the spruce; and Canada balsam, the purest of all the pine turpentines, from the balm of Gilead fir. Turpentine of highly aromatic flavour, called in commerce Chian turpentine, is also derived from the turpentine-tree, (*Pistacia terebinthus,*)—a native of Barbary and the south of Europe,—which is a tree belonging to another family, and quite different in appearance from the pines.

Turpentine, from what species soever of the pine it is derived, can be dissolved in rectified spirit or pure *alcohol;* and, by distillation, they all give similar oils, which, from their being distilled, (and not from any resemblance to *alcohol*, or spirits properly so called,) are vulgalarly termed spirits of turpentine. If the distillation be performed with water, the product is an essential oil, the common spirit of turpentine; and, if the distillation be carried on in a *retort*, without water, the product is more volatile and pungent —a concentrated oil as it were,—and is called the etherial spirit of turpentine. The residuum that is left, in both cases, is a brownish resinous mass, brittle, capable of being melted, highly inflammable, insoluble in water, but mixing freely with oils: it is the common *rosin* of commerce.

Beside producing these resins and oils, there are

some further uses of parts of the pine species. The bark of the larch tree contains a considerable portion of the astringent bitter called *tannin*, which, by being mixed with the mucilaginous, or gluey part of the skins of animals, changes that into a substance not soluble in water; and thus it is useful in the operation of tanning, or converting the raw hides of animals into leather. Portions also are edible: the young shoots of the common fir, stripped of the leaves when these just begin to appear, are sought for with avidity, in some places, by the children of the peasants, and there is no doubt that, properly prepared, they would form both an agreeable and a wholesome salad in the spring. In young and vigorous trees, too, the *liber*, or part of the bark nearest the wood, is pleasant in the early part of the year; and the milky juice upon it, which is the new layer of wood in an incipient state, is very sweet, and without any of the pungent bitterness of turpentine. The inner bark of the spruce has these qualities, though in an inferior degree; but the young shoots of it are bitter, astringent, and disagreeable. The inhabitants of the cold and uncomfortable regions of Lapland contrive to convert the inner bark into a kind of bread: for this purpose, they dry it at the fire till it becomes brittle; next they grind it; then they macerate it in water; and, after this, they knead it into thin cakes, which they bake in the usual manner. These cakes are, however, more insipid than the recent bark,—probably because the sugar, or manna, or whatever imparts to that its agreeable sweetness, may be destroyed by the maceration, in addition to the pungent taste of the turpentine, to get rid of which is the object of that operation. Ropes made of this bark are pretty generally used among the fishermen of the north, and they have considerable strength, as well as elasticity. From the different

species of the spruce an extract is taken, which is used in flavouring a very wholesome beer.

No useful extract is, so far as we know, taken from the yew, the cypress, or the arbor vitæ. The first of these is usually reckoned a poisonous tree, destructive to some animals, though not to others.

From the junipers are derived very powerful ingredients. The spirit (essential oil) of the common juniper is employed in medicine; and also in giving to ardent spirits that peculiar flavour which distinguishes the Geneva, or gin of Holland. The Dutch are understood to distil the juniper berries along with the other ingredients, by which means the more caustic particles of the oil are evaporated, and the liquor rendered less deleterious; while the British distillers not only use the oil of juniper in its most caustic state, but often substitute for it the more pernicious oil of turpentine, on account of its greater cheapness. The quantity of juniper berries annually imported into the United Kingdom is about 800 tons.

Old junipers exude a resin called *Gum Sandrach*, which, under the name of *pounce*, is employed to prevent the ink from spreading upon parchment and improperly-sized writing paper. A decoction of the berries of the common juniper yields a considerable quantity of sugar.

From one species, Lycian Cedar (*Juniperus Lycia*) a native of France, the Levant, and Siberia, (a shrub of considerable size,) there is obtained the resin called Olibanum, which was much used by the ancients, and is still used by the Roman Catholics in their incense offerings. It has a bitter taste, and a strong smell; and, when it is burned, the fumes of it diffuse very considerable fragrance.

Chapter IV.

CHESNUT, BEECH, ELM, ASH, SERVICE.

Chesnut and Beech—(Fagus).

These are both very valuable as timber trees, the first for the firmness and durability of its timber when exposed to the air; and the second for the many purposes to which it is applied, and its durability in water.

The *Chesnut tree* (*Fagus castanea*) is generally understood to be a native of Asia, in many parts of which it is to be found in situations where it is not very likely to have been planted. Tradition says that it was brought from Asia Minor, and that it soon spread all over the warmer parts of Europe. At present, it is very abundant, as a native tree, in the mountainous parts of the south of Europe; and it is also found in North America, from New York to Carolina. The *Castagno dei cento cavalli*, or chesnut of the hundred horses, upon Mount Etna, is probably the largest tree in Europe, being more than two hundred feet in circumference. Brydone, a traveller who wrote about fifty years ago, has given a particular description of this celebrated tree:—

"From this place it is not less than five or six miles to the great chesnut trees, through forests growing out of the lava, in several places almost impassable. Of these trees there are many of an enormous size, but the *Castagno dei cento cavalli* is by much the most celebrated. I have even found it marked in an old map of Sicily, published near an hundred years ago; and in all the maps of Etna and its en-

virons, it makes a very conspicuous figure. I own I was by no means struck with its appearance, as it does not seem to be one tree, but a bush of five large

Chesnut—Fagus castanea.

trees growing together. We complained to our guides of the imposition; when they unanimously assured us, that by the universal tradition, and even testimony

of the country, all these were once united in one stem; that their grandfathers once remembered this, when it was looked upon as the glory of the forest, and visited from all quarters; that for many years past, it had been reduced to the venerable ruin we beheld. We began to examine it with more attention, and found that there is an appearance that these five trees were really once united in one. The opening in the middle is at present prodigious; and it does, indeed, require faith to believe that so vast a space was once occupied by solid timber. But there is no appearance of bark on the inside of any of the stumps, nor on the sides that are opposite to one another. Mr. Glover and I measured it separately, and brought it exactly to the same size, viz. two hundred and four feet round. If this was once united in one solid stem, it must with justice, indeed, have been looked upon as a very wonderful phenomenon in the vegetable world, and deservedly styled the glory of the forest. I have since been told by the Canonico Recupero, an ingenious ecclesiastic of this place, that he was at the expense of carrying up peasants with tools to dig round the *Castagno dei cento cavalli*, and he assures me, upon his honour, that he found all these stems united below ground in one root. I alleged that so extraordinary an object must have been celebrated by many of their writers; he told me that it had, and produced several examples."

In most parts of Britain the chesnut thrives well, there being authenticated anecdotes of many very large ones, in various parts of England and Ireland. Nor is it confined to the southern parts of the islands, for there is one in the garden at Castle Leod, in Rossshire, which measures at least fifteen feet in circumference, and which, only a few years ago, shewed no signs of decay. Nor is it by any means a slow-growing tree; for in Kensington Gardens, and other places,

where it has been planted along with elms and other trees of very inferior timber, it equals them both in height and diameter. If the symptoms of decay that are apparent in some of those trees, of which the age is known not much to exceed a hundred years, are to be taken as evidence of the general failure of the tree, and not of its being in a situation indifferently adapted for it, we should be led to question the great antiquity which has been assigned to some of the chesnut trees in England. The lives of trees must, however, like those of animals, vary with the situations in which they are placed; and the immense size of the celebrated chesnuts must lead us to assign to them a much longer duration than belongs to some others of the same species.

Though none of the English chesnuts rival the great one on Mount Etna, yet this country possesses immense trees. That at Hitchin Priory, in Hertfordshire, had, in 1789, a circumference of more than fourteen yards at five feet from the ground, and though the internal part was decayed and hollowed by time, the external part and the leaves were vigorous. Grose found one of four chesnuts in the garden at Great Cranford Park, Dorset, thirty-seven feet in circumference; and though shattered and decayed, it still bore good crops of fruit. In Gloucestershire, there was a chesnut, in the hollow of which was "a pretty wainscoted room, enlightened with windows, and furnished with seats;" and the great chesnut at Tortworth, in the same county, had dimensions, and a reputed age, belonging to no other English tree. In 1720, it measured fifty-one feet at six feet from the ground; but Lysons, by a later mensuration, 1791, made it only forty-five feet three inches. It bore fruit abundantly in 1788; and tradition carries its origin back to the days of the Saxon Egbert.

The chesnut tree is very ornamental when growing; and it makes excellent timber In extreme age, too, its timber is not so valuable as when of a moderate size. One advantage of chesnut is, that there is very little sap-wood; and thus, in the growing state, it contains much more timber of a durable quality than an oak of the same dimensions.

In the Transactions of the Society of Arts for 1789, there is an account of the comparative durability of oak and chesnut, when used for posts. Posts of chesnut, and others of oak, had been put down at Wellington, in Somersetshire, previous to 1745. About 1763, when they had to undergo repair, the oak posts were found to be unserviceable, but the chesnut were very little worn. Accordingly, the oak ones were replaced by new, and the chesnut allowed to remain. In twenty-five years, (1788) the chesnut posts which had stood about twice as long as the oak, were found in much better condition than those. In 1772, a fence was made, partly of oak posts and rails, and partly of chesnut. The trees made use of were of the same age, and they were what may be termed young trees. In nineteen years, the oak posts had so decayed at the surface as to need to be strengthened by spurs, while the chesnut ones required no such support. A gate-post of chesnut, on which the gate had swung fifty-two years, was found quite sound when taken up; and a barn, constructed of chesnut in 1743, was found sound in every part in 1792. It should seem, therefore, that young chesnut is superior to young oak, for all manner of wood work that has to be partly in the ground. We have not heard of any case in which it has been tried against larch.

Chesnut trees of full growth were more abundant in England than they are now; the timber was used

indiscriminately with oak, in the construction of houses, in mill-work, and in household furniture. Many plantations of it have been formed since the proprietors of land began to turn their wastes to profit, in the production of trees. It makes also excellent underwood, and is quick growing.

The fruit of the chesnut in England is inferior to the produce of the trees of the south of France, and of Spain. In some provinces of France, and in Corsica, this fruit constitutes the principal food of the poorer people. The inhabitants of Limousin, a province of France covered with chesnut trees, have from time immemorial prepared them in a peculiar manner, which deprives them of all their astringent and bitter properties, and, thus prepared, they make them into bread.

The chesnut is the tree with which Salvator Rosa delighted to adorn his bold and rugged landscapes. It flourished in the mountains of Calabria, which furnished the scenes of many of this great artist's pictures. It grows not unlike the ash, except that its branches are more straggling.

The *Beech* (*Fagus sylvatica*) is more generally diffused, and more abundant in Britain than the chesnut. Like the chesnut, it thrives best in rich soils and sheltered situations; and, when planted in places that agree well with it, it is a beautiful as well as a valuable tree. The close texture of the beech renders it a very fit timber for machinery, for the stocks and handles of tools, and for many other purposes. It is not proof against the worm, however; and when exposed to alternate drought and moisture it soon decays. Against a cross strain, too, it is not so strong as the grained timbers, and that, with the comparative shortness of its duration, makes it but little used in building. Although easily

Beech—Fagus sylvatica.

turned, it is not well adapted for bowls and hollow vessels, as it is apt to split when suddenly dried after being wet.

It has been doubted whether the beech be a native of Britain. If it be the *fagus* of the Romans, this is not probable. Cæsar, who was an acute observer, mentions that he did not find it in the country; and as he was in the warmest and richest parts of it, he was exactly in those in which the beech was the most likely to be found. It is possible, however, that the *fagus* of the Romans, which obviously got its name from the edible quality of its fruit, may have been either the Italian oak or the chesnut; or the *phegos* of the Greeks may have been the former, and that of the Romans the latter. Whether the beech be or be not a native of England, its introduction has been prior to the commencement of the written or traditionary history of British trees.

When sheltered, the beech grows to a great height,

and as it lasts long when kept constantly wet, it is well adapted for the sills and floors of locks, for the keels of vessels, and for the planking in the parts constantly kept under water. The small timber of it makes excellent charcoal; the mast or fruit is eaten by hogs; and the poor in Silesia extract from it an oil, which they use as a substitute for butter. The nut is sometimes burnt, for the purpose of making an infusion, which somewhat resembles coffee.

Virgil chose the beech for its shade, for no tree forms so complete a roof. But its bushy head is any thing but beautiful; and its branches have neither the firmness of the oak, nor the elegance of the ash. The hue of the bark is of an agreeable olive; and its trunk, often studded with bold knots, is generally picturesque. Its autumnal hues are particularly beautiful.

Elm.

Of this tree there are about fifteen species. The *Common Elm* (*Ulmus campestris*) is generally understood to be indigenous in the south part of the island; and, at any rate, it must have been in England in the time of the Saxons, as many compound names of places, of which the word "elm" forms a part, are to be met with in "Domesday Book," the drawing up of which was finished in 1086.

Elm is a tough and strong timber; but it is coarse and open in the grain, more especially when it has grown upon very rich land. That which grows in the more fertile parts of England is far inferior to the produce of the midland counties of Scotland; the latter being much closer in the grain, harder, more handsome, and taking a finer polish. Of the one, chairs and other articles of furniture are made, while the other is seldom used but for coarse purposes—casks, coffins, wooden presses, &c. The Scotch seems to be the

Elm—Ulmus campestris.

Mountain Elm (*Ulmus montana*), called wych-hazel, or wych-elm in some parts of England, and corrupted to "witch elm." The timber of this is sometimes described as being inferior to that of the elm of the plains in closeness and strength; but the ancient statute enjoining the use of bows, in which the *wych-hazel* is mentioned, and the *elm* not, is against that hypothesis.

The elm attains a large size, and lives to a great age. Mention is made of one planted by Henry IV. of France, which was standing at the Luxembourg at the commencement of the French Revolution. One at the upper end of Church-lane, Chelsea, (said to have been planted by Queen Elizabeth,) was felled in 1745. It was thirteen feet in circumference at the bottom, and one hundred and ten feet high. Piffes' elm, near the Boddington Oak, in the vale of Gloucester, was, in 1783, about eighty feet high, and the smallest girth of the principal trunk was sixteen feet. From the planting of Sir Francis Bacon's elms, in Gray's Inn walks, in 1600, and their decay about 1720, one would be disposed to assign the

healthy period of the elm to about one hundred and twenty years. The health of these must have been, however, affected in some degree by the smoke of London. The superb avenue called "The Long Walk" at Windsor, was planted at the beginning of the last century. Most of the trees have evidently passed their prime. The most profitable age of elms, both for quantity and quality of timber, is, probably about fifty or sixty years. The central parts of a tree get indurated, lose their natural sap, and are apt to absorb moisture, by which they soon rot on exposure to the air, long before the dry rot consumes them, shielded as they are by the external parts. The predominance of resin insoluble in water, and not liable to be acted on by the acids of the atmosphere, is the cause why the pine and the larch are more durable than the silver fir and the spruce. It is possible that the elm is injured by too much humidity in the soil upon which it grows; and that the Dutch elm, which is usually classed as a different species from the common elm, and of which the timber is good for nothing, may be merely the common one debased in the humid soil of Holland.

The elm rises to a greater height than the generality of English forest trees, with a foliage at once full and hanging loosely, and thus capable of receiving great masses of light, and of producing "the chequered shade," which imparts such a sparkling beauty to woodland scenes. It is the first tree which salutes the spring with its light and cheerful green; and sometimes very early in the season the branches are dark with innumerable small purple flowers, often as full as the subsequent leafy foliage. At this time (April), the common elms in Hyde-park present this singular and beautiful appearance. The bloom of forest trees is not always annual.

The elm has been always considered as one of the trees which can be most safely transplanted after attaining considerable size. Evelyn gives several accounts of trees of this species being thus removed into other soils. Upon this subject we may properly enter into some detail, as the public attention has been recently much fixed on a practical plan for the transplantation of large trees.

Though timber trees be among the most delightful ornaments with which any country can be graced, they are ornaments which, generally speaking, a man cannot procure for himself. If they be raised from seed, or planted as saplings, the grandson of the planter is probably the first that can enjoy their beauty, and walk under their shade. Hence a method of transplanting full-grown timber is a very desirable art. Nor is it desirable only for merely ornamental purposes, for the shelter which trees afford to the soil is one of the surest means of increasing the warmth and fertility of a country; and many districts have been converted from bleakness and sterility, to productiveness and value, by plantations of timber. This is particularly the case where the wind blows over those cold surfaces of heath and morass, which occur in the northern parts of the island of Great Britain. The subject has not been investigated with that attention which its importance merits, but appearances render it highly probable that the spawn of *mosses* and *lichens* are wafted by the winds; and that if these winds are not purified from the pestilent spawn, they spread a noxious vegetable growth over what would otherwise be fertile land. In many places we have seen belts of plantations act as a sort of filter for the winds. The trees next to a marshy heath have been covered with lichens, so that no part of the bark was visible; while in the interior of the belt, and on the side most distant from the barren

track, the bark has been free from these parasites. Further, after the trees have attained sufficient size to shelter the land, the moss has disappeared from it, and the soil has become fit for the production of valuable crops. Nor is it on trees alone that this effect of winds, from cold and watery tracks, may be perceived; for those sides of ancient and elevated buildings which are opposed to them, are incrusted with moss and lichen, while the other sides are comparatively clean. To any one who has paid much attention to the more sterile districts of the country, it is matter of every-day notice, that nothing tends so much to confine within bounds the plants which are hostile to the grasses and cultivated crops, as timber; and this being the case, it follows that the means of procuring an instantaneous shelter of grown timber are, at the same time, the surest means of procuring, comparatively, instantaneous fertility. In very many instances that we have seen, the land, when not sheltered by timber, has returned to its original sterility, whenever it has been allowed to lie in grass; but when so sheltered, the pastures have retained their greenness for years, and, instead of being deteriorated, have been improved by remaining for a few years out of tillage.

The transplantation of grown timber-trees appears, indeed, to be the only way, by which shelter can be restored to cold, bleak, and exposed districts. The remains of large trees, which are found in the mosses and bogs of such districts, prove that once both the soil and climate have been adapted to the production of wood. This is true not only of those countries where timber is still to be found in warm and sheltered places, but in those dreary climes where now hardly a shrub is to be found, and where, although young timber be planted, it will not grow,—as in the

counties of Sutherland and Caithness, the Orkney and Shetland Isles, and even in Iceland itself. The latitude has not altered since the trees which are found in the peat-bogs of those regions were green and flourishing upon the surface; and if the soil and the climate have been deteriorated, it must have been by exposure to the damp and bleaching winds. Those winds, as has been said, prove fatal to young trees; but it is probable that, if grown timber, of the more hardy sorts, could be introduced as a shelter, the land would recover its former fertility, and the landscape its ancient beauty.

The observations of philosophical travellers and inquirers, with regard to the whole of the northern countries of the world, whether in the eastern continent or the western, confirm these remarks. Sir Hans Sloane, in his account of the bogs of Ireland, mentions that a great part of those districts which are now covered by that unprofitable substance, must have been once clothed with forests of trees. Broke, in his "Winter in Lapland and Sweden," notices the same change as having taken place in the north of Lapland and the islands. Sir George Mackenzie and others observe the same as being the case in Iceland; and Hearne mentions that large tracts of the northern parts of America, which at his visit were covered with moss and swamp, were forests in the days of the fathers of the Indians then living. In many parts of the Highlands and western islands of Scotland, where there is now hardly a tree, or, at most, only coppice, along the shores of the lochs, (arms of the sea,) there are found not only the trunks and roots of trees in the soil of the bogs, but the roots of oaks of large dimensions standing on the surface; nor can the period at which they were growing have been very remote, for, in some of the wild and almost inaccessible glens (especially in the

district of Morven,) we have met with very large trunks, lying mouldering and neglected. Indeed, all the evidence that we have been able to collect tends to prove, that the general climate of the north has been deteriorated by the destruction of timber, whether that destruction has been produced by natural or by artificial means; and though farming may do much, it must carry on an extensive warfare against the bleak and blasting wind from the bogs and heaths, unless that be softened and deprived of the pestilent substances which it carries, by passing through forests of trees.

The transplanting of grown timber is by no means a modern art. Theophrastus, the Greek writer upon rural economy, mentions that the Greeks not only replanted the plane tree when uprooted by the winds, but were in the habit of removing other large trees. The Romans, too, according to Pliny, transplanted, when they were twenty feet high, the elms which they used in their vineyards, as poles upon which to train their vines. These were planted in regular rows, nine feet asunder. Seneca the younger mentions, that an entire orchard of full-grown trees was removed from one place to another, near the villa of Scipio Africanus, and that after a season or two they flourished and bore fruit as well as ever. It appears, however, that in the ancient method of transplanting grown trees, whether by the Greeks or the Romans, it was the practice to cut off all the spray and smaller branches, and even the large ones, to within a foot of the stem. Indeed, from the way in which they cut both the top and the roots, it is evident that though the trunks of the trees were old, the whole of the vegetation was new.

During the middle ages, this art was neglected, along with most of the other arts; but it was revived in modern times. Among the early instances of it, one

of the most remarkable is that mentioned by Gasper Barlæus, as having been affected by Count Maurice of Nassau, when he was governor of Brazil, in 1636. Like most Dutch colonists (for Brazil was then a Dutch colony), Count Maurice fixed his abode on the shore, or rather upon an island, at the confluence of two rivers. The place was naturally as naked as Holland itself, but the taste and spirit of the Count soon erected a palace, and surrounded it by a garden of the most extensive and luxuriant character. Pine-apples, citrons, and oranges were quickly found in abundance, and more than seven hundred cocoa-nut trees, some of them fifty feet in height, were transplanted. These trees were seventy or eighty years old, and they had to be carried four miles, partly on wheel-carriages by land, and partly on rafts by water; but skill and perseverance overcame every difficulty, and this magnificent artificial forest flourished, and bore abundance of fruit the very first season. That, however, was to be expected; for if a large fruit-tree which is transplanted lives, it always at least *forms* fruit the first year, although it may not bear again for several years after.

About the middle of the seventeenth century, there were some operations of a similar kind in Europe. The Elector Palatine removed some large lime-trees from the forest of Heidelberg to a slope in sight of his palace. These were removed at midsummer, when in the full strength of vegetation, and the heads of them all were cut down; but there are, probably, few trees, except the lime, that could bear to be so treated. About the same time, M. de Fiat, a French Marshal, removed, as Evelyn says, "huge oaks," at the Chateau de Fiat; and, on the same authority, we are told that "a great person in Devon planted oaks as big as twelve oxen could draw, to supply some defects in an avenue to his house;" and

Lord Fitzharding "likewise practised the removing of great oaks, by a particular address, extremely ingenious, and worthy of communication."* The most extensive of the continental transplanters was Louis XIV., who removed an entire forest, the Bois de Boulogne, from Versailles to its present site, a distance of more than seven miles. But these were efforts of power rather than of science, for the trees were much torn and mutilated by the operation. The great transplanting machine which was made use of in these extraordinary experiments remained at Versailles till, probably, about the time of the French revolution.

Le Notre was the artist employed in those operations—the same who laid out the gardens of Versailles, and planted St. James's and Greenwich parks in this country. Nor were the undertakings of Louis, in the removing of timber, confined to the vicinity of the French capital; for many of them were performed in the provinces; and of these one of the most remarkable was effected at Mont-Louis, a small château near the foot of the Pyrenees, where, in the course of a few weeks, a scene previously naked was clothed with forests and groves of great magnificence.

Evelyn informs us that the example of the French was soon followed in this country; and that he himself had "frequently removed elms as big as his waist." He describes the elm as bearing removal better than any other species; but the instance of the lime-trees moved by the Elector Palatine shows how well that tree can bear transplantation, even in the most dangerous season.

The methods at first used for the transporting of trees, if not very scientific, were extremely ingenious. The object was to raise them with a large ball of earth, and move them along in a vertical position.

* Evelyn's Sylva, by Hunter, i. 102.

Sometimes they called in the aid of frost, by cutting a trench and removing the earth round the tree before the autumnal rains. When the frost set in, the bulb was consolidated, and could be cut out in one mass, along with the tree. But in the case of large trees, the weight of these bulbs was very great; and they could be raised only by powerful cranes, which were also necessary to move the tree to and from the platform on which it was transported. The platform was made low, and with small wheels, which further augmented the force necessary for its removal; and thus the transportation of even a moderate tree for a short distance, required a great deal of animal power. Many trees were, however, moved about Blenheim, and some of the other seats of the nobility.

About sixty years after the time of Evelyn, the "transplanting machine" was invented by Brown, the celebrated landscape-gardener, and the removal of large trees became much more easy. The machine consisted of two very high wheels, an axle, and a pole; and when the trees were large, a truck-wheel was used at the end of the pole. The tree was considerably lopped, the earth loosened from the roots, the pole set erect and lashed to the stem; and then a purchase being made fast to the upper part of the pole, the whole was pulled at once, and drawn horizontally along.

Still, though this machine, and the mode of using it, were great improvements upon the methods recommended by Evelyn, yet the trees were subjected to much mutilation; and they did not recover their beauty and vigour till some time had elapsed.

In the year 1816, a much improved mode of transplanting grown timber was introduced by Sir Henry Stuart, of Allanton. By the practice of that mode, he, in the course of five years, and at an expense remarkably moderate, converted his park, from a cold

and naked field, to a rich scene of glade and woodland. Sir Henry's success has been so complete, that his example has been followed by many other proprietors in the uplands or central part of the south of Scotland. Generally speaking, that part of the island is remarkably destitute of timber; and as the country is pastured by sheep, which require fences more elevated and also more close than cattle, the rearing of wood, in the common way of planting, is very expensive. The nakedness of that part of Scotland is severely felt in the violence of the winds, which are certainly more tempestuous, and attended by more intense cold, than in some places of the country much further to the north,—the snows never falling to the same depth, or being accompanied by the same violence on the Grampians in Perthshire, as upon the naked mountains in the counties of Selkirk and Peebles. In this part of the country, therefore, the invention by Sir Henry Stuart is of the utmost value. Nor is its value confined to those districts in which wood is wanted; for there is much in the disposition of trees, not only as respects beauty, but as regards usefulness; and by Sir Henry's plan growing timber may be moved, at no very great expense, from one place to another, and that without almost the least interruption of its growth.

According to this method, there is no mutilation of the tree,—not a branch is lopped off; and at the time of the removal, not a root is broken: the trees are prepared before they are begun to be removed. This preparation consists in cutting all the roots at some distance from the tree. It is well known that such an operation, instead of being hurtful to trees, is often of advantage. When the long lateral roots are cut, the stumps, if they have not been rendered too short, put out a number of young fibres, which appear to draw and convey the nourishment with

more effect than those fibres that are connected with the more extended roots.

The most handsome and thriving trees are selected, as those that will bear transplantation with the least danger; and the lateral roots being divided, as has been stated, the stumps are covered with fresh mould, in which they are left for two or three years, in order that they may put out new fibres for the absorption of nourishment. This preparation of the tree actually improves it; as the fibres have to fetch the nourishment from a shorter distance. The tree, being thus prepared, can be moved not only without mutilating the top, but also without tearing up the root; and thus the transplanting, if performed with skill, becomes a healthful rather than a dangerous operation. The pits for the reception of the trees are, in the mean time, got ready; and for trees of about thirty feet in height (the diameter of the trunk of such a tree may average about a foot), the diameter of these pits is about eighteen feet. The earth of the pits is trenched to the depth of about two feet, and in the course of the trenching, it is well mixed with compost of a nature as different as possible from that of the soil; and the ground thus prepared is the better if it lie for a year or more, in order that the component parts of the soil may be properly mixed and mellowed. When that has been done, the planting is accomplished, by removing the earth to a proper depth, placing the tree in the pit thus made for it, adjusting the roots as nearly as possible to their natural order, and then covering them with earth. This being properly accomplished, the firmness which the trees have is much greater than would at first sight be suspected. Though the trees in Allanton park are a good deal exposed to the violence of the winds, yet they do not require to be much propped.

The expense of this system of transplantation is

comparatively trifling; and if there be a supply of trees at not too great a distance, there is no question that a park may be ornamented, or land sheltered, by this means, much more cheaply than by any other, and with the incomparable advantage that it is done at once. After the ground has been prepared, the whole expense of removing and replanting the trees is not more than from ten to thirteen shillings each, for trees of from twenty-five to thirty feet in height; about half that sum for smaller ones; and not above two shillings or eighteen pence for shrubs or brush-wood. The following is Sir Henry's account of his park, extracted from his "Planter's Guide":—

"There was in this park originally no water, and scarcely a tree or a bush on the banks and promontories of the present lake and river, for the water partakes of both these characters. During the summer of 1820 the water was executed; and in that and the following year, the grounds immediately adjoining were abundantly covered with wood, by means of the transplanting machine. Groups and single trees, grove and underwood, were introduced, in every style of disposition, which the subject seemed to admit. Where the turf recedes from, or approaches the water, the ground is somewhat bold and irregular, although without striking features of any sort; yet the profusion of wood, scattered over a surface of moderate limits, in every form and variety, gave it an intricacy and an expression which it had never possessed before.

"By the autumn of the third year only after the execution, namely 1823, when the Committee of the Highland Society honoured the place with their inspection, the different parts seemed to harmonize with one another, and the intended effects were nearly produced. What it was wished to bring forward appeared already prominent—what was to be concealed, or

thrown into the back-ground, began to assume that station. The fore-ground trees, the best that could be procured, placed on the eastern bank, above the water, broke it into parts with their spreading branches, and formed combinations which were extremely pleasing. The copse or underwood, which covers an island in the lake, and two promontories, as also an adjoining bank that terminates the distance, was seen coming down nearly to the water's edge. What was the most important of all, both trees and underwood had obtained a full and deep-coloured leaf, and health and vigour were restored to them. In a word, the whole appeared like a spot at least forty years planted."

Ash.

There are about forty species of the Ash: the *Common Ash* (*Fraxinus excelsior*) is one of the most valuable of trees. It has been known from the remotest period of history, and it is very generally diffused. The Ash agrees with a greater variety of soil and situation than, perhaps, any other tree producing timber of equal value; and, differing from many other trees, its value is increased rather than diminished by the rapidity of its growth. On very poor soils, where it grows stunted, it is brittle, and soon affected by the rot; but, where the growth has been vigorous, the compact part of the several layers bears a greater proportion to the spongy, and the timber is very tough, elastic, and durable. In elasticity it is far superior to the oak, and it is not so liable to be broken by a cross strain; but it is much more fibrous, and more easily split. The ash is, by way of eminence, called "the Husbandman's tree," nothing being equal to it for agricultural implements, and for all sorts of poles, ladders, long handles, and

other purposes which require strength and elasticity combined with comparative lightness.

At all ages the growth of the ash is of value: the thinnings of young plantations, and the suckers that spring up from the roots of grown trees, or from the stools of trees that have been cut down, are excellent for hoops, hop-poles, and every other purpose where clean, light, and strong rods are wanted at small expense. The leaves and even the twigs are eaten by cattle with great avidity; the bark is useful in tanning; and the wood yields, when burnt, a considerable quantity of potash.

The drip of the ash is injurious to most other plants, and, therefore, when it is planted in cornfields, a certain portion round it is unproductive; but, in marshy situations, the roots of it, which run a long way at a considerable depth, act as underdrains. Hence the proverb, in some parts of the country, "May your foot-fall be by the root of an ash"—may you get a firm footing. Some idea of the change of times and opinions may be formed from the value set upon the ash, in the extract given from the laws of Howel Dda, in the preceding notice of the yew-tree, wherein, while a branch of misletoe is reckoned at thirty shillings, an ash, not being named, must be classed with "trees after a thorn," and therefore be rated at fourpence! In the useful arts, one good ash is worth all the misletoe that ever grew, or ever will grow. It is true that, since the Druids were succeeded by a more rational priesthood, and the misletoe was changed from sacred to profane use, it has been used in the manufacture of bird-lime; but it may very reasonably be doubted whether any one was ever engaged in using that article whose time could not have been better employed. Such was the veneration of some of the ancients for the ash, that

Fraxinus excelsior.

Hesiod derives his brazen men from it; and the Edda, or sacred book of the Northmen, gives the same origin to all the human race.

From one species of the ash, which grows wild in the mountains of Calabria, and does not attain to a great size, manna is gathered. It is procured by cutting the trunk toward the end of July, and collecting the juice which exudes.

The ash does not grow to such thickness as some of the other forest-trees. Dr. Plot mentions one eight feet in diameter; Mr. Marsham another, at Dumbarton, nearly seventeen feet in girth; Arthur Young mentions one in Ireland that had reached the height of nearly eighty feet in thirty-five years; and

one is spoken of in the county of Galway, a district not remarkable for timber, as forty-two feet in circumference, at four feet from the ground. Instances of so great dimensions are not numerous, however; and it is not desirable that the ash should be left for such a growth, as trees of fewer years, and inferior scantling, are invariably better timber.

Gilpin, in his work on Forest Scenery, calls the oak the Hercules of the Forest, and the ash the Venus. The chief characteristic of the one is strength; of the other, elegance. The ash carries its principal stem higher than the oak; its whole appearance is that of lightness, and the looseness of the leaves corresponds with the lightness of the spray. Its bloom is one of the most beautiful appearances of vegetation. The ash, however, drops its leaves very early; and, instead of contributing its tint to the many-coloured foliage of the autumnal woods, it presents wide blanks of desolated boughs. In old age, too, it loses that grandeur and beauty which the oak preserves.

Though the name be in part the same, and there be a little similarity in the form of the leaves, the *ash* must not be confounded with the *mountain ash* (*Pyrus aucuparia*,) which is quite a different tree. The two species have this in common, that the wood is tough, and the suckers, which spring plentifully from the roots of both, are fit for hoops and other purposes; but the mountain ash is a slow growing-tree, never attains any very valuable size, and the timber is soft and not durable. It is a hardy tree, growing anywhere; and its bright red berries, as well as its white flowers, make it rather an ornamental plant in a shrubbery; but it is seldom if ever planted as a timber-tree, though, in the days of superstition and folly, it was in some repute as a spell against witchcraft.

The mountain ash is a beautiful object intermingled

with the dark pines and waving birch, which cast a solemn gloom over the hills of the north. In summer, the light green tint of its foliage happily contrasts with the deeper green of the surrounding trees; and, in autumn, its glowing berries sparkle amidst the dark brown cones of the larch and the spruce.

Service—Pyrus domestica.

The *True Service* (*Pyrus domestica*) is a native of the south of Europe. It is generally cultivated here as a shrub, but in time, though a very long time, it becomes a tree of considerable size. The wood is compact and strong, and often made into weavers' shuttles, and the wooden parts of other small tools and implements. Notwithstanding the goodness of its timber, the service tree could never be profitably cultivated in this country, in consequence of the slowness of its growth.

The fruits of the service remain on the tree during a part of the winter: they have cathartic properties; but the people of Kamchatka use them as food when they have been mellowed by frost. In some parts of the North an ardent spirit is produced from them by distillation.

Chapter V.

BIRCH, ALDER, MAPLE, LIME, HORSE-CHESNUT, POPLAR, WILLOW.

Birch and Alder (Betula).

In situations where better sorts can be had, the birch and alder are of comparatively little value as timber-trees; but as they thrive in many situations where no other tree, save the pine, will grow, and where even that is stunted and unprofitable, they are deserving of some consideration.

The birch is a native of cold and inhospitable climates; and the dwarf birch is the last tree that is found as we approach the snow in elevated regions. At the island of Hammerfest, lat. 70° 40′, the dwarf-birch, in the sheltered hollows between the mountains, rises to about the height of a man; and in the low branches which creep along the ground, the ptarmigan finds a summer shelter, where it breeds in security. Naturalists affirm that the birch-tree constitutes the principal attraction to the birds which are found in such plenty in high northern latitudes; the catkins affording them food in the spring, and the seeds during the remainder of the year.

The *Common Birch* (*Betula alba*) is a graceful tree, and throws out a pretty strong and very agreeable fragrance. When it arrives at a considerable size, the branches hang down or "weep;" and as they are sometimes thirty or forty feet long, and not thicker than a common packthread, they are very beautiful, especially when the points of them are laved in a clear mountain-stream. Coleridge calls the Weeping Birch "the lady of the woods."

Though the people of more favoured places rather despise the birch-tree, and leave it to the turner, out of which to make some of the smaller of his wares, or employ the shoots as mop-handles and the twigs as brooms, there are situations in which it is among the most valued and valuable productions of nature.

Birch—Betula alba.

In those parts of the highlands of Scotland where pine is not to be had, the birch is a timber for all uses. The stronger stems are the rafters of the cabin; wattles of the boughs are the walls and the door; even the chests and boxes are of this rude basket-work. To the Highlander, it forms his spade, his plough, and, if he happen to have one, his cart and his harness; and when other materials are used, the cordage is still withies of twisted birch. These birch ropes are far more durable than ropes of hemp; and the only preparation is to bark the twig, and twist it while green.

In ancient times, both in Britain and other parts of Europe, strong and light canoes were made of the

tough bark of the birch; and it is still used for the same purposes in the northern parts of America. The species used for canoes by the Indians and French Canadians, is called the canoe-birch (*Betula papyracea* or *Betula nigra*). In good soils it reaches an elevation of seventy feet. The weight of a canoe that will hold four persons does not exceed fifty pounds.

The peasantry in some parts of Northern Europe thatch their houses with the birch, weave the long fibres into mats and twist them into ropes, and even grind the inner bark to mix with their bread. The bark is used in the simple dyes, and also in tanning. The Laplanders use it in the preparation of their rein-deer skins; and in Russia the hides which are so esteemed for binding books are prepared with the empyreumatic oil of the birch. A weak but not unpleasant wine may be obtained by draining the sap in March, boiling it, and then fermenting it. The Northern people also make very neat baskets and boxes of the bark, the Laplanders carving the large knots which the trees put forth, into vases, which, although fashioned with their rude knives, have much of the beauty of turnery. In Kamchatka also it is formed into drinking cups. The wood of the birch on the banks of the Garry, in Glengarry, Scotland, is cut into staves, with which herring barrels are made. It is an excellent wood for the turner, being light, compact, and easily worked; and for undressed palings and gates, such as are used in the sheep countries, few timbers are superior to it. It is not very durable, however, but very cheap, as it thrives upon soils that are fit for little else, and sows itself without any assistance from art. It grows upon rocks which one would think absolutely bare; and such is the power of its roots, that we have seen them separate stones several

tons in weight, to reach the soil. The black birch of America has been imported into this country. It is compact and rather handsome, but it soon decays. Birch makes very good charcoal.

Alder—Alnus glutinosa.

The *Alder* (*Alnus glutinosa*) is not so handsome a tree as the birch, and the timber is not applicable to so many useful purposes. The alder is a native of almost every part of Europe. It thrives best in marshy situations, and by the margins of lakes and rivers, where it is generally a large shrub rather than a tree. As its shade rather improves than injures the grass, coppices of it afford good wintering for the out-door stock on mountain grazings.

The bark of the alder contains a good deal of tannin; and the young shoots dye a yellow or cinnamon colour, the wood a brown, and the catkins of the flowers a green. The twigs of the alder are brittle, and so is the stem when green. In that state it is more easily worked than any other timber. When of considerable size, the timber of one of the varieties

(there are several of them) is red, and often so finely streaked, that it is called Scotch mahogany in the north, and furniture is made of it. That which is got out of the bogs, in an undecayed state, (and though it be not so durable in the air as birch, it lasts much longer in water,) has the colour, if not the consistency of ebony. Of birch or holly, which are very white, of juniper, which has a slight cinnamon tinge, and of the bog alder or the bog oak, both of which are black, the coopers in the north of Scotland form variegated cups, some of which are very handsome. In moist situations alder does very well for foundation piles; and from the ease with which it can be perforated when green, and from its not being liable to split, it is well adapted for wooden pipes.

On the banks of the Mole, in Surrey, the alder grows very luxuriantly; and it adds great beauty to the landscape in the neighbourhood of Dorking and Esher.

Maple.

Of the Maple (*Acer*) there are about thirty-six species, natives of various countries. Six are indigenous to Europe, about twelve to America, and the remainder to various parts of Asia. Most of them are deciduous trees, but one is an evergreen shrub. It will be necessary to notice only two—the *Great Maple*, or *Mock-plane* (*Acer pseudo-platanus*); and the *American Sugar Maple* (*Acer saccharinum*)—the first on account of its timber, and the last on account of its sap.

The Great Maple, called also the sycamore and the plane-tree, is hardy; stands the salt spray of the sea better than most trees; grows rapidly, and to a great height. The timber is very close and compact, easily cut, and not liable either to splinter or to warp. Sometimes it is of uniform colour, and sometimes it is

Great Maple—Acer pseudo-platanus.

very beautifully curled and mottled. In the latter state, as it takes a fine polish, and bears varnishing well, it is much used for certain parts of musical instruments. Maple contains none of those hard particles which are injurious to tools, and is therefore employed for cutting-boards; and not being apt to warp, either with variations of heat or of moisture, it is an eligible material for saddle-trees, wooden dishes, founders' patterns, and many other articles both of furniture and of machinery. Before the general introduction of pottery ware, it was the common material for bowls and platters of all sorts; and many are still made of it. As the juice of the maple, both in the leaves and in the tree, is sweet, it attracts numbers of insects. At certain seasons, the wild bees and wasps may be seen about it in crowds; and if the timber be placed so that insects are allowed to

Sugar Maple—Acer saccharinum.

settle upon it, it is speedily attacked by the worm. When kept dry, and free from this attack, it will last a considerable time; but exposed to humidity, it is one of the most perishable of trees.

The maple forms a very pleasing shade, from the largeness of its leaves; but the twisting of its branches is injurious to its picturesque effect. The constant excoriation of its bark produces a variety of hues, which give colour to any landscape in which the tree is introduced.

The sugar maple grows plentifully in the United States; and from the sap of it the inhabitants make a considerable quantity of sugar, which, though inferior both in the grain and in strength to that which is produced by the cane, granulates better than that of the beet root, or any other vegetable, the cane excepted. The sugar maple is a smaller tree than the maple of this country; and it is not much in repute as timber, although from its abundance it is a good deal used in America,—the wood, for domestic

purposes, and the bark, as a blue dye, and as an ingredient in the manufacture of ink.

February, March, or April, according to the state of the season, is the time when the maple is tapped for the preparation of sugar. A perforation is made by an auger, about two inches into the tree, slanting upwards; into this a cane or wooden pipe is inserted, and a vessel placed to receive the sap. The quantity afforded by a tree varies both with the tree and the season; the most favourable season being when there is the greatest difference between the heat of the day and that of the night. From two to three gallons may be about the daily average afforded by a single tree; but some trees have yielded more than twenty gallons in a day, and others not above a pint. The process by which maple juice is boiled and clarified into sugar, does not differ materially from that used for cane juice in the West Indies. The juice should be as recently drawn as possible; for if it stand more than twenty-four hours, it is apt to undergo the vinous and the acetous fermentation; by which processes, the saccharine quality of the juice being destroyed, sugar can no longer be extracted. From the quantity of saccharine matter in the juice of this maple, there is no doubt that it could be fermented into wine, and that a spirit could be distilled from it. There is saccharine matter in the sap of the common maple, but it does not granulate well, and would not repay the expense of extraction.

Lime or Linden.

Of the *Lime Tree* (*Tilia*) there are ten species, six of which are natives of Europe—the others being Americans; though they have been all introduced as objects of curiosity.

Of the *European Lime* (*Tilia Europæa*) there are six varieties; but the most valuable, and the one which is most frequently met with, is the *Common*

Lime—Tilia Europæa.

Lime Tree (*communis*). It is an exceedingly beautiful tree, grows fast, and attains a very great size. It is not supposed to be a native of England, but mention is made of its growing here, as early as the middle of the sixteenth century. In Switzerland and Germany there are lime trees of an enormous size; and one, in the county of Norfolk, is mentioned by Sir Thomas Brown as being ninety feet high, with a trunk forty-eight feet in circumference, at a foot and a half from the ground.

The lime bears the smoke of cities better than any other tall-growing forest tree; and for this reason the shaded walks about the cities on the Continent, more especially in Germany, are planted with it. It has other advantages: the trunk is smooth; the leaves are of a most beautifully delicate green; the flowers throw out a very agreeable fragrance; and it is not so liable to get unsightly, from wounds and decayed branches, as almost any other tree. But its leaves come late in the spring, and they begin to fall early, —as early sometimes as the month of July.

Though a soft and weak timber, the lime is valu-

able for many purposes. It is delicately white, and of an uniform colour, and therefore it is admirably adapted for all light works that are to be partially painted, and then varnished. Though it is very close in the grain, it blunts the tool less than any other timber; and as it has the same property as maple, of not warping, and even in a higher degree, it is used for cutting-boards and for the keys of musical instruments. It also stands the tool well, and is called, by way of eminence, "the carver's tree," being used by the carvers and gilders for most parts of their wooden ornaments. At iron foundries, the ornaments for the fronts of stoves and other purposes are all first cut in lime-tree, and some of them are moulded from the carving, though casts be more generally taken in lead, as being more durable, and admitting of a smoother surface. The exquisite carvings with which Grindling Gibbons ornamented so many of the churches and palaces in England, in the time of Charles II., are all executed in lime-tree. Lime, though softer and more easily cut than beech or maple, is not so much affected either by the worm or by rot.

The bark of the lime-tree is an article of commerce. As the trunk of the tree is tall and free from knots, the bark may be stripped off in long pieces. These are macerated in water till the fibrous layers separate; and are then divided into narrow slips, called *bast*, which, in the northern parts of Europe, are plaited into ropes, and worked into mats. The mats in which flax and hemp are imported from the Baltic, and which, in this country, are in constant use by gardeners for covering plants from the weather, and tying them up, and also for market and tool baskets, are made of *bast*, or the bark of the lime tree. Though the lime be not so great a favourite in this country as it was in former times, it may very fairly be doubted whether the pop-

lars, and other soft, fast-growing trees that have been substituted for it, are a change for the better. The lime is not a tree for bleak and cold lands. It thrives best in rich loam, and in warm and rather moist situations; and though the average age to which it will grow has not been accurately determined, yet, from the healthy nature of the tree, and the great size that it has arrived at, it must be considerable—upwards of a hundred years.

Horse Chesnut.

Horse Chesnut—Æsculus hippocastanum.

The *Common Horse Chesnut* (*Æsculus hippocastanum*) is a native of the northern or central parts of Asia, from which it was introduced into Europe about the middle of the sixteenth century. Its progress can be traced from parts of Northern Asia to Constantinople, thence to Vienna, and thence to Paris, where the first tree was planted in 1615. It is very beautiful in the arrangement of its branches, which give it the form of a paraboloid; in the shape of its leaves; and in

its pyramids of large white flowers, delicately marked with red and yellow. It grows very rapidly, and to a great height; but the timber is soft, spongy, and not durable, and therefore of little value. It is white, but every way inferior to the lime, as it does not stand the tool, and almost any thing will scratch it. It has sometimes been used by the turner, and also for pipes; but though it is cheap, the advantage of using it is very questionable. As it requires a good soil, it is not worth cultivating but as an ornamental tree. The Turks are said to grind the nuts, and mix them with the food of their horses (whence the common name): they devour them with avidity, and they are stated to be eaten whole by sheep and by poultry when boiled; but hogs refuse them both raw and prepared. The bark of the horse-chesnut has been employed with some success in dyeing yellow. The leaves drop off early in the season, and then the appearance of the tree is rather unsightly.

Poplar.

Of the Poplar (*Populus*) there are about fifteen species described; but it is necessary to mention only two as timber trees: the white poplar, or spreading poplar (*Populus canescens*); and the Lombardy poplar, or poplar of the valley of the Po (*Populus dilatata*), which is spire-shaped, has its branches at very small angles with the trunk, and runs up to a great height. The *abele* tree (*Populus alba*) is distinguished by its broad leaves. All the poplars are fond of moisture, and may be planted near marshy places, where few other trees, save the alder, will grow.

The small-leaved white poplar is a native of most parts of Europe; but it is doubtful whether the large-leaved one, the abele, be a native of England,—at all events, the plants of it were obtained chiefly from

Flanders in the seventeenth century. The poplar grows very rapidly. In favourable situations it will make shoots three inches in diameter, and sixteen feet long, in the course of a single season. The loppings of the poplar are not very inflammable, and thus they are superior to those of the elm, and many other trees, for heating ovens, and for other purposes in which the loppings of trees are used.

White Poplar—Populus canescens.

The wood of the poplar is soft, and it is far from durable; but it is not apt either to swell and shrink, or to warp, and it is very light, so that it is employed for butchers' trays, hogs' troughs, and other articles, in which lightness and cheapness are preferred to durability. It is possible, in consequence of the rapidity with which the poplar grows, and the ease with which it can be worked, that, on the spot where it is produced, it may be more economical for common household purposes, and for casks and packages for dry goods, than more durable timber. It is a tree largely cultivated by the Dutch, being well adapted to their moist soil and climate. On the

Continent a species of poplar is manufactured into thin slices, called *sparterie*, which is made up into ladies' bonnets. The seeds of the white poplar, also, are surrounded with a sort of cotton, of which it has been attempted to manufacture paper and even cloth. Pallas, in his travels, attempted to show that the cotton of the *Populus alba* was as valuable as that of America; but no experiments upon it have yet been successful.

In Holland, the *black* poplar is also much cultivated. It grows rapidly, is cut down at about twenty-four years old, and made into wooden shoes, and other articles. The timber is of nearly the same quality as that of the white poplar, perhaps a little better; and it is used for almost the same purposes.

The *trembling* poplar, or *aspen*, is singular on account of the agitation of its leaves by the slightest breeze that can stir. It is very generally diffused, and the timber of it, though it does not attain quite the same size, is applied to the same purposes.

The leaves of almost all the poplars are of a pale or silver colour on the under sides, and the twigs are flexible, which gives them an agreeable variegation of colour when agitated by the wind. The susceptibility of motion is one of the accidental beauties of trees; and the motion of the poplar is peculiarly graceful, for it waves in one simple sweep from the top to the bottom, and the least breath of wind stirs it, when other trees are at rest.

The Lombardy poplar grows rapidly, and shoots in a compact spire to a great height. It is not so hardy as the others; but when planted in a favourable soil, it will grow at the rate of four or five feet in height annually.

The timber of the Lombardy poplar is even worse than that of the other poplars; but for temporary purposes the rapidity of its growth is some compen-

Lombardy Poplar—Populus dilatata.

sation. It is, perhaps, the lightest of timber, and, therefore, well calculated for packing-cases; and though soft, it will bear some strain without breaking. The vessels in which the people of Lombardy carry and squeeze their grapes are all made of this poplar; and they also frequently train their vines to the tree. In England it is chiefly used as an ornamental tree. The Lombardy poplar is, so far as has been observed, the only spiry tree that is deciduous, or sheds its leaves: the tree which it most nearly resembles in its form, though not in its foliage, is the cypress.

Willow, &c.

Of the willow, called *Salix*, from the Latin word which signifies "to spring up," and so denominated on account of the great rapidity of its growth, there are many species,—of which not fewer than one hundred and forty-one have been enumerated by Sir James Smith. Some of these, however, very much resemble each other, so that the species of willows are not so well defined as those of some other trees. Of this great number, it will be necessary to mention

only four—two, which are chiefly used in the manufacture of baskets, one which is a timber tree, and another which is used principally as an ornament.

The basket-making willows—at least, those most generally and frequently used for that purpose (for baskets may be made of the twigs of many others)—are the *Osier* (*Salix viminalis*); and the *Yellow Willow* (*Salix vitellina*); the timber-tree is the *White Willow* (*Salix alba*); and the ornamental one, the *Weeping Willow* (*Salix Babylonica*).

Osier—Salix viminalis.

The osier is a native of most parts of Europe, and grows spontaneously in fenny places. When allowed, it becomes a small tree, but it is generally cut down for basket-work. The osier grows very rapidly; and is used only for the coarser basket-work, unless when split into pieces. On the banks of large rivers, osier beds may be planted with great advantage; and the osier will also thrive in dry situations if the soil be good. Cuttings of osiers take root very readily, and

it is not of much consequence which end of them be put into the ground. They are of great use in giving consistency to banks and embankments, which are in danger of being washed away. There are many osier-beds in the Thames, which are generally cut about once in three years, and are very profitable to their proprietors.

The shoots of the yellow willow are much more slender than those of the osier: they are very tough; and on that account they are well adapted for the finer kinds of basket-work.

In common language, osier is used for almost any willow-tree, while of that which botanists call the osier there are many varieties.

White Willow—Salix alba.

The white arborescent willow grows to a large size, by the sides of rivers; and when the wind agitates its twigs, and turns up the silvery sides of its leaves, it has a fine appearance. It is a native of most parts of Europe.

The weeping willow is a native of the Levant; but

Salix babylonica.

it thrives very well in England, if the situation be not too cold for it, and if it be near water. It runs to a considerable height, and no tree can be more graceful on the margin of a lake or stream. The twigs, which hang down so beautifully, are tough, as well as long and slender; and there can be no doubt that they would answer well for basket-making; but this tree is chiefly introduced on account of the beauty of its appearance. It has been said, that the first willow was planted in England by the celebrated Alexander Pope. According to the account of this circumstance, the poet having received a present of figs from Turkey, observed a twig of the basket in which they were packed putting out a shoot. He planted this twig in his garden, and it soon became a fine tree; from which stock all the weeping-willows in England have sprung. This tree, so remarkable on every account, was cut down a few years ago.

The willow has not only been noticed, but employed

in basket-work in this country from a very early period, and there is some probability that the Britons taught the art to the Romans—at least, from the mention of a basket brought to Rome by painted Britons, in Martial, we should be led to infer that baskets of British manufacture were esteemed in the capital of the world.

The timber of the willow is applicable to many purposes similar to those in which the poplar is employed, and in toughness it is far superior. The ancient Britons sometimes made their boats of basket-work of willow, and covered them with the skins of animals: they were remarkably light and buoyant. Willow bark may be used in tanning and in dyeing.

The willow is used extensively in the manufacture of charcoal; and it has been found to be superior to most other woods in producing charcoal for gunpowder. A good deal depends, however, upon the manufacture. In the ordinary modes of making charcoal, by building the wood up in a pyramidal form, covering the pile with clay or earth, and leaving a few air holes, which are closed as soon as the mass is well lighted, combustion is imperfectly performed. For charcoal to be used in the manufacture of gunpowder, the wood should be ignited in iron cylinders, so that every portion of vinegar and tar which it produces should be suffered to escape. In India, charcoal is manufactured by a particular caste, who dwell entirely in the woods, and have neither intermarriage nor intercourse with the Hindoo inhabitants of the open country. They bring down their loads of charcoal to particular spots, whence it is carried away by the latter people, who deposit rice, clothing, and iron tools, a payment settled by custom. The benevolent Bishop Heber wished to mitigate the condition of these unfortunate people, but he found that he could not break through the Hindoo prejudice against them.

Evelyn, in his Sylva, fears that the progress of our iron manufacture would lead to the destruction of all our timber, in the preparation of charcoal for furnaces. He did not foresee that we should find a substitute, by charring pit-coal into coke. In 1788, there were eighty-six iron furnaces in England, of which twenty-six were heated by charcoal of wood; in 1826, there were three hundred and five, all served by coke.

Good charcoal is also made from *Dog Wood* (*Cornus sanguinea*), which is, however, a tree, or rather a shrub, very different from the willow in its appearance and habits. The Dogwood is firm and compact; grows naturally in hedges upon chalky soils, and bears berries that have a purple juice, out of which a red colouring matter of considerable brightness may be extracted. It is very common in Kent and Sussex; and as there are many powder-mills there, coppices of it are reared for supplying them with charcoal.

Hazel—Corylus avellana.

Another shrub which is applied to the same uses as the willow, namely, making baskets and hoops, but chiefly the latter, is the *Hazel* (*Corylus avellana*). Of

that there are several varieties, the principal of which are the common hazel, and the filbert. The first is a native of every part of Britain, the shells of the nuts being found in the bogs even in the coldest parts. The filbert, again, is supposed to be a native of Asia—to have been imported first into Italy, and thence to the rest of Europe. The filbert grows more upright, is more tree like, and bears larger and better flavoured nuts than the hazel; but the wood of the hazel is the tougher, and the better adapted for hoops, though both make excellent charcoal. There is an American species; and there is also one growing in the vicinity of Constantinople, which bears a nut nearly double the size of the filbert. More than a hundred thousand bushels of foreign nuts are annually consumed in this country.

Laburnum.

The *Laburnum* (*Cytisus*) does not appear to be so much cultivated in England, as a timber tree, as its merits deserve. There are about thirty species of the Cytisus, properly so called, but the common laburnum is the one which is most valuable.

In England the laburnum is principally cultivated as an ornamental shrub, and when in bloom its numerous and long branches of yellow flowers have a very shewy appearance. Laburnum is, however, exceedingly useful as a tree; and wherever very hard and compact timber is required in small pieces, there are few superior to it. The Romans reckoned it next to ebony; though not so hard, or so perfectly free from grain, it is much more tough and elastic. Its natural colour, too, is good, and it may be rendered almost black by the application of lime water. It is also a very hardy tree, and will grow in almost any soil; but hares and rabbits, which abound in many parts of England, and are preserved to the destruction, not merely of trees, but of the grain crops of

Laburnum—Cytisus.

the farmer, spoil the young laburnums by gnawing the bark in winter.

Even of the small size to which it is permitted to grow, laburnum is used for many purposes,—as wedges, pulleys, pegs, the handles of knives, and other instruments.

When of larger dimensions, no timber is fitter for cabinet work of all kinds. It takes a fine polish, it looks well, and it is durable. Chairs made of it are far stronger than any mahogany. It may, however, be doubted whether laburnum holds glue as well, because it contains an oil, which never dries out; and it is harder to work than mahogany. This oily property fits it well for pins of blocks, and cogs in mill-work, as its unctuous nature prevents it from

being abraded. Many of the purposes for which it was once used are now supplied by lignumvitæ, which is a harder wood, and still more unctuous; but lignumvitæ is more splintery. For tables laburnum wood is not so well adapted, being seldom of sufficient breadth for a fold, and not standing well when glued; but for pillars, bed-posts, feet of tables, and all similar uses, it is excellent.

The seeds of laburnum have very powerful medicinal effects upon the human system, and a garland of the flowers, if worn for some time, is said to occasion head-ache. Some of the largest trees that we remember to have seen are in Athol, by the way side between Dunkeld and Blair.

Nearly allied to the laburnum, though not of the same family, or growing to the same dimensions, is *Broom*,—the wood of the Common Broom (*Spartium scoparium*) very much resembling that of laburnum in everything but colour. The wood, when of sufficient size, is applicable to the same purposes as laburnum. For one purpose—pins for pulleys, it is superior to any other wood. Common broom is so hardy that, instead of requiring any care in cultivation, it is extirpated as a weed. In some places, however, it is sown close, and after two or three years, cut for thatching barns and cottages. Though the brooms be in general evergreens, and the laburnum deciduous, yet some of the brooms are called, indiscriminately, *Genista* and *Cytisus*. When the Scotch snuff-boxes were first made by Mr. Steven, of Laurencekirk, they were formed of the roots of broom, steeped for a long time in water; but when the demand became great, and other persons engaged in the manufacture, inferior materials were used, and the quality of the boxes was deteriorated. The flowers of the 'Dyer's broom' (*Genista tinctoria*) afford a bright colouring

matter, which is used in dyeing wool yellow, or preparing it for being dyed green with woad.

The Broom of Spain (*Genista juncea*) is a beautiful shrub, with very fragrant flowers. In countries where the soil is too dry for the growth of flax and hemp, the bark of the Spanish broom is prepared in a peculiar way, and from the threads which it produces very excellent linen is manufactured.

Broom—Spartium scoparium.

Chapter VI.

WALNUT, MULBERRY, MAHOGANY.

Walnut.

Before the introduction of mahogany, the walnut was "the cabinet-maker's tree" in England, and it was well adapted for the purpose,—being tough and strong in proportion to its weight, beautifully variegated, admitting of a fine polish, durable, and obtained in sizes sufficiently large. In many parts of the continent, where the expense of the carriage of mahogany is great, the walnut is still extensively used in the manufacture of furniture; and, perhaps, there is no native tree which bears the climate of England well, that is better adapted for the purpose. Oak, though abundantly durable, cannot be finely polished without great expense, and it is heavier in proportion to its strength.

Of the Walnut-tree, (called by the Romans *Juglans*, or the nut of Jove,) there are very many species enumerated, which have been divided by modern botanists into three genera. Of these species it is necessary to mention only two as timber trees,—the Common Walnut-tree (*Juglans regia*) and the White Walnut, or hickery-tree (*Juglans alba*). The first of these is a native of the warmer parts of Europe, or perhaps of Asia; and the last is a native of America.

The common walnut is a very handsome and a very useful tree. It is true that the fruit does not come to maturity in the northern parts of this island; and that in the southern, nay in countries much farther south, it is apt to be injured by the frosts of

spring. In many parts of this country, it thrives well as a tree, and wherever it thrives it is valuable.

As is the case with all trees and plants that have been long known, esteemed, and cultivated by man, the original country of the walnut is not recorded. Some are of opinion that it is the "Persian nut" mentioned by Theophrastus; and that, therefore, Persia is the country from which it was first intro-

Walnut—Juglans regia.

duced into Europe. It is found indigenous in the more northern parts of that country, toward the mountains of Caucasus; sometimes, though more rarely, in the Russian territory on the north of those mountains; and in China. In all these situations, it grows, according to the best authorities, in a state of nature, and continues itself without cultivation. In the east of France, the south of Germany, and Switzerland, it is very abundant, more especially in Germany; in many parts of which, such as the plains of the Bergstrasse, which run parallel to the Rhine, be-

tween the Neckar and Mayn, there is hardly any other timber.* In England there are still a good many trees scattered over the country; but the timber is not so great as it was formerly, the partiality for the woods of the colonies and other foreign countries having diminished the value of this, as well as of most other species of domestic timber used for finer purposes.

There is still, however, one use to which the walnut-tree is applied, in preference to any other timber, and this use demands the qualities of beauty, durability, and strength: walnut-tree is employed for the stocks of all manner of fire-arms. Before it is used, however, it should be well seasoned, or even baked, as when recent it is very apt to shrink, a disadvantage which is completely got rid of by seasoning.

The walnut grows rapidly till it attains a considerable size, which is even valuable as timber. The absolute duration of the tree has not been ascertained with accuracy; but, probably, the most profitable age for cutting it is the average of hard-wood trees, about fifty or sixty years. The demand for musket and pistol stocks during the late war thinned England of its walnut trees; and the deficiency should be made up by fresh planting. At that period the timber was so much in demand, that a fine tree has often been sold for several hundred pounds.

Beside the value of its timber, the walnut-tree has many other uses. The ripe nuts are well known as a fruit; the green ones make an agreeable and wholesome pickle; and the oil is used for delicate colours in painting, and for smoothing and polishing wood work: sometimes, also, for frying meats, and

* The spring of 1827 was particularly destructive to the walnuts of the Bergstrasse, and the neighbouring parts of Germany, where the walnut is extensively cultivated for the oil. Many thousand trees were killed, and nearly all the branches of the rest were destroyed.

for burning in lamps. When the leaves and recent husks, in their green state, are macerated in warm water, the extract, which is bitter and astringent, is used to destroy insects; and it is a very permanent dye, imparting to wool, hair, or the skin and nails of the living body, a dingy greenish yellow, which cannot be obliterated without a great deal of labour. On this latter account, it is said to have been used by gypsies, in staining the complexions of stolen children, that they may appear to be their own offspring. The quantity of oil in fresh walnuts is very considerable, being about equal to half the weight of the kernels.

There are several varieties of the common walnut,—as the thick shelled, which afford the best timber; and the thin shelled, which have most fruit, and yield most oil. These, however, are mere varieties; for, as is the case with the oak, and many other trees, in which we find a variation in the colour and shape of the leaves, and in the fruit, all the varieties may be obtained by sowing the nuts of the same tree.

In cultivated vegetables, indeed, there is a confusion of varieties which is not met with in animals. The animal mules, whether quadruped,—as between the horse, and the ass or the zebra,—or birds, as the cross of the goldfinch and canary-bird,—are all barren: but the new varieties of plants, though apparently accidental, are generally productive; and thus, by the seeds alone, varieties may be produced almost without end. Many trees of more full growth, in which forced cultivation has destroyed the faculty of perfecting seeds, may be propagated by cuttings or layers.

The form which the branches of the walnut-tree assume is generally beautiful. In May, the warm hue of its foliage makes a pleasing contrast with other trees; but it opens its leaves late and drops them early.

The white walnut, or Hickery, is a native of North America, where it grows to be a timber tree of considerable dimensions. The nut is rather smaller than that of the common walnut; it is lighter in the colour, and not furrowed in the shell. The kernel is edible, and yields an oil similar to that of the walnut.

One part of the wood is more porous than that of the walnut, but the other is more compact: this gives the grain of the wood something the appearance of that of ash; and where it abounds, it is used for similar purposes,—the small shoots for hoops, and the grown trees for agricultural instruments. Hickery is very tough and elastic; and therefore it answers remarkably well for fishing rods, the shafts and poles of carriages, and other purposes where a slender substance of timber has to resist sudden jerks or strains.

In favourable situations, the hickery grows well in England; the specimens in the arboretum of the Royal Botanical Garden at Kew are of great size for their age, and very handsome trees. The trunk rises to a considerable height, of nearly uniform thickness, as straight as a line, and without any lateral branches; and it is thus very probable that, if the tree were more generally cultivated, it would make one of the most valuable in the country.

There are two other descriptions of foreign trees, which, though they belong not to the same genus with hickery, are applied to purposes almost similar in the arts; and therefore this is the proper place in which to notice them. They are *Lance wood*, and the *Hassagay wood*, of which the natives of Southern Africa make the stems of their spears.

Lance wood (*Guatteria virgata*) is a native of the island of Jamaica; and though it does not grow ot a very great size, it is perhaps one of the most valuable timber-trees in the island. No timber pos-

sesses, in a higher degree, the qualities of toughness and elasticity; and therefore none can be better for the shafts of light carriages, and every other purpose where a small body and weight of timber is required to stand a great strain. The very best ash, the toughest of our native timber, is greatly inferior to lance wood, both in strength and elasticity; and in consequence of ash being open and varied in the grain, while lance wood is close and uniform, it does not carve so well into ornaments, take so smooth a polish, or admit of being varnished with so little labour.

The *Hassagay Tree* (*Curtisia faginea*) is a larger growing tree than the lance wood, being one of the largest timber trees in Africa. Its leaves resemble those of the birch; the timber is compact, firm, and very stiff. It is not so much used in this country as the former.

Mulberry.

The mulberry is a tree of singular and varied uses to man, not so much on account of its timber (for though the timber be close and strong, and very durable, the tree is rather a slow grower) as for its leaves and its bark, and the dye that is obtained from the wood of at least one of the species.

Of the mulberry (*Morus*) there are many species; and though none of them are natives of England, or probably of Europe, some are sufficiently hardy to thrive in most, and bear fruit in many, parts of Britain. The white mulberry (*Morus alba*) is rather a delicate tree, though it grows very well in Spain, Italy, and the south of France. The berries of it are light coloured and insipid.

The black mulberry (*Morus nigra*) is a larger and more hardy tree; the fruit is a blackish red, and has much more taste than that of the other. The timber of both these species is very durable: it will last as

long in water as the best oak; and the bark is tough and fibrous, and may be made into strong and durable mats and baskets.

The greatest value of the mulberry-tree in the arts consists in its being the favourite food of the silk-worm. That insect, and this use of the mulberry-tree, were both unknown to the Greeks and Romans; though there is every reason to believe that they

Black Mulberry—Morus nigra.

were then, and perhaps earlier, known to the Chinese, and possibly to some of the other inhabitants of central and southern Asia.

The rearing of silk-worms, and the manufacture of silk, are said to have been introduced into the Western world in the sixth century of the Christian era. About the year 550, two monks, natives of Persia, while employed as missionaries to the Christian churches in India, are said to have penetrated as far as China, where they acquired a knowledge of the rearing of the silk-worm, and the working of silk. Upon their return, they explained to the Greek emperor at Constantinople the nature and importance of those operations, and undertook to bring to that capital as many silk-worms as should suffice for esta-

blishing and supplying the manufacture. They were immediately sent off, and soon returned, with the eggs of the silk-worm concealed and preserved in a hollow cane : these eggs were hatched by the heat of a dunghill. The attempt succeeded; the worms were fed with the leaves of wild mulberry trees; they multiplied rapidly; and the produce of their labours proved to be as good silk as that which had been made in the East.

The animal by which silk is originally made is a species of moth (*Phalæna Mori.*) When perfect, or in the winged state, it is of a whitish colour, with a pale brown line across the upper wings, and displays in itself none of that lustre which its labours produce. The caterpillar, in which state it spins the silk, and is thence called the silk-worm, is about three-quarters of an inch long, of a yellowish gray colour; it feeds very voraciously on the leaves of the black and white mulberry tree indiscriminately; and it will also feed upon lettuce and some other plants. For about six weeks, the silk worm remains in the caterpillar or larva state, changing its skin four times during that period, and ceasing to feed for a short time previous to each change. When full grown, it eats no more, but, choosing a convenient place, begins to envelop itself in silken fibres; and it continues this operation till it has spun an oval case or ball of yellowish silk, about the size of a pigeon's egg, in which it remains as a chrysalis for about fifteen days, at the end of which it gnaws through the end of the silken ball, and comes out a winged moth, to deposit its eggs for a fresh generation, and very soon after to die.

Those who cultivate the worm for silk do not suffer it to reach this last stage, because the silken fibre would be cut into small pieces by the opening at which the moth escapes. When the whole quantity of silk

is formed, they destroy the chrysalis by means of heat.

Previous to the time when the two missionaries brought the eggs of the silk-worm from China, and succeeded in obtaining raw silk at Constantinople, silk was a very costly article, the price in Rome being an equal weight of gold. But the number of worms augmented rapidly, and Greece, more especially the Morea, produced an abundant supply. The conquest of Constantinople by the Venetians, in 1204, led to the introduction of the article into Venice, from which, in the course of a short time, it extended to Genoa, and other parts of Italy. Henry IV. was anxious to introduce the silk-worm into France, and he took some very efficient measures to advance that object; but his success was not equal to his wish. Colbert, in the reign of Louis XIV., was the first who added it to the productive wealth of that country, upon a large scale. James I. was desirous of introducing it into England, and there have been many trials since; but, though these have promised to be successful, they have not been prosecuted, probably because the culture is better adapted to warmer skies and a less laborious population. When the mulberry is cultivated for the rearing of silk-worms, it is not allowed to grow to a timber-tree. The young shoots are preferred for that purpose; and, therefore, in China, the trees are either cut down altogether every third year, or they are kept low by pruning. When the leaves of the mulberry fail, or are deficient, in China, those of the ash are said to make no bad substitute. Some varieties of the ash have certainly this much in common with the mulberry, that they do not expand their leaves till the season be far advanced,—seldom till the middle of May, and very often not till the end of that month. It is stated that the Chinese dry the mulberry leaves in the sun,

and keep them in close-stopped vessels, for the food of the silk-worm, if it be produced before the young leaves of the tree are ready for its support. When cultivated for its fruit, the mulberry, unlike most other fruit-trees, produces fruit in greater abundance and of larger size as it gets older; and, as its dense and dark foliage forms a fine contrast with trees of more airy form and lighter hue, it is a very ornamental tree.

The *Paper Mulberry* (*Broussonetia papyrifera*), is a native of China and Japan, the South Sea Islands, and some parts of America. It does not attain a very great height, but it shoots vigorously, and is a very branchy tree. Its fruit is black, purple, and sweet, but small—not larger, in general, than a common pea.

It is cultivated in Japan for the manufacture of paper; and from this circumstance it gets its specific name. For this purpose it is raised in beds, as osiers are cultivated with us for the use of the basket-maker and the cooper. When the leaves have fallen off, that is, about the month of December, the shoots are cut down, divided into lengths of about three feet, bound into bundles, placed upright and close together in a copper, and boiled till the bark be completely loosened from the wood. Should they be dry before being subjected to boiling, they are prepared for that operation by maceration in water for twenty-four hours. After the rods are cold, the bark is divided lengthwise by a knife, stripped off, and dried for use. When to be used, it is put into water till it is so much soaked that the external and coloured part of the bark can be separated. That being done, the bark is sorted, the strongest being set apart for the best and whitest paper, and the weaker for that of inferior quality; while of the refuse they make a very coarse brown paper. The sorted bark is

then boiled till it becomes tender, that is, till it easily separates with the fingers; and then it is washed for a longer or shorter time, according to the quality of paper wanted. If strong writing paper, the washing must be moderate; but if the colour is to be very delicate, and the texture soft and silky, the washing must be more prolonged. When properly washed, it is taken to a table, and there reduced to a pulp, by beating with wooden mallets. When sufficiently reduced, it is brought to the requisite consistency with water; rice-starch, and the mucilaginous infusion of manihot-root (*Hibiscus manihot*), are added by way of size; and then the sheets of paper are formed one by one upon a table, collected into heaps, and pressed by a weight.

The same bark is used by the people of many of the South Sea Islands in the manufacture of their finer cloths, more especially those that are to be dyed. They make a coarser but stronger cloth of the bark of the bread-fruit tree, and also of that of another tree resembling the wild-fig of the West Indies. The paper mulberry will grow in England, but the cultivation of it would not, probably, be attended with much profit. There can be no doubt, however, that if proper attention were paid to the subject, excellent paper might be made of the inner bark of many of our native timbers, the bark of which is now used merely for fuel, or thrown away.

The *fustic* mulberry (*Morus tinctoria*) is a native of many parts of South America (especially Brazil) and the West India Islands. It grows to be a very large and handsome tree; and the timber, though like most other dye-woods, brittle, or at least easily splintered, is hard and strong. It is, however, chiefly used as an ingredient in dyeing yellow; and a great deal of it is imported into Europe for that purpose under the name of fustic.

MAHOGANY.

Though the Mahogany is a native of too warm a climate to allow of its cultivation as a timber-tree in this country, yet it is applied to so many uses, and is so well adapted for most of them, that some notice of it is required.

There are three species of mahogany:—Common mahogany (*Swietenia mahagoni*), *Swietenia febrifuga*, and *Swietenia chloroxylon:* the first being a native of the West India Islands and the central parts of America, and the second and third natives of the East Indies. They all grow to be trees of considerable magnitude—the first and second being among the largest trees known. They are all excellent timber.

Swietenia mahagoni is, perhaps, the most majestic of trees; for though some rise to a greater height, this tree, like the oak and the cedar, impresses the spectator with the strongest feelings of its firmness and duration. In the rich valleys among the mountains of Cuba, and those that open upon the bay of Honduras, the mahogany expands to so giant a trunk, divides into so many massy arms, and throws the shade of its shining green leaves, spotted with tufts of pearly flowers, over so vast an extent of surface, that it is difficult to imagine a vegetable production combining in such a degree the qualities of elegance and strength, of beauty and sublimity. The precise period of its growth is not accurately known; but as, when large, it changes but little during the life of a man, the time of its arriving at maturity is probably not less than two hundred years. Some idea of its size, and also of its commercial value, may be formed from the fact that a single log, imported at Liverpool, weighed nearly seven tons; was, in the first instance, sold for 378*l.*; resold for 525*l.*; and would, had the dealers

been certain of its quality, have been worth 1000*l.* Mahogany of remarkable fineness is very costly, as we shall shew when we come to speak of fancy-woods.

As is the case with much other timber, the finest mahogany trees, both for size and quality, are not in the most accessible situations; and as it is always imported in large masses, the transportation of it for any distance overland is so difficult, that the very best trees, both on the islands and on the main land—those that grow in the rich inland vallies—defy the means of removal possessed by the natives. Masses of from six to eight tons are not very easily moved in any country; and in the mountainous and rocky one, where much attention is not paid to mechanical power, to move them is impossible. In Cuba, the inhabitants have neither enterprise nor skill adequate to felling the mahogany trees, and transporting them to the shore; and thus the finest timber remains unused.

The discovery of this beautiful timber was accidental, and its introduction into notice was slow. The first mention of it is that it was used in the repair of some of Sir Walter Raleigh's ships, at Trinidad, in 1597. Its finely variegated tints were admired; but in that age the dream of El Dorado caused matters of more value to be neglected. The first that was brought to England was about the beginning of last century; a few planks having been sent to Dr. Gibbons, of London, by a brother who was a West India captain. The Doctor was erecting a house in King-street, Covent Garden, and gave the planks to the workmen, who rejected it as being too hard. The Doctor's cabinet-maker, named Wollaston, was employed to make a candle-box of it, and as he was sawing up the plank he also complained of the hardness of the timber. But when the candle-box was finished, it outshone in beauty all the Doctor's other furniture, and

became an object of curiosity and exhibition. The wood was then taken into favour: Dr. Gibbons had a bureau made of it, and the Duchess of Buckingham another; and the despised mahogany now became a prominent article of luxury, and at the same time raised the fortunes of the cabinet-maker by whom it had been at first so little regarded.

Mahogany—Swietenia mahagoni.

The mahogany-tree is found in great quantities on the low and woody lands, and even upon the rocks in the countries on the western shores of the Caribbean sea, about Honduras and Campeachy. It is also abundant in the Islands of Cuba and Hayti, and it used to be plentiful in Jamaica, where it was of excellent quality; but most of the larger trees have been cut down. It was formerly abundant on the Bahamas, where it grew, on the rocks, to a great height, and four feet in diameter. In the earliest periods it was much used by the Spaniards in ship-building. When first introduced by them it was very dark and hard, and without much of that

beautiful variety of colour which now renders it superior to all other timber for cabinet-work; but it was more durable, and took a higher polish with less labour. Of course it was wholly unknown to the ancients. It was first introduced in the sixteenth century, but it was not generally used in England till the eighteenth.

The mahogany is a graceful tree, with many branches that form a very handsome head. The leafets are in pairs, mostly four, and sometimes three, but very rarely five; the pair opposite, and without any odd leafet at the point; they are smooth and shining, lance-shaped, entire at the edges like those of the laurel, and bent back; each leafet is about two inches and a half long, and the whole leaf is about eight inches. The flowers are small and whitish, and the seed-vessel has some resemblance to that of the Barbadoes cedar: hence some botanists have given the name of cedar to the tree.

This tree so far corresponds with the pine tribe, that the timber is best upon the coldest soils and in the most exposed situations. When it grows upon moist soils and warm lands, it is soft, coarse, spongy, and contains sap-wood, into which some worms will eat. That which is most accessible at Honduras is of this description; and therefore it is only used for coarser works, or for a ground on which to lay veneers of the choicer sorts. For the latter purpose it is well adapted, as it holds glue better than deal, and, when properly seasoned, is not so apt to warp or to be eaten by insects. When it grows in favourable situations, where it has room to spread, it is of much better quality and puts out large branches, the junctions of which with the stem furnish those beautifully curled pieces of which the choicest veneers are made. When among rocks and much exposed, the size is inferior, and there is not

so much breadth or variety of shading; but the timber is far superior, and the colour is more rich. The last description is by far the strongest, and is therefore the best adapted for chairs, the legs of tables, and other purposes in which a moderate size has to bear a considerable strain. Since the produce of Jamaica has been nearly exhausted, there are only two kinds known in the market. Bay wood, or that which is got from the continent of America, and Spanish wood, or the produce of the islands chiefly of Cuba and Hayti. Though the Bay wood is inferior to the other both in value and in price, it is often very beautiful, and may be obtained in logs as large as six feet square. It is, however, not nearly so compact as the other; the grain is apt to rise in polishing, and, if it be not covered by a water-proof varnish, it is very easily stained. It also *gives to the tool* in carving, and is not well adapted for ornaments. Spanish wood cuts well, takes a fine polish, resists scratches, stains, and fractures much better, and is generally the only sort upon which much or delicate workmanship should be expended. The colours of mahogany do not come well out without the application of oil or varnish; and if the best sorts be often washed with water, or long macerated in it, they lose their beauty, and become of a dingy brown. The red is deepened by alkaline applications, especially lime-water; but strong acids destroy the colour. When the surface is covered by a colourless varnish, which displays the natural tints without altering any of them, good mahogany appears to the greatest advantage.

The *Febrifuga*, or East India mahogany, is a very large tree. It grows in the mountainous parts of central Hindostan, rises to a great height with a straight trunk, which, towards the upper part, throws out many branches. The head is spreading, and

the leaves have some resemblance to those of the American species. The wood is of a dull red colour, not so beautiful as common mahogany, but much harder, heavier, and more durable. The natives of India account it the most lasting timber that their country produces, and therefore they employ it in their sacred edifices, and upon every occasion where they wish to combine strength with durability.

Swietenia chloroxylon.

The *Chloroxylon* is chiefly found in the mountains of the Sircars, that run parallel to the bay of Bengal, to the N.E. of the mouth of the River Godovery. The tree does not attain the same size as either of the former, and the appearance of the wood is different. It is of a deep yellow, nearly of the same colour as box, from which it does not differ much in durability; and it could be applied to the same purposes.

Chapter VII.

SHRUBS PRODUCING HARD TIMBER, FRUIT-TREES, AND FANCY WOODS.

TREES OF SMALLER GROWTH, AND SHRUBS, MOSTLY PRODUCING VERY HARD TIMBER.

Not to multiply too much the subdivisions of this brief sketch, it will not be amiss to class under one head a few of the principal plants that are comprised in the above description, though they have no botanical relationship; though they are natives of different countries; and though some are deciduous, and others evergreens.

1. Thorn.—Of the thorn (*Cratægus*) the botanists enumerate many species, which they class into several genera. Some of these species are natives of America. They are mostly hardy and deciduous, and, when planted singly, grow up to be large shrubs, or small trees. Most of them thrive well in this country; though they are stunted and poor, on very bad soils, in exposed situations.

The *White Beam* (*Pyrus aria*) is a beautiful tree rising to the height of thirty or forty feet. The trunk is large, and divides into many branches. The leaves are light green on the upper sides, and white on the under. It is a native of many parts of Europe, growing upon dry and rather warm soils, such as those over gravel, chalk, and limestone. The wood is very firm and tough. Walking-sticks, wooden axles, handles of tools, and many other things are made of it. It is close and takes a smooth polish; but, like most of the thorns, it requires to be well seasoned, otherwise it is apt to warp and split.

The *Wild Service* (*Pyrus torminalis*) grows to a

considerable size, and requires a stronger soil than the former. The flowers are in large bunches, and are succeeded by brown berries in the shape of haws, but larger, which are often to be met with in the London markets, in autumn. The timber is compact, hard, tough, and white; and answers very well for cogs of wheels, and other working parts of wooden machinery.

The *Indian Hawthorn* (*Raphiolipis Indica*) is a native of the East Indies. It has been said, but the statement is somewhat doubtful, that it is of larger size than most of the other thorns; without spines; and yielding a tough, red timber, fit for oars, handspikes, and similar purposes.

White Thorn—Cratægus oxycantha.

Common hawthorn, or *White Thorn* (*C. oxycantha*), is valuable both as a hedge shrub, and as a tree. Few plants exceed it in beauty, when in bloom; the season of which is usually May, on which account the name of *May*, or "May-blossom," is, in some places, given to the tree. There is one variety however, the Glastonbury thorn (to which the monks of the dark ages attached a popular legend), that

flowers in January or February, and in favourable seasons and situations, as early as Christmas. Gilpin mentions that "one of its progeny, which grew in the gardens at Bulstrode, had its flower-buds perfectly formed so early as the 21st December." In the arboretum at the Royal Gardens, Kew, a similar thorn flowers at the same season. The belief that certain trees put forth their flowers on Christmas-day, was not confined to the Glastonbury thorn. In the New Forest, at Cadenham, near Lyndhurst, an oak used to bud about that period; but the people, for two centuries, believed that it never budded all the year, except on Old Christmas-day. The superstition was destroyed by careful investigation; and the circumstance is thus recorded in the Salisbury newspaper of January 10,1786:—"In consequence of a report that has prevailed in this county for upwards of two centuries, and which, by many, has been considered as a matter of faith, that the oak at Cadenham, in the New Forest, shoots forth leaves on every Old Christmas-day, and that no leaf is ever to be seen on it either before or after that day, during the winter, a lady, who is now on a visit in this city, and who is attentively curious in every thing relative to art or nature, made a journey to Cadenham, on Monday the 3d instant, purposely to inquire on the spot, about the production of this famous tree. On her arrival near it, the usual guide was ready to attend her; but, on his being desired to climb the oak, and to search whether there were any leaves then on it, he said it would be to no purpose; but that if she would come on the Wednesday following, (Christmas day,) she might certainly see thousands. However, he was prevailed upon to ascend, and on the first branch which he gathered appeared several fair new leaves, fresh sprouted from the buds, and nearly an inch and a half in length. It may be imagined that the guide was more amazed at this premature

production than the lady, for, so strong was his belief in the truth of the whole tradition, that he would have pledged his life that not a leaf was to have been discovered on any part of the tree before the usual hour."

When young, the hawthorn grows rapidly, a shoot of a single year being sufficient for a walking stick; but when it stands to be a tree, it makes wood very slowly, and lives to a great age. The wood is remarkably durable : there is (or was, a few years ago) a hawthorn in the cellar of Cawdor castle, in the county of Nairn, which has been without leaves or bark for more than a century, and which, tradition says, has been in its present situation, and of its present size, ever since the castle (which is a very old one) was founded.

The trunk of an old hawthorn is more gnarled and rough than, perhaps, that of any other tree; and this, with its hoary appearance, and its fragrance, renders it a favourite tree with pastoral and rustic poets, and with those to whom they address their songs. Milton, in his L'Allegro, has not forgotten this favourite of the village:

> "Every shepherd tells his tale
> Under the hawthorn in the dale."

When Burns, with equal force and delicacy, delineates the pure and unsophisticated affection of young, intelligent, and innocent country people, as the most enchanting of human feelings, he gives additional sweetness to the picture by placing his lovers

"Beneath the milk-white thorn, that scents the evening gale."

There is something about the tree, which one bred in the country cannot soon forget, and which a visitor learns, perhaps, sooner than any association of placid delight connected with rural scenery. When, too, the traveller, or the man of the world, after a life spent in other pursuits returns to the village of his nativity, the

old hawthorn is the only playfellow of his boyhood that has not changed. His seniors are in the grave; his contemporaries are scattered; the hearths at which he found a welcome are in the possession of those who know him not; the roads are altered; the houses rebuilt; and the common trees have grown out of his knowledge: but be it half a century or more, if man spare the old hawthorn, it is just the same—not a limb, hardly a twig, has altered from the picture that memory traces of his early years.

The timber of the hawthorn is remarkably hard and durable, and fit for very many purposes; but a supply of large dimensions cannot be obtained rapidly, as the tree grows so very slowly after attaining some size.

There are several varieties of the hawthorn, all natives of Europe. Of these the double-flowering has great beauty as a shrub.

2. Holly.—Of the *Holly* (*Ilex*) there are sixteen species, and the varieties produced, distinguished chiefly by the leaves, are very numerous.

Ilex aquifolium.

The *Common Holly* (*Ilex aquifolium*) is very abundantly diffused, being found in warm climates, and in cold,—in most countries of Europe, and in many of Asia and America. Hollies are abundant in some of the uncultivated parts of the southern counties of England; and they are also to be met with in the Highlands of Scotland, in places where one could hardly suppose they had been planted.

Were it not that the holly grows very slowly when young, and cannot be safely transplanted when it has attained a considerable size, it would make better hedge-rows than the hawthorn. When allowed time, and not destroyed by shortening the top-shoot, the holly grows up to a large tree. Some at the Holly-walk, near Frensham, in Surrey, are mentioned by Bradley, as having grown to the height of sixty feet; and old hollies of thirty and forty feet, with clean trunks of considerable diameter, are to be met with in many parts of the country.

A holly hedge is a pleasing object, though it is too often clipped into formal shapes. Evelyn had a magnificent hedge of this sort, at his gardens at Say's Court, which he planted at the suggestion of Peter the Great, who resided in his house when he worked in the dock-yards at Deptford. He thus rapturously speaks of this fine fence: "Is there under heaven a more glorious and refreshing object of the kind than an impregnable hedge, of about four hundred feet in length, nine feet high, and five in diameter, which I can shew in my new raised gardens at Say's Court (thanks to the Czar of Muscovy) at any time of the year, glittering with its armed and varnished leaves, the taller standards, at orderly distances, blushing with their natural coral."

The timber of the holly is very white and compact, which adapts it well for many purposes in the arts; though, as it is very retentive of its sap, and warps in

consequence, it requires to be well dried and seasoned before being used. It takes a durable colour, black, or almost any other; and, hence, it is much used by cabinet-makers in forming what are technically called strings and borders, in ornamental works. When properly stained black, its colour and lustre are not much inferior to those of ebony. For various purposes of the turner, and for the manufacture of what is called Tunbridge ware, it is also much used; and, next to box and pear-tree, it is the best wood for engraving upon, as it is close and stands the tool well. The slowness of its growth, however, renders it an expensive timber. The bark of the holly contains a great deal of viscid matter; and, when macerated in water, fermented, and then separated from the fibres, it forms bird-lime.

3. Box.—The wood of the box is of considerable size, though we generally meet with a small species in this country, in the state of a shrub, forming borders, where the largest stem is not thicker than a packthread, or, when not in this state, still as a little shrub often tastelessly cut into fantastic shapes. Only two species of box are mentioned by botanists; but there are several varieties, and one of them, the *Dwarf Box* (*Buxus suffruticosa*) ought, perhaps, to be considered as a distinct species from the *Common Box* (*Buxus sempervirens*), and not merely a variety, as no art has been able to rear the former to the size of the latter. The seeds of the one were never observed by Miller to produce plants of the other, as is the case with most varieties of species in the vegetable kingdom, more especially of trees and shrubs.

When allowed to arrive at its full growth, the box attains the height of twelve or fifteen feet, and the trunk varies in diameter from three to six inches, which it sometimes, though rarely, exceeds.

Buxus sempervirens.

It is a native of all the middle and southern parts of Europe; and it is found in greater abundance and of a larger size in the countries on the west of Asia, to the south of the mountains of Caucasus. In many parts of France it is also plentiful, though generally in the character of a shrub. In early times it flourished upon many of the barren hills of England. Evelyn found it upon some of the higher hills in Surrey, displaying its myrtle-shaped leaves and its bright green in the depth of winter; and, till very recently, it gave to Boxhill, in that county, the charms of a delightful and perennial verdure. The trees have now been destroyed, and the name, as at other places called after the box, has become the monument of its former beauty.

Yet no tree so well merits cultivation—though its growth be slow. It is an unique among timber, and combines qualities which are not found existing together in any other. It is as close and heavy as ebony; not very much softer than *lignum-vitæ;* it cuts better than any other wood; and when an edge is made of the ends of the fibres, it stands better than lead or tin, nay almost as well as brass. Like holly, the box is very retentive of its sap, and

warps when not properly dried, though when sufficiently seasoned it stands well. Hence, for the wooden part of the finer tools, for everything that requires strength, beauty, and polish in timber, there is nothing equal to it. There is one purpose for which box, and box alone, is properly adapted, and that is the forming of wood-cuts, for scientific or other illustrations in books. These reduce the price considerably in the first engraving, and also in the printing; while the wood-cut in box admits of as high and sharp a finish as any metal, and takes the ink much better. It is remarkably durable too; for, if the cut be not exposed to alternate moisture or heat, so as to warp or crush it, the number of thousands that it will print is almost incredible. England is the country where this economical mode of illustration is performed in the greatest perfection; and just when a constant demand for box was thus created, the trees available for the purpose had vanished from the island.

Permanent figures and ornaments are often impressed upon box, by a much more cheap and simple process than that of carving. For this purpose the wood is softened by the application of heat and moisture; and the die being strongly pressed upon it when in that state, the impression comes off, and is retained with considerable sharpness. Snuff-boxes of this description are extensively made in France, Switzerland, and Germany, and the material used is principally the root of the box.

4. Ebony.—As to which is the real ebony tree, those who treat of and classify plants are not wholly agreed, though it is usually referred either to one or more species of the date plum, that grow in the south-eastern parts of Asia, and the adjoining islands, or to that which is a native of Jamaica; though the former (*Diospyrus Ebenus*) is, by the best judges, considered as the true ebony. The

fact is, that the name ebony is applied to trees of various genera, producing wood of different colours, and only agreeing in the common qualities of great compactness, weight, and durability. Ebony was much more in use and esteem formerly than it is now. When good, it is very valuable for the purposes to which it is applied, not being liable to shrink or warp. It does not, however, hold glue so well as mahogany; and it is apt to be imitated by less valuable woods stained black.

In his Journal, Bishop Heber describes the Ebony tree of Ceylon as a magnificent forest tree, with a tall, black, slender stem, spotted with white. A great deal of the furniture in Ceylon is made of ebony. At Fonthill Abbey there were some splendid ebony chairs, carved in the most elaborate manner, and of prodigious weight, which were said to have belonged to Cardinal Wolsey; and there were formerly some similar chairs in the Round Tower of Windsor Castle.

Lignumvitæ.

5. LIGNUMVITÆ.—The *Lignumvitæ* of commerce (*Guaiacum Officinale*) is a dark-looking evergreen, and grows to a great size in the West India Islands, of which it is a native. It bears blue flowers, which are succeeded by roundish capsules. In its native climate the Lignumvitæ is a very hardy tree, and retains its greenness in the dryest weather. It strikes its roots deep into the ground, and thus defies the hurricane as well as the drought. The bark is hard, smooth, and brittle; and the wood is of a yellowish, or, rather, olive colour, with the grain crossing in a sort of irregular lozenge-work. Lignumvitæ is the weightiest timber with which we are acquainted, and it is the most difficult to work. It can hardly be split, but breaks into pieces like a stone or chrystalized metal. It is full of resinous juice, which prevents oil or water from working into it; and it is, therefore, proof against decay. Its weight and hardness make it the very best timber for stampers and mallets of all sorts; and its resinous matter fits it the best for the sheaves or pulleys of blocks, and for friction rollers and castors. A sheave of lignumvitæ cuts a wooden pin less, and is less cut by a metal one, than a sheave of any other timber; while its own sap makes it work as smoothly as other timber even when smeared with grease, black-lead, or any other anti-attrition application. Lignumvitæ is much used in our dock-yards for sheaves; and its application may be seen upon a grand scale, in the beautiful block-machinery at Portsmouth.

When full grown, the largest lignumvitæ trees are from forty to fifty feet in height, and from fourteen to eighteen inches in diameter. Like the other resinous trees, it contains sapwood, which is of lighter colour than the heart; but, though not so hard, the light part is a weighty and strong timber, and not liable to separate from the other.

The resin of the lignumvitæ, *Gum Guaiacum* of

the shops, may be obtained by bleeding the live tree, and also by boiling the chips and sawdust of the wood. It is aromatic, slightly bitter, and prescribed in chronic rheumatisms, and other diseases. The capsules and also the bark are aperient, and used in medicine, the former being the more powerful.

The lignumvitæ has been reared by artificial heat in this country; but, as it grows slowly even in the West Indies, its growth here must of course be still slower, and therefore it does not admit of being cultivated, except in botanical collections, or as a curiosity.

6. Black-thorn.—The *Black-thorn*, or *Sloe*, though armed with spines, or prickles, like the other thorns, is yet a very different genus of tree. It is a plum, though one in a state of nature, and not much regarded as fruit. It is the *Prunus spinosa* of botanists. It is hardy, and a native of many parts of this country; though seldom cultivated, as it makes but an unsightly hedge, and does not rise to be valuable as a tree. The leaves have sometimes been used for tea; and it is alleged that the "rough-flavoured teas" of cheap dealers are more indebted for their roughness to the sloe, than to any ingredient from China or elsewhere. It is also understood that the berries of the sloe enter pretty largely into the composition of much of the wine that is miscalled Port. The wood, which is very tough and hard, answers well for walking-sticks, pegs, and other small purposes.

7. Crab Tree.—The common *Crab Tree* (*Pyrus malus*) is found native in many parts of this country, where it rises to the height of a considerable tree. When the soil is very rich, the fruit attains the size of a small apple, and is used in feeding hogs. The timber is hard and compact, answers remarkably well for turning, and for the working parts of machinery, while the shoots make excellent walking-sticks. Near the bottoms of the eastern slopes of the Welch mountains, there are many crab trees, both singly

and in the hedge-rows, that produce a great deal of fruit. The sour juice of the crab, previously to the introduction of the modern methods of obtaining vegetable acids, was in considerable request under the name of verjuice.

TIMBER OF TREES CULTIVATED PRINCIPALLY ON ACCOUNT OF THEIR FRUIT.

The varieties of trees of this description are almost innumerable; and so much has been done by cultivation, grafting, inoculating, and mixing of sorts, that the knowledge of these sorts has become almost a science in itself. The original varieties and even species are lost and confounded; and man contests with nature in the production of the varied fruits that appear in our markets, not only as respects the sorts, but as regards the times at which they are brought to market.

Considered merely as timber-trees, they are much more simple. They may be divided into two classes,—stone-fruits, or those that have a hard kernel enclosed in a soft pulp; and fruits that have seeds or pips, and the pulp of a firmer consistency. With the exception of the peach, the nectarine, and the almond, which form the genus *Amygdalus*, the whole of the stone-fruits are contained in the genus *Prunus*, and the seeded fruits in the genus *Pyrus* or *Mespilus*. None of the genus *Amygdalus* are reared as timber-trees in any part of this country: it will, therefore, suffice to confine the few observations that are to be made to the others.

The wood of these two genera is close and compact, and takes a good polish; that of the wild sorts being better than that of the cultivated, and the deterioration being in proportion to the highness of the cultivation. In this they follow the general law, that self-planted trees yield the best timber; and, in addition to

this, their powers of vegetation are exhausted by the quantity of fruit that they are, as it were, forced to bear.

Cherries, in a wild state, are very plentifully diffused, being met with in most temperate countries, and even in those that may be considered as cold. The wood of the cherry is very close, and, in some sorts, of a beautiful colour, and well adapted for handles of tools. It takes a fine polish, and is not liable to split. Some of the bird cherries are beautifully veined, and have an agreeable perfume, on which account they are much used by cabinet-makers in the interior parts of the continent. None of the cherries grow to be very large trees; but they may frequently be met with from a foot to eighteen inches in diameter at the root.

Apricots grow wild in China, Japan, and upon many of the mountains of central Asia: the timber has some resemblance to that of the cherry; but it is white, and not so hard. The apricot is not a native of England, and is not cultivated as a timber tree.

The *Wild Plum* is a native of the warmer parts of Europe, though it be doubtful whether of England or not. It is sometimes found in hedges and other situations where it is not likely to have been planted, but it may have been produced from some of the cultivated sorts. The plum-tree grows to a considerable size; the wood is close and strong; and the bark may be used in dyeing yellow.

The *Pear* grows to a considerable size: the wood is light, smooth, and compact; and answers well for carving, for picture-frames, the handles of tools, and wooden spoons and dishes.

The wood of the *Apple* is harder and weightier than that of the pear: it bears a resemblance to that of the crab, although it be not so tough and hard. In the working parts of machinery, it is very durable.

The timber of the fruit-trees is not well adapted for works that are to be under water. The sap being so-

luble in that liquid, is soon extracted by it, and then the particles of the wood separate. The best timbers for being placed in water are those containing resins which water cannot dissolve: the viscid juice of the fruit-trees is a gum, and not a resin.

Fancy Woods.

Even at a comparatively early stage of the arts, mankind appear to have made use of the bright or variegated colours of wood, to give beauty both to their dwellings and their furniture. The temple built by King Soloman was overlaid on the inside with boards of cedar:—"all was cedar; there was no stone seen"; and among the most ancient specimens of ornamental furniture that are to be met with, we find that attempts have been made to heighten the effect by the contrast of various kinds of wood. Although, both in the materials and the designs, these are inferior to the productions of modern art, many of the cabinets which are still preserved have much higher claims to notice than their mere antiquity.

In all these works a veneer or thin plate of the fancy wood is laid down in glue, upon a surface of a plainer description. This process is of course cheaper than if the whole work were made of the solid fancy wood. The beauty of fancy wood arises in many sorts from its being cross-grained, or presenting the fibres endways or obliquely to the surface. These different positions of the fibres, as well as their different colours in grained woods, give a clouded and mottled variety to the surface; and when some of the parts are partially transparent, as is the case with fine mahogany, the surface gives out a play of different tints, as the observer shifts his place, or the

light falls upon them, and consequently is reflected at different angles.

In the earlier stages of the art of cabinet making, and before the forests of the tropical regions had been explored for those beautiful woods which have since added so much to the elegance of modern furniture, the veneering and ornamenting were in woods of native growth. None of these have the deep an d warm tints of the finest of the foreign; but the figures with which they are marked are often very beautiful. The yew, which, with its other tints, blends a certain trace of pink or rose-colour, and when it is gnarled or knotty, has a very rich appearance, was the wood used for the finest and most costly works. The common veneering timber was walnut; but as that has but few of those variegations, which are technically termed *curls*, the works ornamented with it were rather deficient in beauty. The knotty parts of "pollard" oaks, and "pollard" elms, are much better adapted for the purpose of ornament; but as the grain of both is open, and as it is apt to *rise*, and as the earlier cabinet-makers were not so well acquainted with the art of varnishing, as those of modern times, the beauties of these woods were not turned to the proper account.

When mahogany was first introduced as a cabinet timber, it seems to have been in the dark-coloured, hard, and straight-grained trees, which are now used for chairs, and other articles, in which the solid timber is preferred; and on that account mahogany was not much used in combination with other woods. When, however, its great value was known—the ease with which it can be cut, the improvement that varnish gives to its colours, the firmness with which it holds in glue, and the improvement which, when properly taken care of, it gains in time—it was found that good mahogany was much too valuable a timber

for being used solid; and it began to be employed as the staple timber in veneering. Other foreign woods, some of them lighter and others darker, were employed for borders and ornaments: but mahogany was used for the body of the work; and when it came to be so used, a great revolution was effected in the art of cabinet-making. On the first introduction of mahogany, the same process was resorted to, that had before been practised with the walnut and other woods, and effect was sought to be produced by quartering pannels, forming them of *gyrony** of sectors, with the grain in opposite directions, and other fantastic and unnatural arrangements: but in course of time, a better taste was introduced, and the object was to make the whole surface have the same appearance as if the work had been made solid out of the rich timber. This was one step toward the attainment of a purer style; but the continuity of the surface was still interrupted by ill-sorted additions. The breadth of the mahogany, which would in itself have been beautiful, was broken by bands and strings of other wood, without much regard to the harmony of the colours; and thus that which, with the veneer alone, would have been chaste and classical, was reduced to a piece of patch work.

The veneering, whether done in mahogany or any other wood, was at first very expensive. The veneers were cut by the hand; and thus the piece cut off was of unequal thickness in the different parts, the wood was mangled by the operation of cutting, and the finest pieces, which, as has been said, are cross-grained, or have the fibres across their thickness, were always in danger of being broken. It had been found that veneers laid upon good bodies of timber, whether of the more coarse mahoganies, or of

* A term of heraldry, in which a shield is formed in sectors from the centre.

any other kind, were better, in point both of beauty and of standing without warping, than solid timber; but the cutting of the veneers by the hand was very laborious, and wasted the timber, so that, though the plan was a good one, it was expensive.

When the harder and more unmanageable species of fancy woods came to be used, the difficulty and expense were further increased; and though more beauty and variety were imparted to cabinet furniture, they were imparted at a corresponding increase of expense. Nor was it till the invention of machinery for the cutting of wood into veneers, by Mr. Brunel, that we had the full advantage of the beautiful art of veneering.

The machinery used for this purpose consists of circular saws, driven by mechanical power, and they have so diminished the price of cutting veneers, that the saving is immense. Thus, those classes of the people who, not long ago, had even the favourite articles of their furniture in deal, or in the coarser woods, which are the growth of this country, now have them in mahogany, or in some of the less common foreign woods. Independently of their superior beauty, (and that is a matter of more consequence than many would be disposed to allow,) these foreign woods have the advantage of durability, both in their structure and their colours. There are few of the indigenous woods of Britain into which the worm does not eat; and there are none of them in which the colours have not a tendency to come to the same shade, when long used, unless they are protected by varnish; while, on the other hand, the fancy woods from the tropical countries, are generally, if not universally, proof against the worm in England, and they are not apt to lose their colours. Thus the introduction of machinery, for the purpose of cutting veneers, has been a material saving both in the cost and the wear of furniture, while it has enabled the workman to extend

to a surface of thousands of feet, any fine piece of timber that he may meet with, and which, before the invention of that machinery, he could not have extended to as many hundreds.

The value to which a single log of fine timber is turned, by means of the improved sawing machinery, is really incredible to those who have not witnessed the operation. Thus, when the cabinet-maker has occasion for veneers, he has only to purchase a log of the wood which suits his purpose, send it to the saw mill, and he has it returned cut up to the thickness that he wishes, in a very short time, and at a trifling expense.

In the vicinity of London, there are several mills for the cutting of veneers; but we do not know that there are any in more general or more constant employment than one we have had an opportunity of inspecting—that of Messrs. Watson, at Battersea, which was set up, about sixteen years ago, by Mr. Brunel. Their apparatus is driven by steam, and consists of a number of circular saws, the largest of which is eighteen feet in diameter. One side of those saws is a plane kept perfectly true, by a strong and well bound frame-work, to the circumference of which the saw is attached. The teeth of the saw are rather large than otherwise, in order that it may not clog with the saw-dust, and thus tear the finer veneers; and it revolves with considerable velocity. The log of timber which is to be cut into veneers is fastened upon a frame, with the piece in the direction in which it is to be cut, in a vertical position. The frame that carries forward the log is moved at a rate which may be varied according to the quality of the timber that is cut. It has a rack on the under part, in which a pinion works. In cutting coarse stuffs, such as the soft and straight grained mahogany, of which the bottoms of drawers, and other internal works of an

inferior kind, are made, the log moves forward, and the veneer is cut at the rate of about one foot of length in four seconds. Allowing the depth of the log to be two feet, the quantity of veneer taken off would, by one of those machines alone, be two hundred and forty square feet in an hour. Where the wood is harder, or of more value, the motion is considerably slower; but, even then, the quantity cut by one machine, as compared with that which sawyers would cut in the same time, is, independently of the saving of wood, and the superiority of the veneers, almost incredible to any one who has not actually witnessed the operation.

The circular saw of eighteen feet diameter, at Messrs. Watson's mill, makes thirty-two revolutions in a minute. We observed a veneer of a log of mahogany, four feet six inches long, by thirty-three inches wide, cut in eighty seconds. The smaller saw, at which inferior timber is cut, has a quicker revolution, called a tumbling motion; and by this we noticed a veneer of a piece of mahogany six feet six inches long, by twelve inches wide, cut in twenty-five seconds.

The quantity of veneer that can, by means of these machines, be sawed out of a given quantity of timber, is astonishing. Those who are reckoned respectable cabinet-makers do not, in general, wish to have more than eight or nine thicknesses out of the inch; but those who manufacture furniture for occasional sale, and are in consequence indifferent as to the quality of the timber, and the durability of their work, often have the inch cut into fifteen or sixteen thicknesses. The extent to which a log cut in this last manner would extend, is wonderful. Suppose a log fifteen feet long, and three feet in each of its other dimensions, cut into fifteen thicknesses to the inch, it would be spread out to the vast expanse of about an acre and three quarters; and, when cut for the more

respectable part of the trade, it would cover nearly an acre. Now, when it is considered that the mahogany, or other wood that forms the most beautiful surface, is seldom that which is the best adapted for solid work, it is easy to be conceived how much advantage must result from this invention.

Veneering in fancy woods has sometimes been compared to gilding and plating, but the process does not gain by the comparison; as the covering of one wood with another is a much nearer approach to solidity than the covering of one metal with another. While the cabinet article is kept in such a state as that the glue is not dissolved, the covering of beautiful wood does not wear out; and thus with a vast saving in the more costly material, there is the same durability, as if nothing but that material had been used for the whole. There is another advantage in the use of fancy-woods on the surface; the body of the article upon which the fancy wood is laid can be much better put together than if it had formed the external part of the article. Where that is the case, dovetails or mortices cannot be wedged without an external seam; but in veneering, the body of the article can be put together with every degree of care and strength, and the veneer will hide the whole.

The slightest observation of the domestic life of the middle and humbler classes will shew that, within the last thirty years, there has been a manifest improvement in the appearance of the household furniture of this country. A century ago, even in the mansions of the rich, though there was occasional luxury both in the materials and the forms of their furniture, much of it was mean and ill-fashioned. There were, indeed, splendid cabinets, to be exhibited at seasons of festivity, filled with rare porcelain and laden with costly plate; but the table for ordi-

nary use was of rough unpolished oak, and the chairs were equally plain and unornamental. The Windsor chair, made of elm, and a heavy deal table, were generally found in the tradesman's parlour, even up to a somewhat recent period. The general introduction of mahogany, and the comparative cheapness of furniture made externally of this beautiful material, (principally in consequence of the extreme thinness into which veneers can be cut,) have introduced a more elegant description of furniture even into the commonest houses. In this, there is a national benefit. A taste for comforts and elegancies, universally diffused throughout society, not only calls into action a great deal of mechanical ingenuity, and employs considerable capital, but it gives even to the humblest a sort of self-respect, inferior, indeed, to purer motives, but still operating to produce something of independence, and a desire to maintain the possession of these comforts and trifling distinctions, by honest industry. But the general adoption of articles of luxury, such as well-made furniture, by the bulk of the people, has a natural tendency to make the wealthy desirous of procuring articles not so accessible to the many; and, in this way, there is a constant demand not only for new patterns in furniture, but for new materials of which such furniture should be made. Our commerce with all the known world has enabled the dealers in wood constantly to introduce new sorts; and even our native timber, such as oak and elm, by the ingenuity of the workman, has been converted into the most beautiful and the most expensive of the articles of common use by which the rich are surrounded. The large roots of a fine oak have, in this manner, been rendered extremely valuable; and, when cut into small veneers, and inlaid with that skill which constitutes the art of the cabinet-maker, have produced very high prices

when manufactured into tables. Mechanical skill converts the commonest materials into articles of high price; and this is one of the best directions which can be given to the luxury of an age.

Mahogany is of universal use for furniture, from the common tables of a village inn to the splendid cabinets of a regal palace. But the general adoption of this wood renders a nice selection necessary for those articles which are costly and fashionable The extensive manufacture of piano-fortes has much increased the demand for mahogany. This musical instrument, as made in England, is superior to that of any other part of Europe; and English piano-fortes are largely exported. The beauty of the case forms a point of great importance to the manufacturer. This circumstance adds nothing, of course, to the intrinsic value of the instrument; but it is of consequence to the maker, in giving an adventitious quality to the article in which he deals Spanish mahogany is decidedly the most beautiful; but occasionally, yet not very often, the Honduras wood is of singular brilliancy; and it is then eagerly sought for, to be employed in the most expensive cabinet-work. A short time ago, Messrs. Broadwood, who have long been distinguished as makers of piano-fortes, gave the enormous sum of three thousand pounds for three logs of mahogany. These logs, the produce of one tree, were each about fifteen feet long and thirty-eight inches wide. They were cut into veneers of eight to an inch. The wood, of which we have seen a specimen, was peculiarly beautiful, capable of receiving the highest polish; and, when polished, reflecting the light in the most varied manner, like the surface of a crystal; and, from the wavy form of the fibres, offering a different figure in whatever direction it was viewed. A new species of mahogany has been lately introduced in

cabinet-work, which is commonly called Gambia. As its name imports, it comes from Africa. It is of a beautiful colour, but does not retain it so long as the Spanish and Honduras woods. One of the peculiar excellences which is sought for by cabinet-makers, consists in what they call the *curl*—the direction which the darker parts take in the grain of the wood. But the dealers, although they introduce an auger before they buy a log, are seldom enabled to determine, with much exactness, the quality of the timber. Although mahogany has been so long known in commerce, there is little correspondence between those who export the timber and those who purchase it in this country; and thus it is generally a matter of chance whether the manufacturer may purchase a fine or an inferior commodity. The logs which procured such a large price as Messrs. Broadwood gave for them, were particularly celebrated, and were brought to this country with a knowledge of their worth.

The wood most in use for cabinet-work, next to mahogany, is *Rose-wood.* The name of this species of wood is derived from its fragrance; and it has long been known to the cabinet makers of England and France. It was first introduced, it is said, from the isle of Cyprus; though the great supply now comes from Brazil. The width of the logs imported into this country averages twenty-two inches, so that it must be the produce of a considerable tree. The wood is too well known to require any description. The more distinct the darker parts are from the purple-red, which forms the ground, the more is the wood esteemed. It is ordinarily cut into veneers of nine to an inch; and is employed in this way for all the larger furniture, such as tables; but solid for the legs of chairs, tables, and cabinets.

King-wood is generally used for small cabinet-

works, and for borderings to those which are larger. It is extremely hard. The tree which produces it is small, as the sticks are seldom brought to this country more than five inches wide and four feet long. Its colour is of a chocolate ground, with black veins; sometimes running into the finest lines, and at others more spread over the ground, as in rose-wood. The botanical name of the tree which produces this wood, is not known. It comes from Brazil.

And here we should remark the exceedingly imperfect state of our knowledge with regard to the species of trees which produce the Fancy-woods, so extensively used in cabinet-work in this country. It might be supposed that there would be no more difficulty in determining the botanical names, and deciding the species of those foreign woods which are used in our finer sorts of furniture, and in many small articles of taste, such as Tunbridge-ware, than in pointing out that oak is used in ship-building, and pine in the construction of houses; but the contrary is the fact. The attention of botanists who have described the productions of South America and Australasia, from which these fine woods come, has not been directed to this point; and the commercial dealers in these woods have paid no regard to it. It would be well, in this age when natural history is so much cultivated, if naturalists, and dealers in foreign timber, would combine their experience upon this subject, and supply the deficiency. No knowledge of the matter can be procured in books; and we have consulted commercial men, and practical botanists, without obtaining any information that could be depended upon, though each agreed in lamenting that a subject of general interest should have been left so entirely without investigation. Although no important results to science might proceed from such inquiries, it is certainly humiliating

not to be able to tell with precision where those materials are naturally produced, and what species of trees produce them, with which the useful arts have surrounded our every-day life.

Beef-wood, principally used in forming borders to work in which the larger woods are employed, is intensely hard and extremely heavy. Its colour is of a pale red, not so clouded as mahogany. The timber arrives in this country in logs of about nine feet long by thirteen or fourteen inches wide. The tree which produces it is not known in botanical description, but it is a native of New Holland.

Tulip-wood would appear to be the produce of a tree little exceeding the character of a shrub, for it arrives here in sticks of about five inches diameter, seldom more than four feet in length. It is very hard, and of a clouded red and yellow colour. Its principal use is in bordering; though it is employed in smaller articles, such as caddies and ladies' work-tables.

Zebra-wood is the produce of a large tree, and we receive it in logs of two feet wide. It is a cheap wood, and is employed in large work, as tables. The colour is somewhat gaudy, being composed of brown on a white ground, clouded with black, and each strongly contrasted, as its name imports, derived, as it is, from the colours of the zebra.

Coromandel-wood is used in large works, like zebra and rose wood. It is inferior to rose-wood in the brilliancy and division of its colours, having a dingy ground, and sometimes running into white streaks. The tree which produces it is of a large size.

Satin-wood is well known for its brilliant yellow colour, with delicate glowing shades. It is now not much used in cabinet-work. The timber arrives here in logs of two feet wide, and seven or eight feet long.

Sandal-wood is of a light brown colour, with brilliant waves of a golden hue, not unlike the finest Honduras mahogany. It is about the same size as satin-wood.

Amboyna-wood is now very much used in cabinet-work. It is of various colours; and the shades are generally small. It arrives in logs of two feet wide.

Snakewood is extremely hard, of a deep red colour, with black shades. It is principally used for bordering and small work.

Harewood something resembles satin-wood in the arrangement of its waves, but its colour is different, being of a light brown ground.

Botany Bay Oak forms very beautiful furniture. The ground is an uniform brown, with large dark blotches.

Ebony has been already described. Of the several cabinet-makers' woods bearing this name, there are the African cliff ebony, which is black, with a white spot; and the spotted ebony, a very beautiful wood, and extremely hard (more so than the common ebony), of which the ground is black, with brown and yellow spots.

Acker-wood is the produce of a large tree, and is of a cinnamon colour. *Canary-wood* is of a golden yellow. *Purple-wood*, which has been lately introduced, is of a purple colour, without veins. This appears to be the produce of a thorn of tropical countries, being only four inches wide. These three woods have been little used in furniture, but have been lately employed in mosaic floors, of which there are two now constructing at Windsor Castle, and at the Buckingham Palace. *Bird's-eye Maple*, (its appearance is described in its name,) which has also been so employed, is a narrow and long wood.

Calamander wood. There is a very beautiful wood of this name growing in the island of Ceylon, which, when wrought into furniture, surpasses, we

think, in appearance any other we ever saw. We are surprised that it is not regularly imported into this country: all that is here has been brought over by private gentlemen, returning from that colony, for their own use. The wood is very hard and heavy, and of singularly remarkable variety and admixture of colours. It is very difficult to describe this—nay impossible to convey to those who have not seen it an idea of the manner in which the shades run into one another. The most prevailing of these is a fine chocolate colour, now deepening almost into absolute black, now fading into a medium between fawn and cream colours. In some places, however, the latter tint is placed in more striking, though never quite in sudden contrast with the richest shades of the brown. The variations are sometimes displayed in clustering mottles, sometimes in the most graceful streaks. There is not, however, anything in the least gaudy or fantastic in the general result. It certainly arrests the eye—but it is from the rich beauty of the intermingled colours, not from any undue shewiness.

This wood takes a very high polish. It is wrought into chairs, and particularly, into tables. Nay, we have seen large folding doors made of it. The late Governor of Ceylon, Sir Robert Brownrigg, brought over very large quantities of this remarkable product of that country; and, in some additions he has made to his house in Monmouthshire, he has had the doors of his dining room constructed of calamander. The effect is peculiarly happy.

We are told that the tree grows to the usual size of a forest-tree, and that the leaves are large, and shaped like the figure of a club on a playing-card. But our informant says, he never saw the tree growing but once, and that he speaks from an imperfect recollection.

Partridge, *Leopard*, and *Porcupine* woods, are very rarely used. Their names are derived from a

supposed similarity of their colours to those of the animals whose denominations they bear.

A return of the Custom-house duties for 1827, ordered by the House of Commons to be printed, on the 16th of April, 1829, gives some data for ascertaining the quantities of ornamental wood imported into the United Kingdom during 1827. In some instances, however, the quantity cannot be ascertained from the return, as the duty is different when the import is from different places.

Mahogany. The duty on mahogany is stated at 68,730*l.*, being at the rate of 2*l.* 10*s.* from Honduras and the Bahamas; 4*l.* from Jamaica; and 7*l.* from other places. Now, taking the average duty at 4*l.*, which is not very far from the truth, that makes the whole quantity of mahogany imported in 1827 amount to about seventeen thousand tons, or as much as would load fifteen line of battle ships.

Rosewood is subjected to a duty of 10*l.* per ton; and the duty upon it was 7280*l.* for 1827, which makes the quantity seven hundred and twenty-eight tons,—trifling as compared with the quantity of mahogany, but still very considerable.

Zebra is classed with *king* wood, and some of the other ornamental kinds that come from Brazil, though the duties be different, 2*l.* per ton on the Zebra, and 5*l.* on the others. The duty on these woods is 630*l.*, and, taking the average, the quantity may be about two hundred tons.

Box pays a duty of 1*l.* from British plantations, and 5*l.* from other places. The duty for 1827 was 2130*l.*, and the quantity about eight hundred tons.

Ebony. The quantity of ebony cannot be ascertained, or even approximated from the return, as the duty upon what is *called* ebony, varies from 3*l.* to 10*l.* per ton; the total duty was about 170*l.*

Chapter VIII.

GENERAL QUALITIES OF TIMBER, AND SOME OF THE MORE REMARKABLE APPLICATIONS OF IT.—FORESTS, AND PLANTING.

As the qualities of the different species of timber compared with each other have been mentioned in the individual notices, little else will be necessary here than a mere catalogue of some of the leading properties.

Oak is best on soils where it is the longest in coming to maturity; and when two specimens are equally seasoned, their value may be ascertained by trying which, bulk for bulk, is the heavier; or by soaking them in water till they can contain no more, (and one very effectual way of doing this is by fixing a disc of oak cut across the grain, in a cylindrical jar containing a quantity of water from the top, and exhausting the lower part of the jar by an air-pump); and the one which is the heaviest in the dry way, or has its weight the least increased by the water, is the best. If an oak be dead at the main top, the centre of the tree is sure to be in a state either of actual or of incipient decay; and it is not safe to use any part of it for purposes where durability or strength is required. The same holds true of all deciduous trees—evergreens are not so liable to be hollow, though many of them become so in the course of a very long time. An oak, or indeed almost any other tree that grows singly, or on the outside of the forest, is always more firm and durable than one which grows within the forest, and is partially sheltered; and the more variable the climate is, not so much with regard to seasons as to shorter periods, the timber is the more

firm and durable. An oak which stands alone on a hill side, exposed to the variable weather of Britain, will, as timber, outlast two from the thick forests of Germany, or three from North America, where the summer is intensely hot, and without a cloud for many weeks together.

Trees which are to be used as timber should be felled in the early part of the winter when the sap is at rest; because, when the sap is in motion, the trees are apt to bleed, by which the durability of the timber is diminished. This applies to pines as well as to deciduous trees; for though they and other evergreens retain their leaves during the winter months, they do not vegetate at that season. On account of the value of the bark, however, which cannot well be removed from winter-felled trees, there is a great temptation to fell oaks in the early part of the summer. In coppices, or *hags*, where the bark is the principal object, and the wood is to be used for charcoal or for common purposes, there is of course no harm in cutting down during the season of vegetation; but a summer-felled oak ought never to be introduced into a ship, or into the timbers of a valuable permanent building.

Oak grown on damp situations decays much sooner than that which grows on dry, and the decay is from the outside gradually to the centre. This, however, is to be understood of timber which has been felled before beginning to decay; for if decay be begun, the timber rots first at the centre.

Oak is best seasoned in water, or rather in water and in air alternately, taking care not to expose it so to the sun during the dryings as that it shall champ and split. A large beam of oak ought to soak for at least twelve months, but half that time will do for planks. It is often the practice to season planks by boiling and steaming; and when they have to be

curved or twisted, as in the bends of a ship, steaming is indispensable; but the heat and moisture together always weaken that constituent principle of the timber upon which its strength and durability in a great measure depend.

Ash is a bad timber for any purpose in building, whether for dry or aquatic purposes, because it neither stands moisture nor the weather. Beech also is a bad timber for building, though when wholly under water it is durable. Elm is quite unfit for building, because of its tendency to warp and shrink with drought, and expand with moisture; but when wholly under water, it answers well; and bolts and nails drive better into it than into any other timber. Beech and elm answer remarkably well for the external or lower keels of ships, and also for the planks nearest the keel, as these are seldom exposed to the air: the same qualities fit them for being used as piles in the construction of bridges and harbours; though they should never be used above the low water mark.

The different species of poplar, the sycamore, the lime, and the birch are, generally speaking, unfit for building, being neither strong nor durable; birch is indeed very tough, but it is more subject to worm than almost any other timber, and moisture soon rots it. Lime, however, is much the best timber for carving, and poplar answers very well for the boardings of stairs.

The properties of chesnut have already been pretty extensively mentioned. It is probably the best of the building timbers, though it has been unaccountably neglected in this country. Our ancestors did more justice to it; and some of the finest specimens of ancient carpentry, both in scientific construction, and in tasteful execution, are made of it. When old, it is not very easily distinguished from

oak, but its colour is finer, and it does not stain by the contact of iron, which is always the case with oak when moisture gets access to it.

Mahogany is too costly and too ponderous for its strength, to be used as a building timber. But, when well seasoned, it warps and shrinks less by the heat of the sun than any other wood ; and therefore it is the best timber for sign-boards. It is also excellent for doors and window-frames, but too expensive for ordinary occasions. The Bay wood from the main land of America, and the Spanish wood from the islands—chiefly from Cuba and Hayti, and formerly from Jamaica also—are easily distinguished, before they are oiled and varnished. The pores of bay wood are dark coloured ; those of Spanish seem filled with a chalky matter.

Fir, when of the best quality, has some advantages over oak for the purposes of common building : it is lighter, far more elastic, more easily worked, straighter, and of much greater length. The best that comes in the form of deals is from Christiania ann Frederickstadt, chiefly on account of the vast superiority of the saw-mills there. The fir of Norway has also been long celebrated for masts; and though more weighty, it is far more durable than that obtained from America.

Applications of Timber.

The structures in which timber has been employed, which have been, or are, the most remarkable for their magnitude and utility, are roofs of buildings, bridges and piers, light-houses, and ships. For all of these, timber appears to have been principally used before the introduction of any other material, in every place where it could be obtained: and, notwithstanding the use of stone pretty generally for piers, and since the invention of the arch,

often for bridges, and occasionally for roofs, and the more recent introduction of iron for some of those purposes, wooden structures are met with in all countries, of vast dimensions, and often of great strength and beauty.

Roofs, &c.

In modern roofing, the timbers of the roof are generally hid by a ceiling, so that strength only is attended to; while in more ancient times, the timber itself was made at once both ornamental and useful: and in very large apartments, such as the banqueting halls of the kings and barons of the middle ages, it had the advantage in point both of grandeur and apparent stability. An extended flat ceiling appears to hang in the air; while in an ancient roof, like that of Westminster-hall, the support of every piece of timber is apparent, and the only strain which appears directly across the timber, is on the boards and rafters between the great trusses.

Westminster-hall is the largest roof of the ancient construction any where to be met with; and it is difficult to imagine a work of human art which possesses, in so equal a degree, the three requisites of beauty, strength, and durability. This hall was built by William II. (Rufus), in the year 1097; it was originally intended as a banqueting hall; and the monarch is said to have held a magnificent feast in it on the Whitsuntide after its erection. Stowe adds, that ample as are the dimensions of the hall, it did not satisfy the ambition of the king, who observed, "This halle is not bigge enough by one half, and is but a bed-chamber in comparison of that I minde to make." And Stowe adds, "a diligent searcher might yet find out the foundation of the hall, which he hadde proposed to build, stretching from the river Thames even to the common highway." All traces

of this are of course now obliterated, and the existing hall is left without even an intended rival. It is two hundred and seventy-five feet long, and seventy-four feet wide; and, though the original proportions have been a little deranged by the raising of the floor, —which became necessary, as the vast accumulation of ships in the river downwards, probably the deposition of silt in the bed of the river, and certainly the erection of London Bridge, (about one hundred years afterwards,) caused the old floor to be overflowed during floods,—it is still a graceful structure. The roof of Westminster-hall is formed of chesnut, and does not appear to be in the least decayed. This great hall was, however, enlarged, and had its present roof constructed, in the time of Richard II., who, in the profusion of that expenditure which led to Wat Tyler's insurrection, is reported to have feasted ten thousand guests under this roof. Westminster-hall is now set apart for the most solemn state purposes,—such as the trial of persons impeached by the Commons; and banquets at the coronations of kings.

The *Parliament-house* in Edinburgh, though a much smaller and more recent structure than Westminster-hall, has also a fine roof of the ancient description. The Parliament-house is one hundred and twenty-two feet in length, and forty-nine in breadth. The erection of it was completed in the year 1640; it was built at an expense of 1600*l.*, by the corporation of Edinburgh; and is used partly as an ante-room to the courts of justice, and partly as a place of resort for the inhabitants. The trusses and roof, generally speaking, are of oak; they have not the massive grandeur of those in Westminster-hall, and the effect is injudiciously broken by gilding.

In many places there are still roofs of this construction, though few of the dimensions of that at Edinburgh, and none equal to Westminster-hall. Wherever these roofs are found, they are built not only of the best sorts of timber, but of timber very superior of its kind. In Scotland, they are generally of oak; and the oak of that country, before it was cut down almost to extermination in the lowland countries, was very compact and durable. In England, several are of chesnut, and some, we believe, of walnut tree; both of which are, in hardness, durability, and beauty, well fitted for the purpose.

The *Riding-house* at Moscow has the largest roof of a modern construction, and probably occupies the largest area that ever was covered by a single roof, unsupported by cross walls, or pillars. The length is one thousand nine hundred and twenty feet, and the span of the roof two hundred and thirty-five; the floor has the vast extent of more than ten English acres. This enormous roof was supported by a ponderous rib of timber, of a curved form, and made up of three smaller ones, strongly bolted and strapped with iron. The tie-beam by which this immense rib was prevented from separating at the extremities, consisted of seven lengths of the largest timber, and the whole truss thus formed was stiffened by cross-pieces and strutts. The weight was so great, however, that the tie-beam *swagged*, or bent downwards, until the whole truss had the appearance of two curves joined at their extremities. This roof was constructed under the auspices of the Emperor Paul, then Grand Duke, in the year 1790.

The span or width of the roof of the *Theatre* at Oxford, is seventy feet, and the length eighty; but

the durability has not been corresponding; for the roof had to be replaced in 1802. The original architect was Sir Christopher Wren; and the roofing was long considered as a masterpiece of carpentry.

The *Basilica* of St. Paul at Rome has a roof of large dimensions, the span being more than seventy-eight feet. It is framed of fir. The trusses are double, and placed about fifteen inches asunder, which gives it probably more stability, than if they were strapped and bound into single masses.

The *Theatre d'Argentino*, also in Rome, is of still larger dimensions, the span of the roof being more than eighty feet. This roof is also of fir, and supports the weight of the whole machinery of the theatre.

The number of roofs of large span that have recently been constructed, is very considerable. Perhaps one of the strongest is that of Drury Lane theatre, which has a span of eighty-three feet and three inches, within the walls. The trusses of this roof are fifteen feet apart, and they are so judiciously constructed, that each truss can bear a load of three hundred tons. The roof of the chapel at Greenwich Hospital, constructed by Mr. Wyatt, is one of the finest specimens, and perhaps contains less superfluous timber than most of the others of the same span and carrying the same weight. A new roof put upon the church of St. Paul, Covent Garden, in 1796, also shews the progress of modern art in this very important department of carpentry. The trusses are as strong as those in the original roof, contrived by Inigo Jones, and yet each of them contains eighty cubic feet less timber. Indeed, in no one department of the arts, has the application of scientific principles tended more to lessen the quantity of materials, than in the construction of large roofs; and this has a treble

advantage, as it lessens the cost of the roof itself, its pressure upon the walls, and its tendency to break by its own weight.

The use of timber in the chief construction of houses is well known. Some of those in England and Wales, that are framed with oak beams, and filled with bricks or plaster, are both strong and handsome. In Switzerland, the houses constructed of larch last for many ages. Wooden houses are very common in America; and in the pine countries of Europe they are almost universal, except for palaces and public buildings. In the interior of Russia, ready-made houses are sold at the fairs. They are carried to the fair, and there set up; and when the purchaser has selected one to his mind, it is taken to pieces and removed to the situation destined for it.

One of the most remarkable wooden houses in England was the Nonsuch-house at the north entrance of London-bridge. It occupied two piers with the interverning arch; and was fantastically hatched and carved, with projecting towers at the angles and over the gateways, finished with cupolas at the top. This singular structure overhung the river both upwards and downwards, and if it had little elegance, it was abundantly grotesque. The Nonsuch-house was imported ready made from Holland. It was wholly of timber, even to the fastenings, which were wooden pegs—there not being a nail in the whole structure.

Wooden Bridges.

Wooden Bridges have been resorted to in all ages; and wherever there are trees to be found, bridges formed of them are also to be met with, from the simple log or trunk thrown across a mountain torrent, to some of the most scientific and tasteful structures that art has produced. In Sweden and Nor-

way, where the ravines are often very deep, where the rivers and torrents are apt to swell high and rapidly during rain, and where timber is abundant and costs little, wooden bridges of considerable extent are frequently to be found. Some of these, in consequence of the wild rocks upon which they are made, the large dimensions of the undressed trees, and their great height above the water, have a very striking appearance. The following description of such a bridge is from Dr. Clarke:—

"Before our arrival at Skale, the noise of roaring waters again announced the vicinity of a cataract. We were in the midst of a gloomy forest; but all at once, the dark scenery of the surrounding woods opened upon such a view of the Ljusna, as no pen can describe: it burst upon us in all its terrific grandeur; the whole tide collected from all its tributary lakes and rivers, throughout its course from the Norwegian Alps, in one vast torrent, clamourously foaming and rushing to the Bothnian Gulph. A bridge, constructed of whole trunks of fir-trees, divested only of their bark, stretched across this furious torrent, to the distance of one hundred yards; presenting one of the most picturesque objects imaginable. Above this bridge, the river is a quarter of a mile broad; and, growing wider as it recedes from the eye of a person here placed, it is distantly divided by promontories, projecting from its sides until they almost meet, and covered with tall trees; thereby forming straits which connect it with other seeming lakes, equally beautiful, beyond them; and which appear more remotely terminated by a ridge of mountains, closing the prospect. But, in this amazing spectacle, all is freshness and animation; the utmost liveliness, and light and elegance, exhibited by the distant sheets of water, combined with all the energy and tremendous force of the cataract,

making the bridge upon which the spectator stands shake under his feet, as if it were rocked by an earthquake."

The bridge of *Schaffhausen*, across the Rhine at the town of Schaffhausen, was one of the most celebrated of wooden bridges; and the celebrity was the greater, on account of the architect being an illiterate man, who was not likely to have derived much profit from the works that had been written upon the subject. This architect was Ulric Grubenman. The construction of the Schaffhausen bridge was his first effort; but he was afterwards employed in various other structures of the same description. The width of the Rhine at Schaffhausen is three hundred and sixty-four feet; and the main framing of the bridge was thrown into the form of a single arch, although a pier in the centre of the river divided the water-way into two parts, and also afforded material support to the structure. In this bridge there are regular uprights about seventeen feet and a half apart, and they were crossed by braces resting on the abutments, and inclining towards the centre of the bridge. There were also braces radiating from the central pier, some of them below the roadway, extending to thirty-five feet on each side, and others above. The whole bridge was covered by a ponderous roof. The principal beams in the roadway were joggled throughout the whole length with indentures, like the teeth of two sets of saws, and they were tightened by wedges at each of the cross faces. There were also iron ties from the beam that formed the eaves of the roof, to the principal beam of the floor, which tended to stiffen the bridge for about a fourth part at each extremity of each of the divisions. Some parts of this bridge were overloaded with timber; but the whole of it evinced a very considerable and even uncommon

degree of skill, in balancing strains against each other, so as to insure both steadiness and strength. The principal fault in this celebrated bridge consisted in many of the timbers being of great length, so as not to admit of being easily replaced in case of decay. It was burned down by the French army in the year 1799; and has since been replaced by a more simple wooden bridge, in which the water-way is divided into three parts by two piers, and the road is said to be wider and more convenient.

Several other wooden bridges were constructed by Ulric Grubenman, by his brother John, or by the two together. Of these, John built a bridge over the Rhine, near Richenau, of two hundred and forty feet span; and the two brothers erected another of two hundred feet across the Limmat, near Baden. Both these bridges resembled, in their general framing, the bridge at Schaffhausen. Ulric, however, constructed one somewhat differently; it was two hundred and thirty feet span. In this bridge there were no diverging braces. The abutments were twenty-five feet high, and the arch between them was a *catenary*,—that is, the same form which a rope or flexible chain assumes by its own weight, when hung over two fixed pegs. This arch was of course inverted, in the same manner as the iron chain bridges that have recently been constructed in this country; and making allowance for the difference of materials, and the mode of the junction, it may be fair perhaps to consider it as the first chain bridge that ever was constructed in Europe. The two catenarian arches from which the roadway was suspended were formed of beams of oak, in lengths of from twelve to fourteen feet; there were seven thicknesses of them above each other, and they were so contrived as to break bond like masonry, so that there should never be two vertical joints in the same section, and they were strongly bolted and bonded together. Probably for

a large span this is one of the happiest inventions for a wooden bridge, since the descending catenary has much less vibration than a rising arch, and since any one piece, as it decayed, may be removed and replaced, without injury to the structure.

Some wooden bridges of very superior construction have been erected in Scotland, by Mr. James Burn, of Haddington: one of these is across the river Don, about seven miles from the city of Aberdeen, and on the road leading to Banff. This bridge consists of a single arch of nearly one hundred and ten feet span, and something more than thirty feet rise. The supporting part of it is formed of a series of frames, each set being made double, or at about four inches from each other, and of short lengths of timber, so that any piece of a frame, or even a whole frame, may be removed, when repairs are necessary, without endangering the bridge or interrupting the roadway. They are kept from lateral vibration, by transverse struts and ties under the planking of the road, and the surface is finished with gravel. Another bridge by the same artist, and across the same river, at a shorter distance from Aberdeen, consists of two arches, each nearly seventy-two feet in span, and having a rise of only ten feet and a half. Mr. Burn has also constructed a very handsome wooden bridge across the South Esk, in the park at Brechin castle; it consists of three arches, the middle one thirty-eight feet span, with a rise of only ten feet. This bridge has the spandrils boarded and drawn out, and sanded in imitation of stone, so that, until closely examined, it has the appearance of a stone bridge of a very light and handsome construction. Those bridges by Mr. Burn possess a peculiar advantage, in the shortness of the timber of which the framing is composed. This gives them greater stiffness with a less scantling;

and thus, while they are equally strong with weightier bridges of long timber, they are not so apt to loosen at the abutments by shrinking and expansion, and they can be repaired with less hazard and at much less expense.

It is rather singular that the wooden bridges on the river Thames, in the near vicinity of the British metropolis, are at once the most clumsy and the most totally destitute of any thing like scientific principle in their construction. The bridges that we more immediately allude to are those at Chelsea, or, as it is now called, Battersea, and Fulham. Fulham bridge is the more ancient structure; and that it should be destitute of even the least display of constructive skill, is the more singular, considering the mechanical talents of the designer. It was contrived by Cheselden, the eminent surgeon and anatomist, who was, perhaps, the first Englishman that wrote scientifically and at the same time intelligibly, on the mechanics and statics of the human body; and yet there is not one principle in his bridge, except the mere inert strength of the timber. The length of this bridge is seven hundred and eighty-nine feet, and the breadth twenty-four; the cost was at least twenty-three thousand pounds. It is hardly possible to imagine a more clumsy and tasteless structure, or one (constructed of wood) that could offer more interruption to the navigation of the river, or suffer more itself from the action of the ice in severe winters; nor is there the least doubt that if the learned contriver had but bestowed on it a tenth part of the mechanical skill displayed by the unlettered Ulric Grubenman, in the bridge of Schaffhausen, an elegant structure of three or four arches might have been formed, of little more than half the timber, which would have been at once far more convenient for the navigation, and not have cost half the sum in repairs. The

bridge at Battersea is not much better, though it be a comparatively recent erection. Fulham bridge was completed in 1729; and that at Battersea in 1772; and though the piers of the latter do not obstruct the navigation quite so absurdly as those at Fulham, in consequence of their being parallel to the current, while those at Fulham stand obliquely to it, the one bridge is just as totally destitute of taste in its appearance, and science in its construction, as the other, though it was erected in a comparatively advanced age, and under the sanction of an act of parliament. There is, in fact, little more knowledge of the principles of carpentry, even the very simplest ones, displayed in those bridges, than in the bridges which the beavers are said to build in the vicinity of Hudson's Bay, by cutting a tree with their teeth, and contriving that it shall fall across the river. That they should be tolerated so near a metropolis in which there are stone bridges like the Waterloo and the New London, and iron ones like the Southwark and Vauxhall, would seem a little singular, if it were not borne in mind that they are private property.

Timber is not only useful in forming the materials of bridges, where the circumstances or the expense will not admit of stone or iron, but it is essential for the construction of stone bridges themselves. With regard to them, it answers three purposes. First, the formation of coffer-dams, by means of which the foundations of the piers, or rather the places where they are to be founded, are cleared of water; secondly, when the soil is not of sufficient consistency to afford a firm foundation, piles of timber are driven into it; and, thirdly, centerings of timber are constructed, upon which the whole weight of the arch can be borne, until the key-stones are driven into their places, which centerings can then be removed with comparatively little labour.

The driving of the piles is in some degree a simple matter; though there be a good deal of ingenuity in the engines by which they are driven, and some judgment necessary in order to ascertain that the piling is equally firm throughout the whole foundation:—because if one pier, or portion of a pier, were to settle down much more than the others, the beauty of the superstructure would be spoiled, and its stability would be endangered. The other uses of timber in the construction of stone bridges afford scope for the display of much more ingenuity, and are perhaps among the happiest applications of timber; as without them no stone bridge could be constructed.

Coffer-dams are certainly the best means of getting a foundation for the piers of bridges in a river. Two circles of piles are driven into the bed of the river, round the part intended for the foundation of the pier, and the external surfaces being planked, the space between the two circles is filled up with clay. The whole is made water-tight; and the inner water being removed, the foundation is laid as for any other building. Sometimes a different mode is resorted to: the pier is built to a certain height,—the surface of the water in a running river, and the low water mark, at least in a tideway,—in a *caisson*, or case composed of a strong bottom and sides of timber. These are made water-tight, sunk at first partly by water, and partly by a portion of the materials; and by pumping out the water as high as the surface of the work, that work is continued until it be brought above the surface; then the sides of the *caisson* are removed while the bottom or platform remains, and becomes the foundation of the pier. In order that building in a *caisson* may be secure, two circumstances are essential: first, that the platform shall be constructed of the kind and quality of timber least liable to decay in water; and, secondly, that the bottom on which it

is laid shall be of a firm consistency, levelled throughout, and not liable to be washed or scoured away by currents.

Westminster Bridge is an example of founding in *caissons;* and some of the piers of it are already undermined by scouring,—a danger which will increase when the removal of old London Bridge admits of a more rapid current, and consequently a greater scouring in the river. But though the foundations of Westminster Bridge are thus scarcely deep and secure enough, there is much excellence, as well as ingenuity, in the structure; and it is to be regretted that Mr. Labelye, the very able engineer of it, did not publish his plans, as the science of bridge-building might have derived much advantage from a complete knowledge of the principles upon which he worked.

Blackfriars Bridge is another instance of building in *caissons;* only Mr. Mylne, the engineer of that work, took the precaution of piling round the foundations.

Old London Bridge is under still greater obligations to timber than any of those that have been mentioned; being founded wholly on piles, the tops of which are as high as the low water mark,—and thus neither *caissons* nor coffer-dams were necessary. Those piles are of various timbers, but chiefly of oak and elm,—oak being most abundant in the more ancient part of the structure. They have stood uncommonly well; for though the sap wood had decayed, those which were recently taken up, even in the most ancient parts of the foundations, which had probably remained in water for about six hundred years, were undecayed in the central parts.

Foundations in *coffer-dams* are accounted the most secure, and therefore they are now most generally adopted in large works. From the depth of water, the size of the piers, and the great weight they have

to support, the new London Bridge is probably one of the greatest, and certainly one of the most successful instances of founding in coffer-dams. For this work, the dams were made in the form of ellipses, consisting of three rows of piles, dressed in the joints, but without grooving, which is found not to answer very well, more especially with such a depth, and in so rapid a current. Some of those piles were of the immense length of eighty or ninety feet; and yet they were driven and puddled with clay between the rows so accurately, that, all things considered, the leakage was very trifling.

Ships.

Ships of large dimensions have been constructed in all ages. Some of the war gallies of the ancients are represented as being hardly inferior in dimensions to first rate line of battle ships of the present day. The largest masses of timber that ever navigated the ocean were, however, those constructed by Mr. Wood of Port Glasgow, in the Isle of Orleans, in the gulph of St. Lawrence. The first of these, the Columbus, was three hundred feet long on the deck, fifty feet seven inches broad amidships, and twenty-nine feet and a half deep in the hold. She was flat bottomed, and wall-sided, or had the sides nearly perpendicular, and the stern post with little or no inclination. The admeasured register of the Columbus was about three thousand six hundred and ninety tons; and her actual tonnage not much less than five thousand. She had four masts, the largest of which, however, was hardly equal to that of a seventy-four. She came to England with a cargo of timber in 1825, and arrived safely in the Thames; but went to pieces on her voyage outwards, owing, as is generally alleged, to the pilot committing some error, or not being accustomed to conduct a mass so

enormous through the hazards of the narrow seas. The fate of the Columbus, and that of the Baron of Renfrew, a vessel of equal, if not of larger, dimensions, seem to have established the fact, that notwithstanding the greatest attention to strength in their construction, there is a limit in size beyond which, if vessels are attempted to be carried, they are neither profitable nor safe.

Light-Houses.

One of the most celebrated instances of the application of timber, in the construction of a light-house, was that by Mr. Rudyerd, upon the rock of Eddystone, where Smeaton's magnificent stone edifice now stands. The engineer of this celebrated but ill-fated structure had not been bred to the profession, for he was a silk-mercer upon Ludgate-hill; but he seems to have been a man of the greatest talents for carpentry; and we have the evidence of Smeaton, that, "he directed the performance in a masterly manner." Before this time, a light-house had been built on the same situation, by Mr. Henry Winstanley, which was completed in 1699; but which disappeared with its engineer, in the violent storm during the night of the 26th of November, 1703. That 26th of November was the most dreadful storm ever experienced in the British seas; and the damage that it did, both at sea and on land, has not a parallel in the annals of the country; so that, although Mr. Winstanley's light-house was torn from the rock, and it seems to have been so torn in one mass, it does not thence follow that it was a structure of inferior strength, because no subsequent structure has had to abide a trial so severe. What added to the public regret upon that melancholy occasion, was the fact that Mr. Winstanley had erected the light-house at his own expense.

Rudyerd saw and avoided the errors of Winstanley's structure; that was a polygon,—Rudyerd made the plan of his a circle; there were projecting ornaments at the top of Winstanley's,—Rudyerd's was entirely plain. Rudyerd's structure may be considered as altogether a piece of carpentry; for the several courses of moor stone that were in it were mere ballast, and served little other purpose than that of keeping the structure firm by their weight, which was about two hundred and seventy tons. The main column of Rudyerd's building consisted of one simple figure, being an elegant *frustrum* of a cone, unbroken by any projecting ornaments, or anything on which the violence of the storms could lay hold; measuring, exclusively of its sloping foundation, twenty-two feet eight inches diamcter, on its largest circular base; sixty-one feet in height above that circular base; and fourteen feet three inches diameter at the top; so that the circular base was somewhat greater than one-third of the total height, and the diameter at the top was less than two-thirds of the base at the greatest circle. On the flat roof of this main column, as a platform, Mr. Rudyerd fixed his lantern, which was an octagon of ten feet six inches diameter externally. The mean height of the window-frames of the lantern, above the balcony floor, was nearly nine feet; so that the elevation of the centre of the light above the highest side of the base was seventy feet.

This structure was completed in three years; the light being first exhibited on the 28th of July, 1708; and the work was perfected the following year. Notwithstanding that this edifice was of timber, and exposed to the most violent swells and storms that can well be imagined, it appears, that, in consequence of the simplicity of its form, the skill with which it was framed and fastened to the rock—the base, naturally shelving, having been worked to a series

of horizontal steps or terraces,—it would have defied the ocean and the atmosphere for many centuries, with only a moderate degree of repair. In the year 1744, a number of the upright timbers were broken, but they were soon replaced by Mr. Jessop, (father of the late eminent engineer of that name,) who then had the charge of it. From this time till the year 1755, Rudyerd's light-house sustained no particular injury; but in that year it was totally destroyed, by a catastrophe which cannot be so well expressed as in the words of the celebrated Smeaton, the engineer of the stone light-house. The present erection, considering the difference of the materials, may be considered as a parallel *chef-d'œuvre* with that of Rudyerd.

"On the 22d of August, 1755," says Smeaton, "the workmen returned on shore, having finished all necessary repairs of that season; between which time and the 2d of December following, the attending boat had been off several times to the Eddystone, and particularly on the 1st of December, and had landed some stores, when the light-keepers made no manner of complaint, and said all was right, except that one or two of the bricks in the kitchen fire-place had been loosened by a late storm. What in reality might occasion the building's first catching fire, it has never been possible fully to investigate; but, from the most distinct account, it appears to have commenced in the very top of the lantern, that is, in the *cupola*. From whatever cause it originated, it is certain that when the light-keeper then upon the watch, (about two o'clock in the morning of the 2d of December,) went into the lantern as usual, to snuff the candles, he found the whole in a smoke, and upon opening the door of the lantern into the balcony, a flame instantly burst from the inside of the cupola: he immediately endeavoured to alarm his companions; but they, being in bed and asleep,

were not so ready in coming to his assistance as the occasion required. As there were always some leathern buckets kept in the house, and a tub of water in the lantern, he attempted as speedily as possible to extinguish the fire in the cupola, by throwing water from the balcony with a leather bucket, upon the outside cover of lead; by this time, his comrades approaching, he encouraged them to fetch up water with the leather buckets from the sea: but as the height would be, at a medium, full seventy feet, this, added to the natural consternation that must attend such a sudden and totally unexpected event, would occasion this business of bringing up water, at the best, to go on but slowly. Meanwhile the flames gathering strength every moment, and the poor man, though making use of every exertion, having the water to throw full four yards higher than his own head, to be of any service, we must by no means be surprised, that, under all these difficulties, the fire, instead of being soon extinguished, would increase; and what put a sudden stop to further exertions, was the following most remarkable circumstance:—As he was looking upward with the utmost attention, to see the direction and success of the water thrown, a quantity of lead, dissolved by the heat of the flames, suddenly rushed like a torrent from the roof, and fell not only on the man's head, face, and shoulders, but over his clothes; and a part of it made its way through his shirt collar and very much burnt his neck and shoulders: from this moment he had a violent internal sensation, and imagined that a quantity of this lead had passed down his throat, and got into his body. The man, who was ninety-four years of age, died on the twelfth day after the accident; on opening the stomach, a solid piece of lead was found in it, weighing seven ounces five drachms. Under this violence of pain and anxiety, as every attempt had proved ineffectual, and the rage of the

flames was increasing, it is not to be wondered that the terror and dismay of the three men increased in proportion; so that they all found themselves intimidated, and glad to make their retreat from that immediate scene of horror, into one of the rooms below, where they would find themselves precluded from doing *any thing:* for had they thrown down ever so much water there, it could not have extinguished what was burning above them, nor indeed produce any other effect than that of running down into the rooms below, and from thence finally through the staircase, back again into the sea. They seem, therefore, to have had no other resource, or means of retreat, than that of retiring downwards from room to room, as the fire advanced over their heads. How soon the fire was seen from the shore, is not very certain; but early in the morning it was perceived by some of the *Cawsand* fishermen, and intelligence thereof given to Mr. Edwards of *Rame*, in that neighbourhood, a gentleman of some fortune, and more humanity. This prompted him immediately to send out a fishing boat and men, to the relief of the people he supposed in distress upon the Eddystone. The boat and men got thither about ten o'clock, after the fire had been burning full eight hours; and in this time the three light-keepers were not only driven from all the rooms, and the staircase, but, to avoid the falling of the timber, and red-hot bolts, &c., upon them, they were found sitting in the hole or cove in the east side of the rock, under the iron ladder, almost in a state of stupefaction, it being then low water. At this time the wind was eastward, and did not blow very fresh, but just hard enough to make a landing upon the rock, at the proper landing-place, quite impracticable, or attended with the utmost hazard. It, therefore, became a difficulty how the men were to be taken off; for the ground-swell upon the west side produced so great surf upon the

sloping surface, that no boat could attempt to land there. They, however, fell upon the following expedient: having a small boat with them, they moored their principal boat by a *grappling* to the westward, but as near the rock as they durst; and then launching their small boat, they rowed it toward the rock, veering out a rope, which they fastened to the large boat, till they got near enough to throw a coil of small rope on the rock; which having been laid hold of by the men, they one by one fastened it round their waists, and jumping into the sea, they were towed into the small boat, and thence delivered into the large one; and as they found it was out of their power to do any further service, the boat hastened to Plymouth to get the men relieved. No sooner, however, were they set on shore, than one of them made off, and has never since been heard of, which would, on the first blush, induce one to suppose, that there were something culpable in this man; and if it had been a house on the shore, one would have been tempted to suspect he had been guilty of some foul play: but the circumstance of its being a light-house, situated so as to afford no retreat in the power of its inhabitants, seems to preclude the possibility of its being done wilfully; as he must know he must perish, or be in extreme danger of doing so at least, along with the rest."

Such was the termination of a building, which has always been looked upon as a matchless specimen of skill in carpentry; and which was destroyed by means that had not been contemplated, and therefore not guarded against at the time of its erection. In a few days it was burnt down to the very foundation, after it had stood for forty-nine years, and been the means of saving many a ship from being wrecked upon that dangerous rock.

Forests and Planting.

We have thus taken a general view of the principal timber which is used in this country, in building and in manufactures. The limits of this work necessarily preclude the insertion of much information that might be useful and amusing; but we have endeavoured to select from the great mass of materials which the subject affords, such as might best gratify the curiosity of the reader, and excite that habit of observation which is the first step towards real knowledge.

As timber is one of the most important and valuable materials which man employs for the promotion of his comforts, and is, even to the rudest, absolutely necessary in many ways, so, fortunately, it is the most plentiful of all the productions of nature. We have given, in the preceding pages, many details of the extent of the forests of the north of Europe, and of America. In parts of the coasts of South America, Humboldt found the largest trees growing in such unbounded luxuriance, that he could scarcely set foot on the shore, so thick were the woods, running down even to the water's edge. This thickness of vegetation is a remarkable characteristic of that part of the world; and where the climate is unfavourable to the growth of trees, rank grass and thistles shoot up, in a profusion, and with a rapidity, which is quite astonishing. The great plain on the east of the Cordillera, called the Pampas, is about nine hundred miles in breadth; and its vegetable productions are either small evergreens, clover, or thistles, according to the climate of the several districts. In the spring, the region of thistles presents a most extraordinary spectacle. They suddenly spring

up to the height of ten or eleven feet, and are all in full bloom. The road or path is hemmed in, and the view is completely obstructed. The thistles are so close together, and so strong, that they are perfectly impenetrable. Captain Head, in his journey across the Pampas, says: "it is really possible that an invading army, unacquainted with this country, might be imprisoned by these thistles before they had time to escape from them." We have mentioned these facts to shew the almost universal luxuriance of natural vegetation: generally, this luxuriance produces the most beautiful and majestic objects of the vegetable kingdom, trees. A country without wood is always disagreeable; and thus the inhabitants of bleak regions, possessing no timber, are considered peculiarly unfortunate. On the other hand, the extreme abundance of trees, in many parts of the earth, renders it one of the great labours of man to clear the ground of them, that he may be able to raise food by cultivation. The progress of civilization has thus a natural tendency to diminish the forests of the world. The Britons, the Gauls, and the Germans, in those states of society which have been described by Cæsar and Tacitus, lived almost wholly in the woods, which supplied the principal wants of a rude people; but as the arts of life made advances, through communication with more refined nations, these people permitted the wolves and bears to occupy the forests—associated together in towns—and cultivated the open country. As population increased, more land was required for culture than the plains afforded; and then the forests were subjected to the axe, and their spontaneous produce was succeeded by regular tillage. This is the progress of man in all woody countries.

For several centuries the forests of England were much neglected. Many of them were royal domains;

but as the inhabitants within a forest generally had customary rights which were considered irreconcileable with much improvement, very little young timber was produced. Within the last twenty years, some of the most extensive of these ancient appendages of the crown have been disafforested—that is, a part has been assigned to the inhabitants of the district, and the other part has been inclosed by the crown. The Commissioners of Woods and Forests have important duties to perform, and not the least important is that of providing a proper succession of timber for building ships. We have seen a calculation, in which it is shewn that a first-rate ship of the line contains three thousand loads of timber, and that this quantity could not be grown on a less surface than fifty acres. To maintain, therefore, an abundant supply of timber fit for naval purposes, is not an easy or a trivial matter.

At the time when Gilpin published his "Forest Scenery," about thirty years ago, it was considered that eleven forests had alone preserved their rights, out of seventy-seven which are enumerated in an account of the land revenues of the crown, published by Mr. St. John. These eleven were—Windsor, Waltham, Dean, Rockingham, Whittlewood, Salcey, Sherwood, Whichwood, New-forest, Bere, and Walmer. Of these the greater number, as we have already stated, have now been disafforested. The cruel and iniquitous usurpations called forest law, which had been in former times such a source of oppression to the people, have long since fallen into disuse,—although, till within these few years, some of the forms of those laws were kept up, particularly in the New-forest and the forest of Dean. The principle of these despotic laws, according to Manwood, a legal writer on the subject, was this:—"It is allowed to our sovereign lord the king, in respect of his con-

tinual care and labour for the preservation of the whole realm, among other privileges, this prerogative, to have his places of recreation and pastime, wheresoever he will appoint. For as it is at the liberty and pleasure of his grace to secure the wild beasts and the game to himself, for his only delight and pleasure, so he may also at his will and pleasure make a forest for them to abide in." In this way more than an eighth of the whole kingdom was made forest for the king's pastime; and the most vexatious and arbitrary regulations were enforced for the purpose of preserving the game. The grievance at length was put down by the spirit of the people.

The publication of his Sylva, by Evelyn, gave a considerable impulse to planting in the time of Charles II.; but in the next century that duty was much neglected by the landed proprietors of this country. There is a selfish feeling, that the planter of an elm or an oak does not reap such an immediate profit from it himself, as will compensate for the expense and trouble of raising it. This is an extremely narrow principle, which, fortunately, the rich are beginning to be ashamed of. It is a positive duty of a landed proprietor who cuts down the tree which his grandfather planted, to put a young one into the ground, as a legacy to his own grand-children: he will otherwise leave the world worse than he found it. Sir Walter Scott, who is himself a considerable planter, has eloquently denounced that contracted feeling which prevents proprietors thus improving their estates, because the profits of plantations make a tardy and distant return; and we cannot better conclude than with a short passage from the essay in which he enforces the duty of planting waste lands:—

"The indifference to this great rural improvement arises, we have reason to believe, not so much out

of the actual lucre of gain as the fatal *vis inertiæ*—that indolence which induces the lords of the soil to be satisfied with what they can obtain from it by immediate rent, rather than encounter the expense and trouble of attempting the modes of amelioration which require immediate expense—and, what is, perhaps, more grudged by the first-born of Egypt—a little future attention. To such we can only say that improvement by plantation is at once the easiest, the cheapest, and the least precarious mode of increasing the immediate value, as well as the future income, of their estates; and that therefore it is we exhort them to take to heart the exhortation of the dying Scotch laird to his son:—'Be aye sticking in a tree, Jock—it will be growing whilst you are sleeping.'"

The following Table of the Duties paid upon foreign timber, in 1827, will point out the vast extent of the commerce of the United Kingdom in this article.

PINE-TIMBER.	£
Balks and Ufers	1,096
Battens and Batten-ends	111,013
Clap and Pipe Boards	834
Paling	382
Deals	634,737
Deal-ends	32,820
Fire-wood	2,913
Fir-quarters	3,520
Lath-wood	35,821
Masts and Spars	21,464
Fir-Logs, eight in square and upwards	575,452
	1,420,052

OAK, ELM, ASH, TEAK.	£
Handspikes	660
Knees for Ships (Oak)	1,262
Oak Plank	22,752
Oars, (Ash)	1,222
Staves (Oak)	50,139
Oak Logs	30,102
Wainscot Logs	13,270
Teak	8,690
Unenumerated Timber	7,880
	£135,977

DYE AND HARD-WOODS.	
Mahogany, Rose-wood, &c.	£88,590

In 1827, the number of *loads* of timber exported from British America was 343,203; and from the Baltic, 173,382. Total loads imported, 516,585.

This quantity would load about 2000 ships, of the ordinary tonnage employed in the timber trade.

Total Amount of Duties.	£
Pine-Timber	1,420,052
Oak, &c.	135,977
Dye and Hard-woods	88,590
	£1,644,619

Part II.

FRUITS.

Chapter I.

Introduction.—Fruits of the Temperate Climates. Fleshy Fruits.—Apple; Pear; Quince; Ornamental Crabs; Medlar.

Whether we regard their beauty, their variety, the extent over which they are diffused, or their agreeableness and value to man, there is no class of substances more interesting than the Fruits. Their progressive cultivation, and their removal, by wandering tribes or conquerors, from region to region, associate them in a very remarkable degree with the history of the human race. This historical connexion of fruits with the progress of civilization is sometimes fabulous, and generally obscure; but the great revolutions of society may be traced in their gradual distribution over the surface of the globe: for wherever man has penetrated, in that spirit of change and activity which precedes or accompanies civilization, he has assisted the dissemination of vegetable productions much more surely and rapidly than the birds which bear their seeds from land to land, than the currents of the ocean, or even the winds.

If we examine, for example, the fruits of our own

country, we shall at once see how their introduction has accompanied the great changes in its social state. Before the invasion of the Romans, the natives of these islands probably possessed no other than the wild fruits of Northern Europe,—the crab, the sloe, the hazel-nut and the acorn. The Romans themselves had, but a few centuries before, obtained their principal fruits from the countries of the East, and from Greece and its islands. Hirschfield and Sickler, laborious writers on the history of cultivated vegetables, are of opinion that the Romans derived the fig from Syria, the orange or citron from Media, the peach from Persia, the apricot from Epirus, the pomegranate from Africa, the plum, the cherry, the apple, and the pear from Armenia. Pliny mentions that they had twenty-two sorts of apples; thirty of pears; three of quinces; a variety of plums and cherries; peaches, nectarines, apricots, and almonds; and various sorts of olives. And yet, under the reign of the first Tarquin, the olive did not exist in Italy, although Homer and Hesiod mention it as cultivated in Greece.* A cherry tree laden with fruit adorned the triumph of Lucullus;—the dictator had brought the plant to Rome as a precious memorial of his victory over Mithridates, in whose province of Pontus he had found the tree†. In less than a century, the same species of cherry was common in France, in Germany, and in England, where the conquerors had introduced it,—imparting some few blessings while they inflicted countless miseries in their progress to universal dominion. Thus, the cherry, and in all probability the peach, the plum, the apple, and the pear of England, are evidences that it was once a colony of Rome. Whatever are the evils of war and conquest, and they are very great,

* Humboldt, Géographie des Plantes. † See p. 312.

they yet contributed, in the early stages of society, to diffuse the knowledge of the arts of cultivation. Plutarch, with the partiality arising from his subject, says that Alexander, by his progress into India, which opened communications between distant nations, had more benefitted mankind than all the speculative philosophers of Greece. But when civilization is advanced, war is no longer in any way an instrument even of incidental good—it is an unmitigated evil.

The spread of a milder, though not a less powerful sway—that of the Church—introduced new fruits into Great Britain. The monks after the conversion of the Anglo-Saxons to Christianity, appear to have been the only gardeners. As early as 674, we have a record, describing a pleasant and fruit-bearing close at Ely, then cultivated by Brithnoth, the first Abbot of that place. The ecclesiastics subsequently carried their cultivation of fruits as far as was compatible with the nature of the climate, and the horticultural knowledge of the middle ages. Whoever has seen an old abbey, where for generations destruction only has been at work, must have almost invariably found it situated in one of the choicest spots, both as to soil and aspect; and if the hand of injudicious improvement has not swept it away, there is still the "Abbey-garden." Even though it has been wholly neglected —though its walls be in ruins, covered with stones crop and wall-flower, and its area produce but the rankest weeds—there are still the remains of the aged fruit-trees—the venerable pears, the delicate little apples, and the luscious black cherries. The chesnuts and the walnuts may have yielded to the axe, and the fig-trees and vines died away;—but sometimes the mulberry is left, and the strawberry and the raspberry struggle among the ruins. There is a moral lesson

in these memorials of the monastic ages. The monks, with all their faults, were generally men of peace and study; and these monuments show that they were improving the world, while the warriors were spending their lives to spoil it. In many parts of Italy and France, which had lain in desolation and ruin from the time of the Goths, the monks restored the whole surface to fertility; and in Scotland and Ireland, there probably would not have been a fruit-tree till the sixteenth century, if it had not been for their peaceful labours. It is generally supposed that the monastic orchards were in their greatest perfection from the twelfth to the fifteenth century.

The crusades, impolitic and unjust as they were in principle, contributed something to the improvement of European society; and, by renewing a communication with the countries of the East, they again assisted the diffusion of those vegetable treasures which had been neglected after the destruction of the Roman empire. The monastic gardens owed many of their choicest fruits to the care of those provident ecclesiastics who had accompanied the expeditions to the Holy Land.

This improvement of the country by the monks was a natural effect of their superiority in knowledge and wealth to the people by whom they were surrounded. In the same manner, the ecclesiastics who have settled in South America, from the time of the discovery of the New World, have caused almost all the fruits, of temperate Europe to flourish amidst the productions of the torrid zone. "In studying the history of the conquest," says Humboldt, "we admire the extraordinary rapidity with which the Spaniards of the sixteenth century spread the cultivation of the European vegetables along the ridge of the Cordilleras, from one extremity of the continent to the other;" and he attributes this remarkable effect of

industry principally to the religious missionaries.* The same course is now pursued, in a great measure, by the missionaries in the South Seas, and in Southern Africa.

The destruction of the monastic houses, and the rise of the middle orders of society—a natural consequence of commercial industry and enterprize—gave an impulse to the general cultivation of fruit-trees, instead of their growth being almost entirely limited to the gardens of the ecclesiastics. The time of Elizabeth was marked by a revival of the arts; and that princess herself set the example as a horticulturist. Towards the end of her reign, the celebrated Gerard published his well known 'Herball, or Historie of Plants.' This eminent gardener, who numbered among his patrons Lord Burleigh and Sir Walter Raleigh, was one of those remarkable men who unite a general scientific knowledge with great practical industry—men, above all others, calculated to advance the progress of any art. Gerard kept a garden in Holborn; and in 1596 he published a catalogue of eleven hundred plants growing there. Fitzherbert, and some others, had written on the subject of plants before Gerard's 'Herball' made its appearance. Those attempts were, however, like most of the early treatises on the arts and sciences, derived rather from the Roman writings on the subject than from an examination and knowledge of nature. James I., the most pedantic, but the most peace-loving, and far from the least intelligent of kings, planted a fine garden at Theobalds, near Waltham Abbey, which was, about thirty years afterwards, described with much praise by John Albert de Man-

* Political Essay on the Kingdom of New Spain, book iv., chap. ix.

delslo, a traveller; but so little interest had the garden excited at home, that when Mandelslo's book came to be "done into English," the description of the garden was left out as not worth reading.

In the reign of Charles I. (1629), Parkinson published his great work, '*Paradisi in sole Paradisus terrestris*, or a Garden of all sortes of pleasant flowers, with a Kitchen Garden of all manner of herbs and roots, and an Orchard of all sortes of fruit-bearing trees.' Parkinson may justly claim to be considered as the Bacon of horticulture, because he sent men into the garden and the orchard to see with their own eyes, and handle with their own hands. He describes fifty-eight sorts of apples, sixty-four pears, sixty-one plums, twenty-one peaches, five nectarines, six apricots, thirty-six cherries, three figs, and twenty-three vines, with sorts of most of the smaller hardy fruits still cultivated. Thirty-five years after the appearance of Parkinson's work, the celebrated Evelyn did for the trees of the forest what his predecessor had done for those of the orchard.

Charles II. paid some attention to the luxury of fruits, one of his very few harmless propensities. Le Nôtre, the favourite gardener of Louis XIV., was his landscape gardener; and Rose, his private gardener, who also had studied in France, was so skilled in the management of hot-houses as to be able to produce ripe cherries and strawberries at an installation dinner, holden at Windsor on the 23rd of April, 1667.

We are approaching a period when the commerce of England began to afford some indications of its future greatness—of its unbounded enterprize, and its universal application to the interchange of necessaries and luxuries. About this time the first pines were grown in England. We, probably, obtained this

fruit from Holland, and not direct from any tropical country ; for the Dutch preceded us in the career of commercial adventure, and from them, principally, we learnt our art of modern gardening. For nearly a century and a half this country has steadily proceeded in augmenting the number of its vegetable productions, gathering from every quarter of the globe the fruits and flowers indigenous to each, and cultivating them at home, either to increase the large and valuable number of plants of easy growth, and therefore, of general use and ornament,—or to render the productions of the torrid zone capable of administering to luxurious gratification under our colder skies, by the application of all that science has discovered to make man so far independent of soil and temperature. Thus, the large number of our native plants (for we call those native which have adapted themselves to our climate) mark the gradual progress of our civilization through the long period of two thousand years; whilst the almost infinite diversity of exotics which a botanical garden offers, attest the triumphs of that industry which has carried us as merchants or as colonists over every region of the earth, and has brought from every region whatever can administer to our comforts and our luxuries,—to the tastes and the needful desires of the humblest as well as the highest amongst us. To the same commerce we owe the potatoe and the pine-apple ; the China rose, whose flowers cluster round the cottage-porch, and the Camellia which blooms in the conservatory. The addition even of a flower, or an ornamental shrub, to those which we already possess, is not to be regarded as a matter below the care of industry and science. The more we extend our acquaintance with the productions of nature, the more are our minds elevated by contemplating the variety, as well as the exceeding beauty, of the works of the

Creator. The highest understanding does not stoop when occupied in observing the brilliant colour of a blossom, or the graceful form of a leaf. Hogarth, the great moral painter, a man in all respects of real and original genius, writes thus to his friend Ellis, a distinguished traveller and naturalist:—"As for your pretty little seed-cups or vases, they are a sweet confirmation of the pleasure Nature seems to take in superadding an elegance of form to most of her works, wherever you find them. How poor and bungling are all the imitations of Art! When I have the pleasure of seeing you next, we will sit down, *nay, kneel down if you will*, and admire these things."

In the progress of this sketch of the various fruits which administer to the comfort of man throughout the globe,—we shall endeavour to trace, as far as is possible, the early history and the first localities of those which are more generally esteemed. The information possessed upon these subjects is, however, necessarily limited and vague. The history of many of them belongs to very distant periods; for, as soon as they were rendered attractive to man by cultivation (and we know that scarcely any wild fruit is of value), a state of civilization followed, which of necessity would lead to commercial intercourse. The very first movements of mankind would, in all probability, unsettle the native localities of the fruits; and as modern experience shews that their qualities are altered generally for the better by transplantation, it is probable that, in the course of a time by no means long, the fruit which had first attracted the attention of the adventurer in some fertile and favoured spot, would be flourishing in a far superior state upon the inferior soil, or under the inferior climate, where it had received his subsequent care. It is one of the proudest attributes of man, and one which is most important

for him to know, that he can improve every production of nature, if he will but once make it his own by possession and attachment. A conviction of this truth has rendered the cultivation of fruits, in the more polished countries of Europe, as successful as we now behold it.

In carrying the pursuit of any branch of knowledge to the utmost limits of its means, a stimulus to activity and mental exertion is produced, which is in itself a great good. The establishment of the Horticultural Society of London has afforded such an impulse to the art of gardening. It was well observed by the President, in the first paper of its Transactions, that "the austere crab of our woods has been converted into the golden pippin; and the numerous varieties of the plum can boast no other parent than our native sloe. Yet few experiments have been made, the object of which has been new productions of this sort; and almost every ameliorated variety of fruit appears to have been the offspring of accident, or of culture applied to other purposes. We may therefore infer, with little danger of error, that an ample and unexplored field for future discovery and improvement lies before us, in which nature does not appear to have formed any limits to the success of our labours, if properly applied." This institution was founded in 1805, by the spirited exertions of Sir Joseph Banks, the Earls of Powis and Dartmouth, Mr. Knight, and several other eminent naturalists and encouragers of useful pursuits. Under the direction of distinguished men of science as its officers, and with the assistance of the most skilful practical gardeners, this Society has given a great impulse to that taste for gardening which began to be generally diffused about the middle of the last century. Its objects are of much more extensive range than can be effected

by establishments, however excellent, like the Botanical Garden at Chelsea. A similar society was formed in Scotland in 1809, at the suggestion of Dr. Andrew Duncan, senior; and there are many local societies, whose objects are the same, which have contributed in like degree to lead the rich to the encouragement of horticulture, and to instruct those who practise the art, in the real value of a higher knowledge, both of the nomenclature and the physiology of plants, than had formerly been considered necessary or even fitting for practical men.

A popular division of fruits, in a sketch of which the object is more to excite than to gratify a desire for the knowledge of their history and properties, must principally have reference to those differences of climate by which they are brought to maturity in the open air. Without following, therefore, a strict geographical arrangement, we shall first treat of *fruits of the temperate climates*, and, secondly, of *tropical fruits*.

Of the fruits of the temperate climates, the following will comprise the principal genera:—

I. *Fleshy Fruits*, having the seeds enclosed in membranous cells.

II. *Pulpy Fruits*, having the seeds lying among pulp.

III. *Stone Fruits*, having the seed enclosed in a hard nut, covered with flesh.

IV. *Nuts*, or dry fruits, which are neither fleshy nor pulpy.

a. Apples. b. Pears. c. Quince. d. Medlar.

THE APPLE—*Pyrus malus.*

The apple is distinguished as the fruit of the colder climates. It is at once the most brisk and refreshing of any of the common hardy orchard fruits. It remains the longest in season, is used in the greatest number of ways, and, therefore, is the most generally cultivated. The stone fruits of the English orchard keep only for a few days, unless they are preserved; and in this state they lose that natural flavour on which their value chiefly depends. Many of the finer pears keep only for a short time, when they become vapid and flat: but there are apples of very rich and vinous flavour, which, with care, can be preserved till the early sorts of the succeeding season come in to supply their place.

The useful qualities of the apple have extended its cultivation throughout Europe, as far as the 60th degree of latitude. It has been observed by a distinguished traveller, that the commoner fruit-trees, such as apples, pears, cherries, and apricots, grow

in the open air, wherever oaks thrive.* As we proceed farther north, the apple is scarcely known. The people of Lapland shewed Linnæus what they called an apple-tree, which, they said, bore no fruit, because it had been cursed by a beggar-woman, to whom the owner of the tree had refused some of its produce. The naturalist found that it was the common elm, a tree also rare in that severe climate.† The apple as well as most other European fruits, which now appear indigenous, is probably a native of the East. The Prophet Joel, enumerating the trees of Syria, says, "the vine is dried up, and the fig-tree languisheth; the pomegranate-tree, the plum-tree also and the apple-tree, even all the trees of the field, are withered." The cultivated apple was probably scarce at Rome, in the time of Pliny; for he states that there were some apple-trees in the villages near the city which yielded more profit than a small farm. The art of grafting was at that period either very recently discovered, or comparatively little known. This practice must evidently have belonged to an advanced state of civilization. It is remarkable that Moses, in his directions to the Israelites when they "shall come into the land, and shall have planted all manner of trees for food,"‡ makes no mention of the art of grafting. Hesiod and Homer, in like manner, have no allusion to a practice which would naturally have formed part of their subject had it existed when they wrote.§ The art of grafting, as well as that of pruning, has been ascribed to an accidental origin. The more vigorous shooting of a vine, after a goat had broused on it, is said to have suggested the one great principle in the management of fruit trees;

* Von Buch's Travels, p. 41. 4to.
† Linnæus's Tour in Lapland, vol. i., p. 23.
‡ Leviticus, c. xix., v. 23. § See Goguet, Origine des Lois.

and it is probable that the occasional natural union of the boughs of distinct trees may have shewn the general practicability of the other. Pliny mentions apple-trees "that will honour the first grafters for ever;" and this enthusiastic sort of praise belongs to the infancy of an art, when mankind are first conscious of its blessings, and therefore not disposed to undervalue them through their familiarity. To the facility of multiplying varieties by grafting, is to be ascribed the amazing extension of the sorts of apple, probably from one common stock The varieties at present known are considerably more than a thousand. Of late years these varieties have been increased in a remarkable manner, by the application of the pollen* of one sort to the blossom of another.

Many of the better sorts of English apples were probably at first introduced into this country from the continent. The greater part of our names of apples are French, either pure or corrupted. Those varieties which had been celebrated abroad were spread through the kingdom by their cultivation in the gardens of the religious houses; and many of these fine old sorts still exist. Thus the *Nonpareil*, according to the old herbalists, was brought from France by a Jesuit in the time of Queen Mary, and first planted in the gardens of Oxfordshire. The *Oslin*, or *Arbroath pippin*, an ancient Scotch variety, was either introduced or extensively cultivated by the monks of the abbey of Aberbrothwick. On the other hand, the celebrated *Golden Pippin* has been considered as the native growth of England; and noticed as such by French and Dutch writers. It is described by Duhamel under the name of "Pomme d'Or; Reinette d'Angleterre." The same celebrated

* The prolific powder contained in the anther of the flower.

authority on fruit-trees also mentions the "Grosse Reinette d'Angleterre." The more delicate apples for the table, such as the pippins were probably very little known here till the latter part of the sixteenth century. Fuller states that one Leonard Maschal, in the sixteenth year of the reign of Henry VIII., brought pippins from over sea, and planted them at Plumstead in Sussex. Pippins are so called because the trees were raised from the pips, or seeds; and bore the apples which gave them celebrity, without grafting. In the thirty-seventh year of the same king we find the barking of apple-trees declared a felony; and the passing of the law had probably a relation to the more extended growth of the fruit through the introduction of pippins. 'Costard-monger' is an old English term for the dealers in vegetables, derived from their principal commodity of apples; the costard being a large apple, round and bulky as the head, or 'costard.' If we may deduce any meaning from this name, which is the same as 'coster,' it would appear that the costard or large apple, was the sort in common use, and that hence the name of the variety became synonymous with that of the species; the more delicate sorts were luxuries unknown to the ordinary consumers of our native fruits, till they were rendered common by the planting of orchards in Kent, Sussex, and other parts of the kingdom.

The growth of the more esteemed apple-trees had made such a general progress in half a century, that we find Shakspeare putting these words in the mouth of Justice Shallow, in his invitation to Falstaff: "You shall see mine orchard, where, in an arbour, we will eat a last year's pippin of my own graffing." Sir Hugh Evans, in the 'Merry Wives of Windsor,' says, "I will make an end of my dinner—there's pippins

and cheese to come." Pippins were, therefore, in the time of Shakspeare, delicacies for the dessert. But in another fifty years the national industry had rendered the produce of the apple an important article of general consumption. The fine cider orchards of Herefordshire began to be planted in the reign of Charles I. The adaptation of these apples to the soil was quickly discovered; and they spread over the face of the whole country. Of the varieties of the cider apples, the *Redstreak* and the *Sline* were formerly the most prized; and the cider of these apples, and the perry of the *Squash* pear, were celebrated throughout Europe. At the time when cider was first manufactured in England it was believed that it would almost wholly supersede the use of foreign wines. From the period of the Norman conquest England carried on a great wine trade with France, principally with Bordeaux, and the neighbouring provinces. It increased considerably when Henry II. married the daughter of the Duke of Aquitaine; and after the kings of England subsequently became possessed of some of the great wine provinces of France, the consumption of their produce was almost universal. About the middle of the sixteenth century, although no wines were permitted to exceed the price of twelvepence per gallon, we find a law enacted, by which no person, except those who could expend a hundred marks annually, or were of noble birth, should keep in his house any vessel of wine exceeding ten gallons,—a regulation which would suggest that the demand for wine was greater than the supply, owing probably to the increase of the middle ranks of society. In the year 1635 we find a patent granted to Francis Chamberlayne, for making wine from the dried grapes of Spain and Portugal; and the patentee set forth that his wines would keep

good during several years, and even in a voyage under the line.* This circumstance also shews that the demand for the luxury of wine amongst the commercial classes (who had become of great number and importance, as the political events of those times fully prove) could not be supplied from the wine countries, probably on account of the prevalence of false principles of trade. Cider, therefore, became a general beverage before the time of Charles II., though it had been partially used for nearly a century before. Gerard, who published his Herball, as already mentioned, about the close of Elizabeth's reign, says, in his quaint way, "I have seen, about the pastures and hedgerows of a worshipful gentleman's dwelling, two miles from Hereford, called Mr. Roger Badnome, so many trees of all sortes, that the servants drink, for the most part, no other drink but that which is made of apples. The qualitie is such, that, by the report of the gentleman himselfe, the parson hath for tythe many hogsheads of cyder."

During the reigns of William III. and Anne, when there was a constant succession of wars with France, the use of cider was generally inculcated, as tending to the permanent exclusion of the wines of our great rival. Philips, a contemporary of Addison, wrote a long poem in praise of cider; and embodied in his work a good deal of the art of selecting and managing apple-trees. But he wrote as a poet, and maintained the unwise and impolitic doctrine of a nation's wholly depending on its own resources, instead of living in intercourse with its neighbours, and thus advancing the comforts and riches of all. After praising the cider of Hereford, Philips says,

"What should we wish for more? or why, in quest
Of foreign vintage, insincere and mixed,

* Rymer's Fœdera;—see Pennant's London.

Traverse the extremest world? Why tempt the rage
Of the rough ocean, when our native glebe
Imparts from bounteous womb annual recruits
Of wine delectable, that far surmounts
Gallic or Latin grapes, or those that see
The setting sun near Calpe's towering height?"

We have at length learnt that the truest way to advance the prosperity of nations, is by exchanging the best natural products of one country for those of another. If we are to drink the cider of Hereford, in preference to the claret of Bordeaux, for the sole reason that we grow it, the same principle, applied to ourselves by other nations, would cut us off from the greater part of that commerce with the whole world which constitutes our peculiar superiority. The interest of each individual, and of each country, is best consulted by the facilities with which each can secure a share of the natural advantages and the mechanical skill that belong to the rest. The advice of the well-meaning poet of cider, if acted upon by individuals as well as nations, (and if it be applicable to the one it must be applicable to the other,) would destroy society altogether, by making self the means as well as the end in every thing. The freedom of commercial intercourse has no tendency to the repression of internal improvement, but has a contrary effect. The finest cider and perry of Herefordshire is brought for exportation to the East and West Indies and to America; and this foreign demand for the better sorts keeps up an attention in the cultivators which domestic consumption alone could perhaps not induce.

The Cider counties of England have always been considered as highly interesting. They lie something in the form of a horseshoe round the Bristol channel; and the best are, Worcester and Hereford,

on the north of the channel, and Somerset and Devon on the South. In appearance, they have a considerable advantage over those counties in which grain alone is cultivated. The blossoms cover an extensive district with a profusion of flowers in the spring, and the fruit is beautiful in autumn. Some of the orchards occupy a space of forty or fifty acres; and the trees being at considerable intervals, the land is also kept in tillage. A great deal of practical acquaintance with the qualities of soil is required in the culture of apple and pear trees; and his skill in the adaptation of trees to their situation principally determines the success of the manufacturer of cider and perry. The produce of the orchards is very fluctuating; and the growers seldom expect an abundant crop more than once in three years. The quantity of apples required to make a hogshead of cider is from twenty-four to thirty bushels; and in a good year an acre of orchard will produce somewhere about six hundred bushels, or from twenty to twenty-five hogsheads. The cider harvest is in September. When the season is favourable, the heaps of apples collected at the presses are immense—consisting of hundreds of tons. If any of the vessels used in the manufacture of cider are of lead, the beverage is not wholesome. The price of a hogshead of cider generally varies from 2*l.* to 5*l.*, according to the season and quality; but cider of the finest growth has sometimes been sold as high as 20*l.* by the hogshead, direct from the press—a price equal to that of many of the fine wines of the Rhine or the Garonne.

The varieties of the apple are so many, and they are so rapidly multiplied, that it would be impossible for us, within our limits, to present any account of them which should be either useful or interesting.

The knowledge of varieties is a part, and a very important one, of the science of the practical horticulturists; and one of the most valuable objects which individual growers of fruit, or societies for the encouragement of experiments in cultivation, could propose to themselves, would be to diminish the embarrassing list of varieties, by directing their attention to the best sorts alone. In a great public establishment, such as the gardens of the Horticultural Society, it is perhaps necessary that almost every known variety should be found. Their catalogue presents a list of more than twelve hundred sorts of apple. In the introductory observations to this list, the difficulties produced by this almost unlimited choice are thus noticed: —"A considerable reduction of the names is to be anticipated whenever a general comparison of the varieties can be effected; but, after all the discovery of synonyms which can be expected, the list will remain far more extensive than can be either desirable or useful. No sufficient reduction, however, can effectually take place until a public declaration shall be made of those sorts which are undeserving further cultivation."*

Seeing, therefore, the embarrassing extent of the varieties of the apple in particular, and of fruits generally, and knowing that the progress of experiment is daily adding to their number, we forbear to touch at all upon this branch of the subject. The *general* history of fruits is full of amusing information; and to that, in the present work, we feel it proper to confine our attention.

It has been asserted that many of the fine old varieties of the apple are now going into decay. This may be owing partly to their being more generally

* See a valuable paper on the 'Formation of a Select Collection of Apple Trees,' by Mr. Sabine. Hort. Trans. vol. iii.

cultivated, and consequently grown in a great variety of soils and situations, some of which would suit them, and others not; and that this is the case may be inferred from the fact, that in some places these sorts are to be found healthy enough. There are many theories upon this subject, which form subjects of curious inquiry to the practical horticulturist.

American apples are brought into England, as well as many French apples. About twenty thousand bushels is the average amount of the importation.

The Pear—*Pyrus communis.*

Amongst the trees which Homer describes as forming the orchard of Laertes, the father of Ulysses, we find the pear.* Pliny mentions several sorts of pears which were grown in Italy, and particularly mentions that a fermented liquor was formed of their expressed juice. It is probable that the Romans brought the cultivated pear to England, and that the monks paid great attention to its varieties. There is a tradition that King John was poisoned in a dish of pears by the monks of Swinsted; and the tale, whether true or false, would imply that the fruit was such as the churchmen would offer to the monarch as a luxury. In an old book of household accounts of Henry VIII., there is an item of twopence "to a woman who gaff the Kyng peres;" and in the time of Gerard we find that great attention was paid to their growth by the nurserymen in the neighbourhood of London. The old herbalist, after declaring that in his time to write of the sorts of apples and pears, "and those exceeding good," would require "a particular volume," adds—"Master Richard

* Odyessy, l. xxiv. v. 337.

Pointer has them all growing in his ground at Twickenham, near London, who is a most cunning and curious grafter and planter of all manner of rare fruits; and also in the ground of an excellent grafter and painful planter, Master Henry Bunbury, of Touthil-street, near unto Westminster; and likewise in the ground of a diligent and most affectionate lover of plants, Master Warner, neere Horsly Down, by London; and in divers other grounds about London." The neighbourhood of Worcester was probably then celebrated, as at the present day, for the cultivation of this fruit, for three pears are borne in the arms of the city. We have already alluded to the manufacture of perry, which is almost peculiar to Worcestershire.

Most of the fine sorts of pears are of continental origin, the horticulturists of France and the Nethelands having paid more attention to that species of fruit than those of England. As these varieties have retained their original names, a good many laughable corruptions have been produced in their popular nomenclature: in just the same way that "the Boulogne Mouth" is now rendered "the Bull and Mouth." Thus the *Bon-Chrêtien* is converted into the *Boncrutching;* the *Beurré* into the *Bury;* the *Chaumontelle* into the *Charmingtel.* Such odd names as the *Bishop's-Thumb*, and many others which our fruiterers use, may probably be traced to a similar cause. In the names of apples there is the same corruption,—as *Runnet* for *Reinette.* The names of fruits in all countries occasionally present some laughable anomalies, such as the "*Bon-Chrêtien Turc*," one of the finest of the French pears.

The Chinese, who are said to carry the cultivation of fruit to much greater perfection than the European gardeners, are stated by Marco Polo to

have pears, white in the inside, melting, and with a fragrant smell, of the enormous weight of ten pounds each.

The wood of the pear is much firmer than that of the apple, and it is much less liable to be attacked by insects, or to decay. In some of the old orchards, where the apple-trees have wholly disappeared, the pears are in full vigour, and bear abundantly. This is remarkably the case at the old Abbey garden at Lindores, on the south bank of the Tay, in the county of Fife: disease could have nothing to do with the death of the apple-trees there, as the soil is one of the very best for apples in the kingdom, being fine strong black loam to a great depth. Yet there are many old apple-trees in the kingdom. At Horton, in Buckinghamshire, where Milton spent some of his earlier years, there is an apple-tree still growing, of which the oldest people remember to have heard it said that the poet was accustomed to sit under it. And upon the low leads of the church at Rumsey, in Hampshire, there is an apple-tree still bearing fruit, which is said to be two hundred years old.

The fruit catalogue of the Horticultural Society contains above six hundred varieties of the pear; and it is there observed, that "the newly introduced Flemish kinds are of much more importance than the greater part of the sorts which have been hitherto cultivated in Great Britain, and when brought into use will give quite a new feature to the dessert."

The Quince—*Cydonia vulgaris.*

The quince was introduced into Europe, according to Pliny, from the island of Crete. From the large-

ness of this fruit, and its splendid colour, it is not improbable that it was the same with the apples of the Hesperides; for Galesio, in his treatise on the orange, has shewn that the orange tree was unknown to the Greeks, and that it did not naturally grow in those parts where the gardens of the Hesperides were placed by them. The fruit of the quince, however useful and ornamental it may be in some respects, does not warrant such honours, and in truth has not continued to receive them; for the French, who have paid great attention to its cultivation, particularly for grafting pears upon its stocks, call the quince tree "*coignassier*" probably, according to Duhamel, because the disagreeable odour of the fruit requires that it should be placed in a corner (*coin*) of the orchard or garden. In the south of France, particularly on the borders of the Garonne, the quince is very extensively grown; and the peasants prepare from it a marmalade which they call *cotignac*. The term marmalade is derived from the Portuguese name for the quince, *marmelo*. Gerard says, that in his time quince-trees were planted in the hedges of gardens and vineyards; and marmalade, two centuries ago, seems to have been in general use, principally from a belief that it possessed valuable medicinal properties. The seeds of the quince are still used in medicine, on account of the great quantity of mucilage which they yield to boiling water.

There are eight varieties of the quince noticed in the fruit catalogue of the Horticultural Society. Amongst these the Chinese quince (*Cydonia Sinensis*) is inserted on account of the resemblance which its fruit has to that of the common quince; although in France, where only in Europe it has produced fruit, it is not considered eatable. The Chinese

quince was introduced into England and Holland nearly forty years ago, and was planted in France about ten years later. The tree has much the appearance of the common quince, as well as the fruit. It is remarkable for the number and brilliancy of its flowers.

Ornamental Crabs.

The crab of Siberia, which had been introduced into this country within the last fifty years, has contributed to the extension of our varieties of apple, by offering a valuable stock for grafting. The fruits thus produced by the union of our richest apples and the Siberian crab are remarkably hardy and luxuriant. The Siberian crab differs in a peculiar manner from our native crab. It furnishes one of the many evidences of the continued influence of original climate upon vegetables, when they are naturalized in another region. The winters of Siberia are intensely cold, the change to summer is sudden, and the heat equally violent. Our own changes of temperature are much slower, and more irregular. Thus, when the native crab scarcely shews signs of life, the Siberian variety puts forth its leaves, blossoms, and bears fruit, early even in an unfavourable season.* The flowers of the Siberian crab are beautiful; and its fruit is of a sharp, yet pleasant, flavour. There are many pretty varieties of *Pyrus*, which are principally cultivated in our gardens for their flowers. The Chinese crab (*Pyrus spectabilis*) is most showy and ornamental. It grows to the height of twenty or thirty feet. Its blossoms are of a pale red, but they are of short

* See Hort. Trans., vol. i.

duration. Dr. Fothergill is considered to have introduced this native of China, which he cultivated in 1780. The Japan crab, or quince, (*Pyrus*, or *Cydonia Japonica*,) was brought here about 1796; but it was described as a very rare plant in the Botanical Magazine of 1803. Its blossoms are of a deep red, and its flowers succeed each other during many months. The white variety of the *Pyrus Japonica* is a yet more recent introduction. It blooms abundantly in April and May; and as it will grow in almost any soil, and may be increased by layers and cuttings, is very valuable as an ornamental tree. The *Pyrus pollveria* (figured in Loddiges' Botanical Cabinet, vol. xi.) is a native of Germany. Its flowers are beautiful, and its fruit not unpleasant. The *Pyrus salicifolia* is said to have been introduced into this country by Pallas, the celebrated naturalist. He found it in sandy deserts, between the rivers Terec and Cuma. It grows also on Caucasus and in Persia. With us it is a small tree, with pendulous branches, and beautiful silvery leaves *

The Medlar—*Mespilus Germanica.*

The medlar is a fruit resembling the smaller apples, and has a good deal of flavour, but is not fit for use until it is very ripe. This ripeness is seldom or never attained while the fruit remains on the tree. It is generally understood to be a native of the south of Europe; but it has been naturalized, though rarely, in the hedgerows in England.

The common medlar is a middle or small-sized branching tree; covered with spines in the wild state, and having ash-coloured bark. In Sicily, according

*Loddiges' Cabinet, vol. xii.

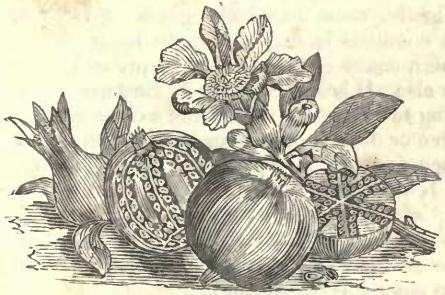
to Miller, it rises to be a large tree, with a straight stem, and the fruit shaped like a pear. The Dutch medlar, which is the kind most cultivated in England does not reach a great height, and is crooked and unsightly in the branches. The leaves are much larger than those of the common medlar, and they are downy on their under sides. The fruit, also, is larger, and so are the flowers; but it is inferior in pungency and flavour to the smaller sort, which is known by the name of the Nottingham medlar.

The timber of the medlar is very hard and durable. The tree is also rather a slow grower, and lasts to a great age.

Chapter II.

Pulpy Fruits borne by Shrubs and Trees.—Pomegranate; Fig; Vine.

Pulpy fruits are distinguished from others by the softness of their texture, in which the seeds lie imbedded. They differ very much among themselves in botanical characters,—some being berries, others pulpy receptacles; but the arrangement is sufficiently precise for our purpose.



The Pomegranate—*Punica Granatum.*

Before the peach, the nectarine, and the apricot had travelled from Persia to the more western countries on the borders of the Red Sea, the pomegranate was there assiduously cultivated, and held in the greatest esteem. In the wilderness, when the children of Israel murmured for the fruits of Egypt,

they exclaimed, "It is no place of seed, or of figs or of vines or of pomegranates." On the borders of the promised land, Moses described it as "a land of wheat, and barley, and vines, and fig-trees, and pomegranates; a land of oil-olive, and honey." In the Canticles, Solomon speaks of "an orchard of pomegranates, with pleasant fruits." A tree, therefore, which partakes of the antiquity of the vine, the fig, and the olive,—and which, in point of utility, is numbered with the grain-bearing plants, and with honey, all constituting the principal food of the nations of antiquity, in their early stages of civilization,—must possess a considerable historical interest. It is probable that the pomegranate, differing from the stone fruits, travelled from the West to the East. Pliny says that it is a native of Carthage, as its name (*Punica Granatum*) imports. Yet as it is found wild in the same botanical regions of Europe,—that is, in countries having the same temperature as the northern coasts of Africa,—it is probably indigenous there also. It is still common in Barbary, (where, according to Shaw, the fruit often weighs a pound, and is three or four inches in diameter,*) in the south of France, in Italy, in Spain, and throughout the East. The Jews employ the fruit in their religious ceremonials; and it has entered into the heathen mythology—for in the isle of Eubœa there was formerly a statue of Juno, holding in one hand a sceptre, and in the other a pomegranate.

This general diffusion of the pomegranate throughout the climates suited to it, implies that it possesses highly valuable properties. In hot countries its utility is incontestable; for its juice is most grateful to the palate, and assuages thirst in a degree quite peculiar to it from its pleasant acid—an acid so soft, that the

* Travels, vol. i.

pomegranate may still be called "full of melting sweetness.*" The bark is very astringent, and was anciently employed in dyeing leather: the yellow Morocco of Tunis is still tinted with an extract from it. The flowers were also used to dye cloth of a light red. The tree is easily propagated by cuttings.†

The pomegranate tree attains the height of about twenty feet. The branches are thick, and in some of the varieties they are armed with spines. The leaves, which are of a beautiful green, stand opposite, and are about three inches long, and half an inch broad at the middle. The flowers come out at the end of the branches; they are sometimes in clusters of three or four, and the times of their blowing are so irregular, that the succession is often continued for months. The petals are handsome, very thick, and fleshy. The beauty of the tree, independently of its fruit, has caused it to be planted for ornament in the South of Europe, and in the East. "The nightingale," says Russel, in his account of Aleppo, "sings from the pomegranate groves in the day-time."

In England, the fruit very seldom arrives at maturity; but the tree is highly prized as an ornament, the flowers being of a bright scarlet colour, and (especially the double ones) very handsome. Their odour, too, is as fragrant as their colour is bright. The longevity of the pomegranate tree is remarkable. At Paris and at Versailles there are specimens which are distinctly ascertained to have existed more than two centuries. The pomegranate, even at Paris, will not bear exposure in the open air too early in the spring; but it is not quite so delicate as the orange, and is therefore generally removed from the houses eight or ten days earlier.

It is stated that the pomegranate was first cultivated in England in the time of Henry VIII. Ge-

* Moore. † See p. 320.

rard says he reared several plants from the seeds; and it is mentioned amongst the trees that bore fruit in the orangery of Charles I.

THE FIG—*Ficus carica.*

The traditions of the Greeks carried the origin of the fig back to the remotest antiquity. It was probably known to the people of the East before the Cerealia (wheat, barley, &c.); and stood in the same relation to men living in the primitive condition of society as the banana does to the Indian tribes of South America, at the present day. With little trouble of cultivation, it supplied their principle necessities; and offered not an article of occasional luxury, but of constant food, whether in a fresh or a dried state. As we proceed to a more advanced period of the history of the species, we still find the fig an object of general attention. The want of blossom on the fig-tree was considered as one of the most grievous calamities by the Jews. Cakes of figs were included in the presents of provisions by which the widow of Nabal appeased the wrath of David.* In Greece, when Lycurgus decreed that the Spartan men should dine in a common hall, flour, wine, cheese, and figs

* 1 Samuel, chap. xxv., v. 18.

were the principal contributions of each individual to the general stock. The Athenians considered figs an article of such necessity that their exportation from Attica was prohibited. Either the temptation to evade this law must have been great, or it must have been disliked ; for the name which distinguished those who informed against the violators of the law, συκοφάνται,—(from σῦκον, a fig, and φαίνω, to shew,) became a name of reproach, from which we obtain our word sycophant. As used by our older writers, sycophant means a *tale-bearer;* and the French employ the word to designate a liar and impostor generally—not a flatterer merely. At Rome the fig was carried next to the vine in the processions in honour of Bacchus, as the patron of plenty and joy ; and Bacchus was supposed to have derived his corpulency and vigour, not from the vine, but from the fig. All these circumstances indicate that the fig contributed very largely to the support of man; and we may reasonably account for this from the facility with which it is cultivated in climates of moderate temperature. Like the cerealia, it appears to flourish in a very considerable range of latitude ; and even in our own country frequently produces fine fruit, without much difficulty, in the open air. Yet the tree is not generally cultivated except in very favourable situations ; and it must belong to more genial climates to realize the ancient description of peace and security, which assigns the possession of these best blessings of Heaven to " every man under his own fig-tree."

The fig consists of a pulp, containing a number of seed-like pericarps, inclosed in a rind. There is something very singular in the fructification of the *Ficus carica.* It has no visible flower ; for the fruit arises immediately from the joints of the tree, in the form of little buds, with a perforation at the end, but

not opening or shewing anything like petals, or the ordinary parts of fructification. As the fig enlarges, the flower comes to maturity in its concealment ; and in the eastern countries the fruit is improved by a singular operation known by the name of *caprification*. This is performed by suspending by threads, above the cultivated figs, branches of the wild fig, which are full of a species of cynips. When the insect has become winged, it quits the wild figs and penetrates the cultivated ones, for the purpose of laying its eggs; and thus it appears both to ensure the fructification by dispersing the *pollen*, and afterwards to hasten the ripening by puncturing the pulp, and causing a dispersion or circulation of the nutritious juices. In France, this operation is imitated by inserting straws dipped in olive oil.

The double, and, in some climates, the treble, crop of the fig-tree, is one of the most curious circumstances belonging to its natural history, and further illustrates the value attached to it in the countries of the East. It offers the people fruit through a considerable portion of the year. The first ripe figs, according to Dr. Shaw, are called boccôre, and come to maturity about the latter end of June ; though, like other trees, they yield a few ripe before the full season. These few are probably of inferior value ; for the prophet Hosea says, "I found Israel like grapes in the wilderness ; I saw your fathers as the first-ripe in the fig-tree at her first time." When the boccôre draws near to perfection, the karmouse, or summer fig, begins to be formed. This is the crop which is dried. When the karmouse ripens in Syria and Barbary there appears a third crop, which often hangs and ripens upon the tree after the leaves are shed.

The time of gathering the summer-fig in the Levant, with its corresponding process of drying and

packing for the European market, is one of consider able bustle and activity. The principal seat of this commerce is Smyrna.

The import of figs to Great Britain alone, which is principally from Turkey, amounts to nine hundred tons annually, subject to a duty of 1*l.* 1*s.* per cwt. Dry figs form, also, a very considerable article of commerce in Provence, Italy, and Spain; beside affording, as in the East, a chief article of sustenance to the native population. In Spain the principal exports of dried figs are from the provinces of Andalusia and Valencia; though the fruit grows, more or less, in every province.* In the northern parts of France there are many fig gardens, particularly at Argenteuil.

It is probable that if the fresh fig were much esteemed by the people of this country, the tree would be more extensively cultivated here in favourable situations, such as our southern coast. But it would seem, from our old writers, and indeed from a common expression even of the present day, that, from some association of ideas, the fig was an object of contempt. "*Figo* for thy friendship," says Pistol.† Steevens, the commentator on Shakspeare, thinks that "the fig of Spain," mentioned in many of our old poets, alluded "to the custom of giving poisoned figs to those who were the objects of Spanish or Italian revenge;" and hence probably, a vulgar prejudice against the fruit. We have, however, old trees still remaining in some gardens, which bear good crops. These are generally trained against walls; but fig-trees have also been planted as standards here with success. We shall mention a few instances of each case.

The fig-tree is said to have been first brought into England, in 1525, by Cardinal Pole; though probably it was introduced before, both by the Romans and the

*Laborde's View of Spain, vol. iv. † Henry V.

monks. The specimens came from Italy, and are still in the archbishop's gardens at Lambeth. They are of the white Marseilles kind, and bear excellent fruit. In the course of their long existence, they have attained a size far exceeding the standard fig-tree in its native situations. They cover a space of fifty feet in height, and forty in breadth. The trunk of the one is twenty-eight, and the other twenty-one inches in circumference. In the severe winter of 1813-14, those venerable trees were greatly injured; and, in consequence of the injury, it was found necessary to cut the principal stems down nearly to the ground; but the vegetative powers of the roots remained unimpaired, and they are shooting up with great vigour.

In the garden of the manor-house at Mitcham, which was formerly the private estate of Archbishop Cranmer, there was another fig-tree of the same sort, which is generally understood to have been planted by that prelate. It was low, compared with the trees at Lambeth, but had a thicker stem. It was destroyed some time before the close of the last century.

Another celebrated fig-tree was in in the Dean's garden at Winchester. It bore a small red fig, and was in a healthy state in the year 1757. It was inclosed in a wooden frame, which had a glass door, with two windows on each side, by which the sun and air were admitted, while the frame protected it from the wind and rain. On the stone wall to which the tree was nailed, there were several inscriptions; and, among the rest, one which mentioned that, in the year 1623, King James I. "tasted the fruit of this tree with great pleasure." That tree also has been destroyed.

A few years since, there was a fine old fig-tree at the back of a house, in King-street, Covent-Garden. The trunk has now been cut down to build a wall

where it grew; but shoots are springing up from the root. This tree was doubtless one of the *Convent Garden;* which, in the reign of Elizabeth, bounded the Strand, on the north, extending from St. Martin's Lane to Drury Lane—these two lanes being the only approaches to the neighbouring village of St. Giles.

The *Pocock Fig Tree* is one of the most celebrated in this country, and was once supposed to have been the first of the white Marseilles figs introduced into England. The tradition is, that it was brought from Aleppo by Dr. Pocock, the celebrated traveller, and planted in the garden of the Regius Professor of Hebrew at Christ Church, Oxford, in the year 1648. An extract from a communication by Mr. William Baxter, curator of the Botanical Garden at Oxford, read before the Horticultural Society in 1819, contains the latest history of this tree. It received considerable damage from the fire that happened at Christ Church on the 3rd of March, 1809: till that time, the large trunk mentioned by Dr. John Sibthorpe, in Martyn's edition of Miller's Gardener's Dictionary, remained. In order to preserve it from the injuries of the weather, this trunk had been covered with lead; but at the time of the fire the lead was stolen, and, soon after, the trunk itself decayed, and was removed. The tree in 1819 was in a very flourishing state. There are some remains of the old trunk to be seen a few inches above the surface of the ground. The branches then growing were not more than eight or ten years old; but those in the middle of the tree were twenty-one feet high.

It is probable that standard fig-trees were formerly much more common in this country than at present. Bradley, an old writer on agriculture, mentions an ancient fig-tree at Windsor, which grew in a gravel-pit, and bore many bushels every year, without any pains being bestowed upon it.

In the fourth volume of the Horticultural Transactions, there is a very interesting account, by Mr. Sabine, of some standard fig-trees in the garden of a cottage at Compton, near Worthing, in Sussex. The garden in which they stand slopes gently to the south, is protected on the north by a thick grove of apple and plum trees, and the climate is very mild. "The number of the fig-trees," says Mr. Sabine, "is fourteen; they occupy the principal part of the garden, which is very small, and are in perfect health; their average height is about ten feet; and, if any of the larger ones were detached, they would cover a space of twelve feet in diameter. Their stems are not large: the plants are bushes rather than trees, for the branches spread in all directions from the root. These are propped up by stakes, but many of them are suffered to hang near the ground." Mr. Kennard, to whom they belonged, informed Mr. Sabine, that though the quality varied, there always was a crop; that the figs begin to ripen in the end of August, or beginning of September, and continued during October; that the crop was generally from the spring figs, though occasionally a few of the autumn ones ripened; that he manured the ground every autumn; and that he pruned as little as possible.

In the neighbourhood of Worthing, and indeed along nearly all the south-east coast of Sussex, fig-trees are very common in the gardens. At Tarring (about two miles from Worthing) there is a remarkable plantation of figs, called by the inhabitants of that village, "The Fig-garden." The trees, which are about eighty in number, grow luxuriently at intervals of about twelve feet, on the sides of the paths. They are about fifteen feet high; and the stems are from six to eleven inches in diameter. We saw them on the first of September, 1829, bearing a most abundant crop. The people to whom the

garden belonged knew nothing of the history of these trees; but an old inhabitant of the village told us that he thought they had been planted about forty years.

With the requisite degree of care, figs may be readily obtained in this country in a hothouse; but they require a mode of cultivation so peculiar, that if it is wished to procure them in perfection they ought to be cultivated along with no other fruit, and then two or three crops may be gathered.

Of the fig-tree, botanists now describe very many species. One of these, the banian tree (*Ficus Indica*) deserves notice, not as a fruit tree, but from its being a sacred tree with the Hindoos in the East Indies, from the vast size that it attains, and from the singu larity of its growth. The fruit does not exeeed that of a hazel nut in bigness; but the lateral branches send down shoots which take root, till, in course of time, a single tree extends itself to a considerable grove. This remarkable tree was known to the ancients. Strabo mentions that after the branches have extended about twelve feet horizontally, they shoot down in the direction of the earth, and there root themselves; and when they have attained maturity, they propagate onward in the same manner, till the whole becomes like a tent supported by many columns. This tree is also noticed by Pliny with a minute accuracy. which has been confirmed by the observations of modern travellers; and Milton has rendered the description of the ancient naturalist almost literally in the following beautiful passage:—

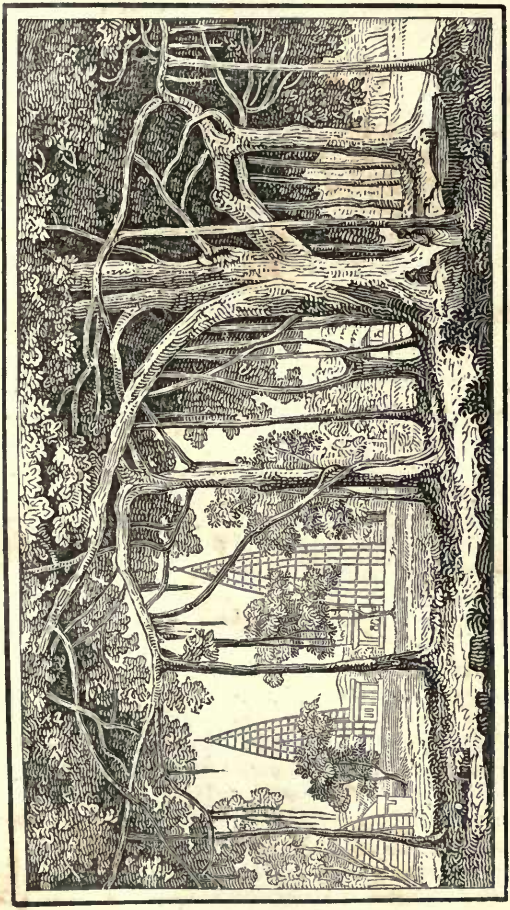
> "Branching so broad along, that in the ground
> The bending twigs take root; and daughters grow
> About the mother tree; a pillared shade,
> High over-arched, with echoing walks between.
> There oft the Indian herdsman, shunning heat,
> Shelters in cool; and tends his pasturing herds
> At loop-holes cut through thickest shade."

Some specimens of the Indian fig-tree are mentioned

as being of immense magnitude. One near Mangee, twenty miles to the westward of Patna, in Bengal, spread over a diameter of 370 feet. The entire circumference of the shadow at noon was 1116 feet, and it required 920 feet to surround the fifty or sixty stems by which the tree was supported. Another covered an area of 1700 square yards; and many of almost equal dimensions are found in different parts of India and Cochin China, where the tree grows in the greatest perfection. A particular account of the banian tree (sometimes called the pagod tree) is given in Cordiner's 'Ceylon.' Mr. Southey has also described it both in the spirit of a poet and a naturalist. The plate on page 251, which is copied from Mr. Daniell's splendid work on 'Oriental Scenery,' well illustrates this description:

"'Twas a fair scene wherein they stood,
A green and sunny glade amid the wood,
And in the midst an aged Banian grew.
It was a goodly sight to see
That venerable tree,
For o'er the lawn, irregularly spread,
Fifty straight columns propt its lofty head;
And many a long depending shoot
Seeking to strike its root,
Straight like a plummet, grew towards the ground.
Some on the lower boughs, which crost their way,
Fixing their bearded fibres, round and round,
With many a ring and wild contortion wound;
Some to the passing wind, at times, with sway
Of gentle motion swung;
Others of younger growth, unmov'd were hung
Like stone-drops from the cavern's fretted height.
Beneath was smooth and fair to sight,
Nor weeds nor briers deform'd the natural floor;
And through the leafy cope which bowered it o'er
Came gleams of chequered light.
So like a temple did it seem, that there
A pious heart's first impulse would be prayer.*"

* Curse of Kehama.



THE BANIAN—*Ficus Indica.*

THE VINE—*Vitis vinifera.*

Of all the berries, the grape has in every age been held the most in esteem. As is the case with the cerealia, the early history of the vine is involved in obscurity. The cultivation of the grape was, probably, amongst the earliest efforts of husbandry. "And Noah *began* to be an husbandman, and he planted a vineyard."* According to the tradition of the Egyptians, Osiris first paid attention to the vine, and instructed other men in the manner of planting and using it. The inhabitants of Africa ascribe the same gift to the ancient Bacchus. We find mention of the fermented juice of the grape as early as that of its cultivation. Wine was among the first oblations to the Divinity. "Melchizedek, King of Salem, brought forth bread and wine, and he was the priest of the Most High God.†" We may trace through all the most ancient records of the human race, a conformity between the chief articles of subsistence, and the sacrifices to heaven.

"The vine," says Humboldt, "which we now cul-

* Genesis, ix. 20. † Genesis, xiv. 18.

tivate, does not belong to Europe; it grows wild on the coasts of the Caspian Sea, in Armenia, and in Caramania. From Asia it passed into Greece, and thence into Sicily. The Phocæans carried it into the south of France; the Romans planted it on the banks of the Rhine. The species of *vites*, which are found wild in North America, and which gave the name of the land of the vine (*Winenland*) to the first part of the New Continent which was discovered by Europeans, are very different from our *vitis vinifera.*"* It is a popular error that the grape vine was common to both continents.

It has been said that the vine was introduced into England by the Romans; but if so, it could not have been till near the close of their influence, for Tacitus mentions that it was not known when Agricola commanded in the island. At the invasion of the Anglo-Saxons, however, when the country had been under the Roman dominion four hundred years, and had received, during that long period, all the encouragement which that people gave to the agriculture of their provinces, the vine, without doubt, was extensively cultivated. Vineyards are mentioned in the earliest Saxon charters, as well as gardens and orchards, "and this was before the combating invaders had time or ability to make them, if they had not found them in the island."† In the Cottonian Manuscripts, in the British Museum, there are some rude delineations in a Saxon calender, which, in the month of February, represent men cutting or pruning trees, some of which resemble vines. King Edgar, in an old grant, gives the vineyard, situate at Wecet, together with the vine-dressers. In 'Domesday Book,' vineyards are noticed in several counties. According to

* Géographie des Plantes, 4to., p. 26.
† Turner's Anglo-Saxons, Appendix to vol. ii. 8vo.

William of Malmesbury, who flourished in the first half of the twelfth century, the culture of the vine had in his time arrived at such perfection within the vale of Gloucester, that a sweet and palatable wine, "little inferior to that of France," was made there in abundance. In the thirteenth and fourteenth centuries, almost every large castle and monastery in England had its vineyard. The land on the south side of Windsor Castle, now a pleasant green lawn, running from the town under the castle-wall, was a vineyard, of which a particular account may be seen in the 'Archæologia.' At this period, wine was made in England in considerable quantities; and yet the importation of foreign wines was very large. In the year 1272, London imported 3799 tuns; Southampton and Portsmouth, 3147; and Sandwich, 1900.* In the time of Edward III., a trade in Rhenish wine was carried on between Hull and the ports of the Baltic.† The vineyards were, probably, continued till the time of the Reformatian, when the ecclesiastical gardens were either neglected or destroyed; and about this period, ale, which had been known in England for many centuries, seems to have superseded the use of wine as a general beverage. This arose from the better cultivation of the country. Under the feudal tenures, when the serfs were often suddenly compelled to follow their lords to battle, husbandry, particularly the growth of grain, was fearfully neglected; and sometimes the most dreadful famines were the result. The prices of wheat occasionally fluctuated from ten shillings to twenty pounds per quarter of modern money.‡ But when just principles of tenancy were established, so that the occupier of the land could be sure of appropriating to himself a

* Anderson's History of Commerce.

† Rymer's Fœdera.

‡ In 1270, wheat was £19 4*s.* per quarter; in 1316, it was 2*s.*

fair proportion of the fruit of his labour, agriculture began to flourish. The cultivation of hops was revived or introduced about the end of the fifteenth century. All these circumstances—the decay of the vineyards, the encouragement to the growth of grain, and the culture of hops—gradually tended to supersede the demand for wine, by offering a beverage to the people which was cheaper, and perhaps as exhilarating. Ritson a celebrated antiquary has preserved a rude ballad of this period in praise of that beverage which was becoming the national favourite :—

"Bryng us home no sydyr, nor no palde wyne;
For an that thou do shalt have Cryst's curse and mine:
But bryng us home good ale, and bryng us home good ale,
And for our der lady's love bryng us home good ale."

We understand that on the southern coast of Devonshire, possessing the mildest temperature of the English counties, there are still two or three vineyards, from which wine is commonly made. A vineyard at the castle of Arundel, on the south coast of Sussex, was planted about the early part of the last century, and of the produce there are reported to have been sixty pipes of wine in the cellars of the Duke of Norfolk, in 1763. This wine is said to have resembled Burgundy; but the kind of grape and the mode of culture have not been particularly recorded. Whatever may have been the condition and qualities of the early English grapes employed in making wine, we know that they must have been ripened by the natural temperature of the climate, as artificial heat was not resorted to for the ripening of grapes till the early part of the last century; and then the heat was applied merely to the other side of the wall on which the vines were trained: nor is it till about the middle of the same century that we have any account of vines being covered with glass. Professor

Martyn is an advocate for the renewal of grape culture in this country for wine. For that purpose he recommends that the vines should be trained very near the ground, he having found that, by this method of training, the berries were much increased in size, and also ripened earlier. The same method is pursued in the northern part of France, where it is found to be successful.

The culture of the grape, as an article of husbandry, extends over a zone about two thousand miles in breadth, that is, from about the twenty-first to the fiftieth degree of north latitude; and reaching in length from the western shores of Portugal, at least to the centre of Persia, and probably to near the sources of the Oxus and the Indus. Farther north than that, it does not ripen so as to be fit for the making of wine; and farther south, it seems to be as much injured by the excessive heat. The best wines are made about the centre of the zone; the wines towards the north being harsh and austere, and the grapes towards the south being better adapted for drying and preserving as raisins. Thus, in Spain, while the wine of Xeres, in the Sierra Morena (the real Sherry), is an excellent wine, and while that of the ridge of Apulaxarras, in Granada, is very tolerable, the grapes of the warm shores about Malaga, and in Valentia, are chiefly fit only for raisins. So, also, while the slopes of Etna, and those of the mountains in Greece, furnish some choice vines, the grapes upon the low shores in those countries have also to be dried. It should seem, that the grapes are always the higher flavoured and the more vinous, the greater the natural temperature under which they are ripened, but that an extreme heat throws the juice into the acetous fermentation before the vinous one has time to be matured. We have an analogous case in the fermentation of malt liquors in this coun-

try, which cannot be properly performed in the warm months.

About eight thousand tons of raisins, or dried grapes, are annually imported into England, at a duty of about £160,000. A considerable quantity of undried grapes are also imported, principally from Portugal, in jars, among saw-dust. The value of those so imported is about £10,000. The *currants* of commerce, which are so extensively used in England, and of which about six thousand tons are annually imported into this country, are small dried grapes, principally grown in the Ionian islands.

Laborde, in his account of Spain, gives the following description of the mode of drying raisins:—"In the kingdom of Valencia they make a kind of ley with the ashes of rosemary and vine branches, to which they add a quart of slacked lime. This ley is heated, and a vessel, full of holes, containing the grapes, is put into it. When the bunches are in the state desired, they are generally carried to naked rocks, where they are spread on beds of the field artemisia, and are turned every two or three days till they are dry. In the kingdom of Granada, particularly towards Malaga, they are simply dried in the sun, without any other preparation. The former have a more pleasing rind, but a less mellow substance; the skins of the latter are not so sugary, but their substance has a much greater relish; therefore, the raisins of Malaga are preferred by foreigners, and are sold at a higher price: to this their quality may likewise contribute; they are naturally larger, and more delicate, than those of the kingdom of Valencia."

A vineyard, associated as it is with all our ideas of beauty and plenty, is, in general, a disappointing object. The hop plantations of our own country are far more picturesque. In France, the vines are

trained upon poles, seldom more than three or four feet in height; and "the pole-clipt vineyard" of poetry is not the most inviting of real objects. In Spain, poles for supporting vines are not used; but cuttings are planted, which are not permitted to grow very high, but gradually form thick and stout stocks. In Switzerland, and in the German provinces, the vineyards are as formal as those of France. But in Italy is found the true vine of poetry, "surrounding the stone cottage with its girdle, flinging its pliant and luxuriant branches over the rustic viranda, or twining its long garland from tree to tree.*" It was the luxuriance and the beauty of her vines and her olives that tempted the rude people of the North to pour down upon her fertile fields:—

> "The prostrate South to the destroyer yields
> Her boasted titles and her golden fields;
> With grim delight the brood of winter view
> A brighter day, and heavens of azure hue,
> Scent the new fragrance of the breathing rose,
> And quaff the pendent vintage as it grows.†"

In Greece, too, as well as Italy, the shoots of the vines are either trained upon trees, or supported, so as to display all their luxuriance, upon a series of props. This was the custom of the ancient vine-growers; and their descendants have preserved it in all its picturesque originality.‡ The vine-dressers of Persia train their vines to run up a wall, and curl over on the top. But the most luxurious cultivation of the vine in hot countries is where it covers the trellis-work which surrounds a well, inviting the owner and his family to gather beneath its shade. "The fruitful bough by a well" is of the highest antiquity.

* The Alpenstock, by C. J. Latrobe, 1829.
† Gray's Alliance of Education and Government.
‡ See the second Georgic of Virgil.

The vine lasts to a considerable age ; it spreads also to a large extent, or, when supported, rises to a great height. Although it bears at three or four years plentifully, it is said that vineyards improve in quality till they are fifty years old.* Pliny mentions a vine which had attained the age of six hundred years. In France and Italy there are entire vineyards still in existence, and in full bearing, which were in the same condition at least three centuries ago, and have so continued ever since. The slender stems of ordinary vines, when they have attained a considerable age, are remarkably tough and compact; and the timber of the very old ones in foreign countries, which is occasionally of size enough for being sawn into planks, and being made into furniture and utensils, is almost indestructible. Strabo mentions an old vine which two men could not embrace. A single vine plant, which was trained against a row of houses at Northallerton, covered, in 1785, one hundred and thirty-seven square yards. It was then about a hundred years old, and it increased in size afterwards ; but it is now dead. In 1785, the principal stem of this vine was about fifteen inches in diameter.

Of the variety of the vine called the black Hamburgh there are several remarkable trees in England, covering a great extent of surface, and bearing (under glass) a profusion of the finest fruit. Of these, among the most celebrated are the Hampton Court vine, and the vine at Valentines, in Essex. The Hampton Court vine is in a grape-house on the north side of the palace: it covers a surface of twenty-two feet by seventy-two, or 1694 square feet. It is a most productive bearer, having seldom fewer than two thousand clusters upon it every season. In the year 1816, there were at least 2240, weighing each, on the

* Miller.

average, a pound ; so that the whole crop weighed a ton, and, merely as an article of commerce, was worth upwards of £400. The Valentines vine extends over a greater surface, and has a larger trunk, than that at Hampton Court; but it is not, on the average of seasons so productive. It has, however, been known to produce two thousand bunches of a pound each.

Chapter III.

Pulpy Fruits, borne by Shrubs and Trees, continued.—Mulberry; Currant; Gooseberry; Raspberry; Strawberry; Barberry; Elder; Bramble; Cloud-Berry; Bilberry; Gualtheria Shallon.

a. Currant. b. Gooseberry. c. Raspberry. d. Strawberry. e. Mulberry.

The Mulberry—*Morus nigra.*

The mulberry tree appears to have formed an object of cultivation at a very early period in the western parts of Asia, and in Europe. The attention there bestowed upon it must have been solely on account of its fruit; for the knowledge of the mode of rearing silk-worms was confined to the people of central and southern Asia till the sixth century. We read in the Psalms that the Almighty wrath destroyed the

"mulberry-trees with frost;" and this must have been recorded as a remarkable instance of the divine displeasure, for the mulberry is universally known not to put forth its buds and leaves till the season is so far advanced that, in the ordinary course of events, there is no inclement weather to be apprehended. It has therefore been called the wisest of trees; and in heraldry it is adopted as "an hieroglyphic of wisdom, whose property is to speak and to do all things in opportune season."* In the history of the wars of David with the Philistines, the mulberry-tree is mentioned as a familiar object. Pliny says of it, somewhat questionably, that "when it begins to bud, it despatches the business in one night, and that with so much force, that their breaking forth may be distinctly heard." Thunberg, an oriental traveller, tells us, which is still more extraordinary, that the sheath which encloses the flower of the talipot palm bursts with an explosion like the report of a cannon.

In this country, there are many old mulberry-trees, of large dimensions, and remarkable also for the quantity of fruit they bear. It is probable that some of these old trees were planted at the latter end of the sixteenth and the beginning of the seventeenth centuries; for James I. endeavoured to render the cultivation of the tree general, in the same way that Henry IV. had laboured to introduce it in France. The first mulberry-trees of England are said to have been planted at Sion House, the seat of the Duke of Northumberland, in 1548; and the trees, though decayed in the trunk, still bear fruit. Mulberry gardens were common in the seventeenth century, in the neighbourhood of London; but either from the climate, or the prejudices of the people, the growth of silk never prospered. The mulberry is distinguished for the facility with which it may be

* Guillam's Display of Heraldry.

propagated. A cutting from a tree which has borne fruit will soon become a vigorous plant. It is recorded that, at Bruce Castle, at Tottenham, an immense branch being torn off by the wind from an old mulberry-tree, about forty years ago, the branch was thrust into the ground, and flourished. It is now a handsome tree. That part of the trunk of the old tree which lost the branch is covered with lead. But at the same time the mulberry has been also remarkable for not producing fruit till the trees have acquired a considerable age; and this circumstance has materially affected its cultivation as a fruit tree. The same objection has applied to the walnut. Recent experiments, however, have shewn that, by proper culture, both the mulberry and the walnut may be made to produce fruit at three years old.

A particular description of the mulberry as a timber tree has been already given,* and its important services to the arts in the rearing of silk-worms has also been noticed. The sort principally cultivated for fruit is the black mulberry (*Morus nigra*), although the fruit of the white, Tartarian, red, and Pensylvanian species (of the white particularly) "are of sufficient consequence to merit a place in a list of edible fruits."† The black mulberry is a hardy tree; and, as the berries are abundant, and of very wholesome quality, while the wood makes excellent timber, and the leaves are adapted for the feeding of silk-worms as well as those of the white mulberry, it deserves more attention than it generally receives.

The mulberry is the latest tree to put forth its leaves; and it drops every leaf on the first night of severe frost. Some trials have been made of mulberries trained against a south wall, and the result has been a great improvement in the fruit.

* Timber Trees, p. 141.
† Horticultural Society's Fruit Catalogue.

The Currant and Gooseberry—*Ribes.*

The currant was formerly erroneously held to be the Corinthian grape degenerated. It is now considered as a native of this country, the red (*Ribes rubrum*) being found growing naturally in many places both of England and Scotland, and the white being merely a variety of the red. Mr. Aiton, in his Hortes Kewensis, is of opinion that it is a native production. Its name, however, being the same as the small seedless grape of the Levant (*Corinth*), is against this theory; and in 'Dodoen's History of Plants,' translated in 1578, it is called "the red beyond-sea gooseberry." The white, having the most delicate flavour, is most in request for the dessert. The red is principally used in the preparation of jellies; and the white is converted into wine, which, with fine fruit, and using the juice alone, or only with sugar, without any mixture of spirits or of water, may, when kept to a proper age, be made to equal some of the inferior wines from the grape. For pastry, the currant is amongst the most valuable of the British fruits, being easily preserved, and growing in sufficient abundance, on account of its hardiness, to offer a cheap luxury to the humblest classes. This bush forms the principal ornament of some of those neat cottages which are or were the peculiar characteristic of England; and which it would be wise, as well as benevolent, in the landlords to multiply, if they could steadily keep out of them all who were unable to maintain themselves. In parts of the country where it is the custom to train the currant against the walls of the house, its rich dark leaves, and its brilliant fruit, growing over the latticed window, offer almost as pleasing a picture as the vines of Italy.

The *Black Currant* (*Ribes nigrum*) is supposed to

be a native of Britain; or, at all events, the period of its introduction is unknown. The berries are larger than those of the red or the white, but they are not so juicy; and the crop upon a single bush is less abundant. Their taste is peculiar, and to some disagreeable; they are supposed to have medicinal qualities which do not belong to the other species of currants. They answer well for tarts and puddings; they can be made into a very pleasant jelly, which, in village pharmacy, is recommended in cases of sore throat; and they make a very good *rob* (souring) for flavouring liquors. The leaves of the black currant have a strong taste, especially in the early part of the season; and if a small portion be mixed with black tea, the flavour is changed to one resembling that of green. On this account, it is suspected that those leaves are pretty extensively used in the adulteration of tea,—the coarser sort of black being coloured green by moistening it with vinegar, laying it upon heated plates of copper till it be shrivelled into small balls, and mixing it with black currant leaves, which have also been shrivelled by heat. If this process has been employed the tea will discolour a silver spoon.

There are thirty-five varieties of the currant specified in the fruit catalogue of the Horticultural Society; but there is perhaps no class of fruits in which so much ignorance exists as to the merits and difference of the varieties. It is stated to be impossible to obtain the different kinds with certainty from the nurseries.

The *Gooseberry* (*Ribes grossularia*), if not a native of Britain, is yet a fruit much better adapted to cold than to warm climates. It was cultivated here in the time of Tusser, a writer on husbandry,

who flourished in the reign of Henry VIII. He says,

> "The barberry, respis,* and gooseberry too,
> Look now to be planted as other things do."

In the south of Europe, it is small, tasteless, and neglected; and though it grows to a large size in the warmer parts of England, its flavour there is very inferior to that which it has in Scotland. Even in that country, the flavour seems to increase with the cold; for if there be warmth enough for bringing gooseberries to maturity and ripening them, the farther north they are grown the better. The market-gardeners about Edinburgh pay much attention to the culture and kinds of their gooseberries; but they are never equal in flavour to those which are grown at Dundee, Aberdeen, or Inverness.

In England, the Lancashire gooseberries are the finest in appearance. They are very large; but their flavour is far inferior to that of the Scotch. Perhaps the inferiority of the English berries may be in great part owing to the large sorts that are cultivated,—the finest, even in Scotland, being those that are of a middle size.

Gooseberries are of various colours,—white, yellow, green, and red; and of each colour there are many sorts. If, however, any particular sort be wished to be preserved, it must be done by cuttings, because the seeds of any one sort are apt to produce not only all the known sorts, but new ones. In almost all fruit trees, indeed, that run into sorts, the only way of securing a favourite sort is by budding, grafting, or planting cuttings. The bud or the branch does not change, but the seed does; and most of the varieties of apples called pippins have been obtained by sowing the seeds or pips of other

* Raspberry.

sorts. It is generally supposed that this is effected by variation of soil and climate; and as it is well known that every cultivated vegetable degenerates when repeatedly *sown* in the same soil, it is by no means improbable that the quality of fruit trees might be very much improved by raising them from the seed, in situations as different as possible from those in which the seed is produced.

The gooseberry plant, under favourable circumstances, will attain a considerable age, and grow to a great size. At Duffield, near Derby, there was, in 1821, a bush ascertained to have been planted at least forty-six years, the branches of which extended twelve yards in circumference. At the garden of the late Sir Joseph Banks, at Overton Hall, near Chesterfield, there were, at the same time, two remarkable gooseberry plants, trained against a wall, measuring each upwards of fifty feet from one extremity to the other.*

The yellow gooseberries have, in general, a more rich and vinous flavour than the white: they are, on that account, the best for the dessert, and also for being fermented into wine. When the sort is choice, and well picked, so that none of the fruit is damaged, or over or under ripe, and when the wine is properly made, it often puzzles an unpractised taste to distinguish the wine of the best yellow gooseberries from champaign. It has the flavour and colour, and it mantles like the best of the foreign wine.

Generally speaking, the green gooseberries are inferior to the yellow, and even to the white: many of them, however, run large, and are used for the sake of appearance. Large gooseberries in general, and large green ones in particular, are thick in the husk, and contain less pulp than those of a smaller size; while the flavour is in general rich in proportion to

* Hort. Trans. vol. v.

the thinness of the husk. Some of the larger greens, especially those that are smooth, gourd-shaped, and of a brownish tinge, are almost tasteless, or even disagreeable.

The red gooseberries are very various in flavour, but are commonly more acid than the others. The same may be said of most other fruits; and it agrees with the well-known fact that acids change the vegetable blues to red. In many fruits, and the goose berry in particular, the amber colour is accompanied by the richest vinous flavour, while the white tends to insipidity. When the green is deep and pure, sweetness seems to be the leading characteristic, as in the Gascoigne gooseberry, the green-gage plum, and the small green summer pear, known in Scotland by the name of the "Pinkey green." Among the red gooseberries there are, however, many exceptions. Some of the older and smaller red sorts (especially that known by the name of the "old ironmonger") are very sweet. It would be unavailing to fix upon any particular kind of gooseberry as the best, as every year produces new varieties. In the fruit catalogue of the Horticultural Society there are nearly two hundred kinds enumerated, of which about a hundred and fifty are the large Lancashire gooseberries.

The cultivation of gooseberries forms a pleasing occupation amongst the manufacturers of that part of the kingdom; and the custom has doubtless a tendency to improve both the health and the morals of the people. Any pursuit which makes men acquainted with the peculiarities of vegetable economy, in however small a degree, has a beneficial effect upon the heart and understanding: and it is certainly better for weavers and nailers to vie with each other in raising the largest gooseberries, than in those games of chance or cruel sports, to which the few leisure hours of the working classes are too often devoted. The one is a rational and innocent emulation; the other,

a degrading excitement, or a brutal indulgence. The names of the Lancashire gooseberries are indicative of their humble origin,—"Jolly Miner," "Jolly Painter," "Lancashire Lad," "Pastime," "Top Sawyer," and so forth, may appear odd to a foreigner; but they are characteristic of the manners of the country in which they are produced, as the high-sounding titles which distinguish the fruits of other nations are indicative of theirs.

The gooseberry shows of Lancashire, Cheshire, Staffordshire, Warwickshire, and other manufacturing counties, are conducted with great system; and an annual account of them, forming a little volume, is printed and published at Manchester. The heaviest gooseberry which appears to have received a prize, was exhibited at the Shakspeare Tavern, Nantwich, in 1825: it weighed 31 dwts. 16 grains. The prizes given on these occasions are adapted to the manners of the homely people who contend for them, being generally either a pair of sugar-tongs, a copper tea-kettle (the favourite prize), a cream-jug, or a corner cupboard. The proceedings of these contests, and the arrangements for future years, are registered with as much precision as the records of horse-racing; and, doubtless, the triumphs which are thus handed down to the collier's or the weaver's children, by the additions which the goodman makes to his household ornaments, are as deeply valued as the "gold cups" of Newmarket.

The Raspberry—*Rubus idæus.*

This plant obtains its common name from the rough and bristly appearance of the fruit. The French call the raspberry "Ronce du Mont Ida," (in common parlance, "Framboise,") considering it a native of that classic ground, for which they have the authority of Pliny. The root is perennial and spread-

ing, but the stems last only two years. Both the red and the white varieties are natives of Britain, and prefer situations that are shaded and rather moist The uses of the raspberry, both for the table and for sweetmeats, are well known. Though the flavour of raspberries is peculiar, it is one which is very generally liked ; but it is the most fleeting with which we are acquainted. Even a few hours will diminish it ; and if the berries be kept for two or three days, the flavour is almost entirely gone. Even on the bush, the flavour does not continue above two or three days after the fruit is ripe. Raspberries, indeed, to be enjoyed in perfection, should be eaten from the bush. They require less attendance than almost any other fruit ; and if the twice-bearing kind be mixed with the others, they may be continued till November. The shrubs come into full bearing about three years after the planting of the stools or roots, and they last good for about three years more, at the end of which they begin to degenerate. The common mode of propagation is by cuttings, which should always be taken from plants that are in their prime bearing condition, on or about the fourth year after they are planted. A quantity of peat or bog-earth greatly improves both the size and the flavour of raspberries. New varieties may easily be obtained from the seed, the plants raised from which begin to bear the second year. There are thirty-five varieties of raspberry mentioned in the Fruit Catalogue of the Horticultural Society ; of which the differences in quality are very considerable. Gardeners in general appear to have paid too little attention to these differences.

The Strawberry—*Fragaria vesca.*

No vegetable production of the colder latitudes, or which can be ripened in those latitudes without

the assistance of artificial heat, is at all comparable with the strawberry in point of flavour; and, if the soil and situation be properly adapted to it, the more cold the climate, indeed the more bleak and elevated, the more delicious is the berry. The fine *aroma* of the strawberry is not quite so evanescent as that of the raspberry; but it is by no means durable, and the berries can be had in absolute perfection only when taken from the plants, and in dry weather, for a very slight shower will render the strawberry comparatively flavourless. The soils and situations in which the strawberry and the raspberry come to the greatest perfection are the very opposites of each other. The strawberry, in all its varieties, certainly in all the finest of them, is a sort of rock plant; and soil which contains a good deal of decomposed rock, more especially if that rock be greenstone, or any other containing much clay, produces fruit of the finest flavour. The places where the strawberry is the finest, as raised for the market, and of course as produced at the least expense of artificial culture, are probably Edinburgh and Dundee, at both of which the soil is of the description mentioned.

The strawberry is very widely diffused, being found in most parts of the world, especially in Europe and America. Its common name is peculiar to England, and is supposed to have been derived from the custom of laying straw under strawberry plants when their fruit begins to swell. Others, however, contend it is *straw*berry, from its trailing along the ground. The gardener of Sir Joseph Banks revived this old method with advantage. The fruit was known in London as an article of ordinary consumption, in the time of Henry VI. In a poem of that age, called 'London Lyckpenny,' by John Lidgate, who died about 1483, we find the following lines :—

"Then unto London I dyde me hye,
Of all the land it bearyth the pryse;
'Gode pescode,' owne began to cry—
'Strabery ripe and cherrys in the ryse.'"

It is mentioned by Hollinshed, and the fact has been dramatised by Shakespeare, that Glo'ster, when he was contemplating the death of Hastings, asked the bishop of Ely for strawberries :—

"My lord of Ely, when I was last in Holborn,
I saw good strawberries in your garden there."

The palace and garden of the bishop occupied the site which is now Ely-place.

The cultivation of the strawberry, at the present time, is very extensive in the neighbourhood of London. The largest quantities, and the finest sorts, are grown at Isleworth and Twickenham. One of the most remarkable examples of the power of the human body in the endurance of great and continued fatigue, is shewn by the strawberry women, who, during the season, carry a heavy basket on the head twice daily from Twickenham to Covent Garden, walking upwards of forty miles. Fatigue like this would soon destroy a horse ; but these women, who come purposely from Wales and the collieries, endure the labour for weeks without injury or complaint.

The common wood strawberry (which was probably the earliest cultivated) has the leaves rather small, the runners (at the joints of which the new plants are produced) slender, and often of a purple colour. The fruit is small, and generally red, but without much flavour, owing to its being shaded from the sun. When brought out of the shade, or in countries where the influence of the sun is more powerful, both its size and flavour are very much improved; and though not the handsomest, it becomes far from the worst of the cultivated sorts. There is a variety of the wood strawberry a good deal paler, both in the leaves and the fruit, than the one now

mentioned, which also ripens later in the season; but it is by no means productive, and is accordingly not much cultivated.

The Alpine strawberry is, in its native situation, a more vigorous plant, and produces larger and more highly flavoured fruit than the common one of the woods. It is often much darker in the colour than any of the other strawberries; and when it is so, the flavour has a sharpness bordering upon austerity.—Still, however, it is an excellent fruit; and it has this advantage, that it continues bearing from June until stopped by the frost; and, in very open seasons, fruit has been gathered from it at Christmas.

The Hautbois was the first known of the larger variety of strawberry. Its history has never been well ascertained, though it is generally believed to be the mountain strawberry of Bohemia, and to have been first improved by cultivation in France. The hautbois is very productive; and the fruit is highly flavoured, with a peculiar kind of perfume; but some care is necessary in order to prevent the plants from degenerating. The name of this strawberry is probably derived from the circumstances of the scape which bears the fruit standing higher than the leaves, and, consequently, being called hautbois (high wood). It is not improbable, however, that its original locality in the *high woods* of Bohemia may have suggested the name. In the old gardening books it is written hautboy.

In the early part of the last century, the Alpine strawberry of Chili was introduced into the Royal Gardens at Paris, and from thence found its way over many parts of Europe. It grew to a very large size, and had a finer colour than the hautbois; but in the southern countries of Europe it was soon neglected, because it ran greatly to leaves, produced comparatively little fruit, and what it did produce was defi-

cient in flavour. The "old scarlet strawberry," which was an original introduction from North America, has been an inhabitant of our gardens for nearly two hundred years. The "old black strawberry," an unproductive sort, has been long known in England. The "Chinese" and the "Surinam" strawberries are of considerable antiquity amongst us. The "old pine, or Carolina," has been cultivated and highly prized by the English growers, for many years.

Since attention began to be paid to the culture of strawberries, the number of varieties has been greatly increased. The British strawberries are divided into scarlet, black, pine, hautbois, green, alpine and wood, according to a classification in a valuable paper in the sixth volume of the Horticultural Transactions. Of these varieties, the pine is the most esteemed. It is a native of Louisiana and of Virginia. Its colour is a deep red on both sides; and it is the most rich and highly flavoured of all strawberries, constituting the most valuable variety that has yet been discovered.

The Barberry—*Berberis vulgaris.*

This tree is a native originally of the eastern countries, though it is now found in most parts of Europe, where it thrives best upon light and chalky soils. It grew formerly wild, in great quantities, in the hedgerows of England, but has been universally banished, from a general belief that its presence is injurious to the growth of corn. Duhamel, Broussonet, and other scientific writers, treat this belief as a vulgar prejudice. It should, however, be remarked, that the fructification of the barberry is incomplete, unless the stamens be irritated by insects when the filaments suddenly contract in a most remarkable manner towards the germ. The flowers are, therefore, by a beautiful arrangement of nature,

a. Elder-berry. *b. Cloud-berry.* *c. Bramble-berry.* *d. Bilberry.*

peculiarly attractive to insects; and thus the barberry may become injurious to neighbouring plants. The berries grow in bunches, and are so very acid, that they are seldom eaten, but with the requisite quantity of sugar they make an excellent jelly.

The Elder—*Sambucus.*

The elder is a native of this country; is very generally diffused; grows with singular rapidity, though it never arrives at great size; and endures the most bleak situations, though in the northern parts of Scotland the fruit seldom ripens. The berries of the elder are fermented into a wine, which when spiced and drunk warm, is a pleasing winter beverage. They are supposed to contain a portion of the narcotic principle. The black variety is chiefly cultivated for this purpose; but the berries of the yellow and green are also applicable to wine making. There is also an elder *flower* wine, with a flavour resembling Frontignac.

The elder-tree furnishes the unscientific practitioner of the healing art with many of the most

approved remedies; and perhaps not without reason. Boerhaave, the great physician, is said to have regarded the elder with such reverence, for its medicinal virtues, that he sometimes took off his hat in passing a tree of this species.

The Bramble—*Rubus fruticosus.*

Though the bramble is rather annoying with its long trailing stems and its sharp thorns, the fruit, commonly called *blackberry*, is perhaps in its wild state (and it does not need to be cultivated) among the best, and certainly it is the most abundant, of our native berries. The bramble prefers a soil that is moderately good; but, it is found in every situation, except marshes, to the borders of which it creeps very close. On the slopes of the Welsh mountains, more especially in Denbigshire, the bramble berry grows to the size of a middling gooseberry; and in a dry and sunny autumn is really an excellent fruit. Pliny mentions the mulberry growing on a brier, which probably was a fine blackberry. In England there are a number of species confounded under the names of *rubus fruticosus*, and *rubus corylifolius*, that vary very much in the quality of their fruit, some of them really deserving cultivation. The family of brambles is divided into those with upright stems, those with prostrate stems, and those with herbaceous stems.

There is another species of bramble, the Arctic or Dwarf crimson (*Rubus arcticus.*) This is a small species, and a native of the coldest regions of the world. Its fruit, however, is exceedingly delicious; and were it possible to cultivate it in any habitable situation, it would be a most important addition to garden berries. We have not heard of its ever having been found either in England or in the Welsh mountains; and in Scotland it grows only in the most wild and elevated situations. Some of the

Scottish horticulturists have tried to raise it from the seed, and have, we believe, obtained plants; though the fruit, when they bore any, has been tasteless, and the plants themselves are preserved alive with difficulty. The Arctic berry, which grows in the wildest and most exposed districts of Lapland, sometimes offered to Linnæus the only food which he found in his perilous journey in those dreary regions; and he thus speaks of it with much feeling:—"I should be ungrateful towards this beneficent plant, which often, when I was almost prostrate with hunger and fatigue, restored me with the vinous nectar of its berries, did I not bestow on it a full description."*

The Cloud-Berry—*Robus chamæmorus.*

This is another mountainous berry, which it is exceedingly difficult to cultivate. A single berry grows on the top of the stem. These berries are much more numerous than the former, though, like them, they are found only in very elevated and exposed situations—on the sides of the loftiest mountains in Scotland. The berries are about the size of small strawberries, and the flavour is exceedingly fine, superior to that of any of the strawberries, as found wild in this country, and having a sharpness which does not belong even to the best of those which are cultivated. They remain in season for about a month; and, during that time, the Highlanders, in the districts where they are found, (for they are by no means generally diffused over the Highlands,) collect them in considerable quantities, and make them into excellent preserves. In the east, as well as the north, the wild berries of the mountains and vallies, which nature offers in such abundance for a short season, are thus used by man:

* Flora Lapponica.

> "With rich conserve of Visna cherries,
> Of orange flowers, and of those berries
> That, wild and fresh, the young gazelles
> Feed on in Erac's rocky dells."*

In more northern countries the cloud-berry is still more abundant, so much so as to justify the encomium passed on it by the poet, while speaking of those dreary lands:—

> "Ever enduring snows, perpetual shades
> Of darkness, would congeal the living blood,
> Did not the arctic tract spontaneous yield
> A cheering purple berry, big with wine."

In the northern parts of Sweden and Norway, and in Lapland, even to the North Cape, the cloud-berry grows in such abundance as to be an article of extensive commerce. Great quantities of it are sent every autumn to the Swedish capital, and to the southern parts of that country, where they are used in a variety of ways; and, in fact, it forms the principal fruit that they have.

Dr. Clarke notices the value of this berry in his travels:—"In woods, and moist situations near the river, we found the *Rubus chamæmorus* still in flower. The Swedes call it Hiortron; the Laplanders give it the name of Latoch; the inhabitants of Westro-Bothnia call it Snotter; and in Norway its appellation is Multebær. The same plant is found upon some of the highest mountains, and in some of the peat-bogs of the north of England; on which account, perhaps, it is called cloud-berry in our island: but it is not likely that its fruit ever attains the same degree of maturity and perfection in Great Britain as in Lapland, where the sun acts with such power during the summer. Its medicinal properties have certainly been overlooked, owing, perhaps, either to this circumstance, or to its rarity in Great Britain.

* Moore's Lalla Rookh.

The fruit is sent in immense quantities, in autumn, from all the north of the gulph of Bothnia to Stockholm, where it is used for sauces, and in making vinegar."*

Our English traveller, as appears by the following passage, was under greater obligations to the cloud-berry than the Swedish naturalist to the other species of Arctic fruit:—

"Mr. Grape's children came into the room, bringing with them two or three gallons of the fruit of the cloud-berry, or *Robus chamæmorus*. This plant grows so abundantly near the river, that it is easy to gather bushels of the fruit. As the large berry ripens, which is as big as the top of a man's thumb, its colour, at first scarlet, becomes yellow. When eaten with sugar and cream, it is cooling and delicious, and tastes like the large American hautboy-strawberries. Little did the author dream of the blessed effects he was to experience by tasting of the offering brought by these little children; who, proud of having their gifts accepted, would gladly run and gather daily a fresh supply; which was as often blended with cream and sugar by the hands of their mother; until at last he perceived that his fever rapidly abated; his spirits and his appetite returned; and, when, sinking under a disorder so obstinate that it seemed to be incurable, the blessings of health were restored to him, where he had reason to believe he should have found his grave. The symptons of amendment were almost instantaneous after eating of these berries."*

The Bilberry, or Bleaberry—*Vaccinium myrtillus.*

This berry grows plentifully on heaths and waste places; and though it does not live in situations as

* Clarke's Travels, vol ix. pp. 371, 2. † Ibid. p. 470, 1.

cold as those which have been mentioned, it is very hardy. It is a handsome berry, with a delicate bloom when in perfection; but it is tender, and, when kept for some time, ferments. In some of the pine forests in Scotland it grows to the height of three feet; and there are places where the pedestrian can pull handfuls of berries as large as the common black currant of the gardens.

Two other species of *Vaccinium*, the black whortleberry, and the red (the cranberry) are common enough in some parts of this country. One, if not both of these, grows most readily in moist situations, such as the dry patches in peat-bogs. Tusser mentions "hurtil-berries" amongst the cultivated fruits of his time. These were, perhaps, confounded with the fruit of the brambles. "Dewberries" (though supposed by some to be gooseberries) were formerly amongst the delicacies of fruit, if we may judge from the celebrated passage in Midsummer's Night's Dream:—

> "Feed him with apricots and dewberries,
> With purple grapes, green figs, and mulberries."

The red cranberry (*Vaccinium vitis idæa*), of which the berries are excellent, has borne fruit abundantly under cultivation. The berries of the Pennsylvanian *Vaccinium* are very ornamental.

This genus of berries is very abundant in North America, and also in the northern parts of Russia. The American cranberry (*Vaccinium macrocarpon*) forms a considerable article of commerce; and, as does not appear to be the case with some others of the genus, it may be cultivated to advantage on the margins of ponds, and in other moist situations. The importation of cranberries to this country is about 30,000 gallons annually, the duty being sixpence per gallon. This species has been grown in England.

Gualtheria Shallon.

This is a new and interesting berry, recently found on the north-west coast of America. Mr. D. Douglas, an indefatigable naturalist, whom we have already mentioned in the Part on Timber Trees, sent the seeds of this plant home in 1825 to the Horticultural Society, in the discharge of his duty as collector to that establishment. These plants, now growing in the gardens of the Horticultural Society, promise remarkably well: and if the fruit shall equal in size that of their preserved specimen, the Gualtheria will be among the handsomest of the berries. Mr. Douglas has thus described the Gualtheria Shallon in that pleasing work, 'Loddiges' Botanical Cabinet:'—"In its natural state it is a most graceful spreading shrub, from four to ten feet high, and exceeding that, when growing on stumps of decayed pines. It flowers from April through the summer; and the fruit, which is good, is ripe from July to October. It is very abundant, and much esteemed by the inhabitants, who dry it in the sun, and sometimes make it into a kind of cake, for winter use. It will, I doubt not, become a valuable addition to the dessert, and, probably, be useful for making wine, as it possesses a great portion of saccharine jelly. I have seen it from forty to forty-five degrees north latitude; and, according to Mr. Menzies, who discovered it, and Dr. Scouler, it is plentiful at Nootka Sound. It is exclusively confined to the mountainous, woody parts of the coast, being rarely seen above one hundred miles from it, or beyond the influence of the sea breeze. The young shoots are the favourite winter food of the elk and other kinds of deer."

Chapter IV.

Pulpy fruits borne by Herbaceous Plants.—Melon; Cucumber; Gourds; Love-Apple; Egg-Plant.

The pulpy fruits that are borne by herbaceous plants principally belong to three genera. They are all annuals, and some of them grow to an immense size. Each of the genera, besides the esculent species, contains many that are merely curiosities; and among them there are some that have powerful medicinal qualities, and others that are poisonous. The melon and cucumber belong to the genus *Cucumis;* to which also belongs the *Cucumis Colocynthis*, a native of Turkey, which yields the colocynth of medicine. To the genus *Cucurbita* belong the water-melon, the pumpkin, the succada, or vegetable marrow, the squash, and the calabash; and to the genus *Solanum* the varieties of love-apple and egg-plant. Of these, several are not used as food in England, though all of them bear fruit, and many of them in the open air; but in regions more favourable to their growth, or where other esculent substances are less abundant, they are all more or less used as food.

The Melon—*Cucumis melo.*

The melon is the richest and most highly flavoured of all the fleshy fruits. It is often said to be a native of the central parts of Asia, and to have been first brought into Europe from Persia; but the date of its first culture is so remote, that there is no certain knowledge on the subject. Pliny and Columella describe the fondness of the Emperor Tiberius for melons, and detail the contrivances by which they

Gourds.

were procured for him at all seasons. Stoves appear to have been used in this process; so that forcing-houses were not unknown to the Romans. The melon has certainly been generally cultivated in England since about the middle of the sixteenth century; how much earlier is not known. It is highly probable that those ecclesiastics who paid such attention to the other fruits grown in Italy and France, would not neglect one so delicious as the melon; and it is distinctly said by a writer on British Topography, Gough, that the cultivation of the melon in England preceded the wars of York and Lancaster, but that it was destroyed in the times of civil trouble that succeeded. It is probable, however, that the melon was confounded with the pumpkin by the earlier writers whom Gough consulted. While in France, and in England, melons are grown as an article of luxury, in some parts of the East they are used as a chief necessary of life. Niebuhr, the celebrated traveller, says, "Of pumpkins and melons, several sorts grow naturally in the woods, and serve for feeding camels; but the proper melons are planted in the fields, where a great variety

of them is to be found, and in such abundance, that the Arabians of all ranks use them, for some part of the year, as their principal article of food. They afford a very agreeable liquor. When its fruit is nearly ripe, a hole is pierced into the pulp; this hole is then stopped with wax, and the melon left upon the stalk. Within a few days the pulp is, in consequence of this process, converted into a delicious liquor." Mr. Southey has alluded to this circumstance in the following passage:

> "Whither is gone the boy?
> He had pierced the melon's pulp,
> And clothed with wax the wound;
> And he had duly gone at morn
> And watched its ripening rind;
> And now all joyfully he brings
> The treasure, now matured."*

Although the melon is a very delicious fruit, it is not one of the most wholesome; more especially in cold climates, where, if eaten in any considerable quantity, it is apt to derange the stomach, unless corrected by warm and stimulating ingredients; and the same remark may be applied to the cucumber.

Small melons are, when equally ripe, more highly flavoured than large ones. In general, however, the fruit is chosen as much for show as for use, and thus the large ones are preferred. Indeed, in almost all the cultivated fruits and vegetables, quality is very apt to be sacrificed to appearance; as in the markets the articles are bought by the judgment of the eye, and not by that of the palate. To obtain the large size, a ranker manuring, and higher culture, must be resorted to than are altogether consistent with the natural developement of the juices of the plant.

Of the melon there are many varieties, and the number of them is constantly increasing. Seventy-

* Thalaba, book ii.

one are enumerated in the Fruit Catalogue of the Horticultural Society. The Cantaloupe is one of the best. It obtains its name from a seat belonging to the Pope, not far from Rome, where it was probably first cultivated in Europe, and whence it has spread into most countries. The Cantaloupe is of a middling size, nearly round in form, and remarkably rough and irregular in the surface. The colours, both of the surface and the flesh, vary,—the former from orange mottled with green, to green mottled with black; and the latter from white, or nearly so, to orange tinged with rose colour. The flesh of some varieties is greenish, but these are inferior to the others. When melons of this sort are equally ripened, it may be considered as a general rule, that those which are darkest on the outside, most richly tinted in the flesh, and of a moderate size, have the most high and musky flavour.

There is also a small African or Egyptian melon, the flesh of which is green, of particular excellence. Frederick the Great was passionately fond of these melons; and Zimmerman, who attended him in his last illness, finding him very ill from indigestion, discovered that he ate three or four of them daily for breakfast. On remonstrating with the king, the only answer that the physician could get was, that the king would send him some of the fruit to taste the next day,—as if its excellence would be a sufficient apology for the habitual indiscretion.*

The Romana is also a fine melon; and it ripens earlier than the Cantaloupe. The surface is often netted. It is of an oval shape, highly flavoured, and when good, very heavy and solid.

The Salonica, which has been but recently introduced into this country, is a beautiful melon. It is

* Zimmerman's Conversations with the King of Prussia.

spherical, smooth, and of a fine golden colour. The flesh is white, very sweet, and in consistency resembling the water-melon. The Salonica preserves its qualities, though it is very large; and with good culture specimens may be had weighing seven or eight pounds.

The small Portugal is a very early and productive melon, but not remarkable for flavour. The rock-melons are thickly set with knobs; they are of various colours, and some of them of very fine flavour. The oblong ribbed is marked into segments from the root to the crown; it is very productive; and the flavour is so high, that it is sometimes called, by way of eminence, the musk-melon.

The melons of Persia have long borne a high character. "Persia," says Malte Brun, writing after Chardin, Olivier, and Langles, "is consoled for the occasional failure of her grain crop, by the fineness of her fruits. There are twenty sorts of melons —the finest in Khorassan. In Persia, this fruit is extremely succulent, and contributes greatly to health: they are sometimes so large that three or four are a full load for a man." It was not till lately that the seeds of melons were received here direct from that country. In 1824, Mr. Willock, the Ambassador to the court of Persia, sent a parcel of seed; and another parcel in the spring of 1826. An account of ten varieties of these melons, by Mr. Lindley, was read before the Horticultural Society in September, 1826; and the individual fruits referred to were the produce of the Society's garden that season.

The Persian melons are extremely rich and sweet; and instead of the thick rind of the common melons, they have a very thin and delicate skin, which makes a fruit of the same apparent size contain nearly twice as much edible matter. In addition to this, the melons are beautiful, and they bear abundantly; but they

require a great deal of care. In the warm climate of Persia, the only attention which they ask from the cultivator, is to be regularly watered; and though the melons may be supplied with water artificially, the air, in their native country, is still very dry: this humid soil and dry atmosphere are, as Mr. Lindley remarks, very difficult to be obtained in this country. The covering which is requisite for confining the heat confines also the moisture raised by evaporation. It is further judiciously observed in this paper, that the supply of water should be at the roots, and not over the plant; and that the air should be kept warm by repeated changes of soil on the surface, and dry by abundant ventilation. Some of the melons, of which Mr. Willock furnished the seed, are ready for the table as soon as cut; and some are winter melons, which must be kept for some months before they are eaten.

THE CUCUMBER—*Cucumis sativa.*

The cucumber, like the melon, is an annual, and, being a native of warmer climates, it does not ripen in Britain, except in very favourable situations, without the protection either of a frame or a hand-glass.

In the East the cucumber has been very extensively cultivated from the earliest periods, as well as most of the other species of gourd. When the Israelites complained to Moses in the wilderness, comparing their old Egyptian luxuries with the manna upon which they were fed, they exclaimed, "We remember the fish which we did eat in Egypt freely,—the cucumbers and the melons." Hasselquist, in his Travels, states that these cooling fruits still form a great part of the food of the lower class of the people in Egypt, especially during the summer months; and that the water-melon in particular,

which is cultivated in the alluvial soil left by the inundation of the Nile, serves them for meat, drink, and physic. The cucumber of Syria was cultivated in large open fields, in which a hut was erected for the abode of the watchman, who guarded the fruit against foxes and jackals. These fields, doubtless, were far away from the habitations of men; for Isaiah, speaking of the desolation of Judah, says, "The daughter of Zion is left as a cottage in a vineyard—as a lodge in a garden of cucumbers." In India beyond the Ganges, Bishop Heber saw a man in a small shed of bamboos and thatch, watching a field of cucumbers; and he was naturally interested in the circumstance, as being the same custom to which Isaiah alludes. He again observed a watcher of cucumbers, who lighted a fire during the night, to keep off the wild dogs and wolves from his fruit. On the west side of the Jordan, Burckhardt saw fields of cucumbers.

The cucumber has been known in England from the very earliest records of horticulture. Gough says, that it was common, like the melon, in the time of Edward III.; but being neglected and disused, became entirely forgotten, till the reign of Henry VIII. It was not generally cultivated till about the middle of the seventeenth century. There are many varieties of cucumbers.

Some cucumbers are cultivated for their fantastic shapes, of which the *Snake* is remarkable for its great length and small diameter; but it is of no value, except for shew.

Gourds—*Cucurbita.*

Of the gourd there are many varieties, some of them of beautiful form and colour, and others of an immense size. In England, however, they are cultivated more as matters of curiosity than for food.

One sort, the *Pumpkin* (*Cucurbita pepo*), is occasionally eaten, but always in a baked state, and combined with other substances of higher flavour. In warm situations, and when highly manured, it grows luxuriantly in the open air; and villagers sometimes grow it, and when ripe, convert it into a sort of pie, by cutting a hole in the side, extracting the seeds and filaments, stuffing the cavity with apples and spices, and baking the whole. The pumpkin seems to have been earlier introduced into general culture than either the cucumber or the melon: the pumpkin is, in fact, the melon of the old English writers, the true melon being then styled the musk melon. The pumpkin or gourd enters more into the cookery of the southern nations on the Continent, than into those of Britain.

The *Squash* (*Cucurbita melopepo*) is little cultivated or eaten in this country, though it is often used in the southern parts of Europe, and in North America. It is said to be a native of the Levant, but probably it is found in many other places. It is better adapted for boiling or stewing in a green state than any other gourd. At Versailles, the people esteem it so much for this purpose that they call it a "*livre de beurre.*" The orange fruited gourd (*Cucurbita aurantia*) is a native of the East Indies. It is a very handsome variety, but cultivated only as a curiosity. The calabash, or bottle gourd (*Cucurbita lagenaria*), is similar to the other in quality, and gets its trivial name* as well from its form as from the use of which the hard and tough rind is applied. It is a native both of the East and the West Indies; and the humbler inhabitants employ these gourds as ready made bowls and other vessels. In some parts

* *Trivial* is a term used by botanists for a name descriptive of the species only—as distinguished from other names which point out a genus.

of the East, gourds are sufficiently large to support a man in the water, who floats upon a cross bar fastened to the top of two of vast dimensions.

Vegetable marrow (*Cucurbita succada*) is a very important gourd; and though it has been but lately introduced into this country, it is already cultivated to a considerable extent. It is straw coloured, of an oval or elongated shape, and when full grown attains the length of about nine inches. When very young, it eats well fried in butter; when half grown, it may be cooked in a variety of ways, and is peculiarly soft and rich, having an oily and almost an animal flavour; when fully matured, it may be made into pies, for which purpose it is much superior to any of the other gourds. But it is in the intermediate or half grown state only that it deserves its common appellation of vegetable marrow. The vegetable marrow gourd is a native of Persia; but if the soil on which it is placed be rich and warm enough, it thrives very well with us in the open air.

"I have been able," says Mr. Sabine, "to obtain but very imperfect accounts of the origin of this gourd. It was certainly new in this country within a few years; and I think the most probable account, of the many that I have heard, of its introduction, is, that the first seeds were brought here in one of our East India Ships, and came probably from Persia, where, as I am told, it is known, and called Cicader. Its cultivation is easy." If any other kind of gourd grow in the neighbourhood, no reliance can be placed on the goodness of the seed of the vegetable marrow.

The *Water-melon* (*Cucurbita Citrullus*), though not much cultivated in this country, is one of the most valuable vegetables in warm and arid climates, answering there both for food and drink. The fruit

is large, the flesh sweet and succulent, and the juice delightfully cool. Hasselquist, however, recommends caution in the use of this gourd, "for," says he "it chilled my stomach like a bit of ice."* It is a native of the south of Europe, of Egypt, and the Levant, and of South America. In the peninsula of Araya, where sometimes rain does not fall for fifteen months, water-melons weighing from fifty to seventy pounds are not uncommon.† It was introduced into England about the same time with the common melon.

Egg-plant and Love-apple.

LOVE APPLE—*Solanum lycopersicum.*

The love-apple, or tomata, is a native of the tropical parts of South America; but as it now thrives well in the warmer countries of Europe, and will, if the plants are forwarded in a hot-bed in the early part of the season, produce fruit with as much certainty in this country, upon a warm border, it may be considered as naturalized in the temperate regions. It is an annual: the leaves and flowers have some resem-

* Travels in the Levant, p. 257. 8vo

† Humboldt, Voyages, liv. iii., chap. viii.

blance to those of the potatoe, only the latter are yellow. The fruit, when ripe, attains the size of a small apple. It is compressed at the crown and base, and furrowed along the sides; the whole is of uniform colour, and smooth and shining. There are some varieties both in the shape and colour of the fruit; bright red and orange are the prevailing colours. The love-apple is used for eating in every stage of its growth. When green, it is pickled or preserved; when ripe, it is employed for soups and sauces, and the juice is made into a kind of ketchup. In this country, however, where the culture requires a good deal of care, except in favourable situations, the love-apple is not in very general use; but in warmer countries it is in much more esteem, so that in Italy whole fields are covered with it, and it is a general article at table.

Humboldt describes a species of the *Solanum*, which he conceives indigenous to the isle of Cura, and which is at present cultivated in many parts of South America. The fruit is round and small, but very savoury.

The *Egg-plant* belongs to the same family, has the same habits, and requires nearly the same culture as the love-apple. It is found in the warmer parts of Africa, Asia, and America: it is an annual; rises to the height of about two feet; bears light violet flowers, which are followed by large fleshy berries, having the size and shape, and, in the white varieties, very much the colour and resemblance of eggs,—whence the common name. The forms of the egg-plant are globe-shaped and oval; and some of both forms are white, and others purple or mottled. The egg-plant, according to the 'Hortus Kewensis,' has been cultivated in England since the year 1596; but it has seldom been made use of as

an article of cookery. Even on the continent, where the temperature agrees better with its habits, it has not so much flavour as the love-apple; but still it is used in soups and stews, and also eaten sliced and fried with oil or butter. Though the young plants require to be forwarded in a hot-bed, they may afterwards be made to produce fruit on warm and sheltered borders; and both they and the love-apple succeed best when placed against a sunny wall.

Beside the white egg-plant, (the *Solanum melongena* of Linnæus,) which has been long cultivated as a curiosity, though never used as food, there are several others; and M. Dunal, in his history of Solanums, has separated the edible ones, of which he has enumerated four varieties, into the species of *Solanum esculentum*. The round and the long variety of the esculent are both cultivated in the garden of the Horticultural Society. The plants, which are annuals, are raised to the height of nine or ten inches in the stove, and then planted on the borders in the open air, where they grow to the height of between two and three feet. The fruits of both are large: the round, or rather oval (for that is its proper shape), is four inches long and about three thick. This variety is called the Mammoth egg-plant. The long has larger fruit, measuring sometimes as much as eight inches in length. They vary much more in colour than the round,—some of them being streaked with yellow. Other varieties are described as being found in India; but the seeds that have been sent to this country have produced fruit similar to the kinds now mentioned.

Various species of the solanum are common in the Levant: and three are particularly described by Dr Walsh in the Horticultural Transactions. The following is the substance of his communication:—

Solanum Æthiopicum is the scarlet egg-plant, of

which the fruit is produced in the neighbourhood of Constantinople; but it is rare, being never sold in the markets, and but seldom seen in private gardens. It is used as an ingredient in soups.

Solanum Sodomeum is a purple egg-plant, of which the fruit is large and handsome. A species of *cynips* often attacks and punctures the rind; upon which the whole fruit gangrenes, and is converted into a substance like ashes, while the outside is fair and beautiful. It is found on the borders of the Dead Sea, and is that apple, the external beauty and the internal deception of which have been so celebrated in fabulous, and so perplexing in true history.

> "Dead-Sea fruits, that tempt the eye,
> But turn to ashes on the lips."

The dreadful judgment of the cities of the plain, recorded in sacred history,—the desolation around the Dead Sea,—the extreme saltness of its waters, the bitumen, and as is reported, the smoke that sometimes issued from its surface,—were all calculated for making it a fit locality for superstitious terrors; and among the rest were the celebrated apples which are mentioned by Josephus, the historian of the Jews, not as fabulous matters of which he had been told, but as real substances which he had seen with his own eyes. He says, they "have a fair colour, as if they were fit to be eaten; but if you pluck them with your hand, they vanish into smoke and ashes."

Milton, who collected all of history or fable that could heighten the effect of his poem, refers to those apples as adding new anguish to the fallen angels, after they had been transformed into serpents, upon Satan's return from the temptation of man.

> ——————————"There stood
> A grove hard by,
> ————laden with fair fruit, like that

Which grew in Paradise, the bait of Eve,
Us'd by the Tempter: on that prospect strange
Their earnest eyes they fix'd, imagining,
For one forbidden tree, a multitude."

* * * * * *

"They, parched with scalding thirst, and hunger fierce,
——————— could not abstain;
But on they rolled in heaps, and up the trees
Climbing, sat thicker than the snaky locks
That curl'd Megæra: Greedily they pluck'd
The fruitage fair to sight, like that which grew
Near that bituminous lake where Sodom placed;
This more delusive, not the touch but taste
Deceives; they fondly thinking to allay
Their thirst with gust, instead of fruit
Chew'd bitter ashes, which the offended taste
With sputtering noise rejected."

Henry Teonge, a chaplain in the English fleet, whose Diary was, a few years since, published from the original manuscript, so well describes the real condition of the decayed *Solanum Sodomeum*, which he states that he saw in December, 1675, that no one can doubt that his notice was founded upon personal examination. "This country (that about the Dead Sea) is altogether unfruitfull," says he, "being all over full of stones, which looke just like burnt syndurs. And on some *low shrubbs* there grow *small round things*, which are called apples, *but no witt like them*. They are somewhat fayer to looke at, but touch them and they moulder all to black ashes, like soote, boath for looks and smell." Though these are only the remarks of a popular observer, who told what he saw, without any view to a scientific purpose, the single addition of the attack of the plant by the insect, and the subsequent mortification and internal drying, would have made it just as perfect as the descriptions of the present day.

Pocock, who travelled more than fifty years after Teonge, did not see the apples; and though he did mention them, he pointed to a plant very different

from the real one: "As for the fruits of Sodom, fair without and full of ashes within," says he, "*I saw nothing of them:* but from the testimony we have, something of the kind has been produced; but I imagine they may be pomegranates, which, having a tough, hard rind, and being left on the trees for two or three years, the inside may be dried to dust and the outside remain firm." Mariti, who visited those regions thirty years after Pocock, mentions that "No person could point out to me in the neighbourhood that species of fruit called the apples of Sodom, which, being fresh and of a beautiful colour in appearance, fall to dust as soon as they are touched." Hasselquist, however, not only found the apples, but the plant, referred it to the Linnæan species of *Solanum melongena*, and pointed out the cause of the disease; and though, in the more recent and accurate division of the genus *Solanum*, to which allusion has been made, the name of *Sodomeum* has been substituted for that of *melongena*, the fruit and the disease have been proved to be as Hasselquist stated.

Solanum melongena is more common in the markets of Constantinople than either of the former sorts, being almost as abundant as the gourd and the melon, and used for nearly the same purposes. There are several varieties of this solanum. The first appearance of the plant, it is said, is always attended with a north-east wind of some continuance; and, therefore, the ships for the Black Sea sail before this harbinger, or rather companion, of bad weather comes forth. This is probably one of the superstitions which in all countries attach to matters so uncertain as the weather.

Chapter V.

Stone fruits.—Peach; Nectarine; Almond; Apricot; Plum; Cherry; Olive.

a. Peach. *b. Necturine.* *c. Apricot.* *d. Almond.*

The principal stone fruits, that are valued chiefly as fruits, without any reference to their other qualities, are the peach and nectarine, which are only varieties of the same species, the almond, the apricot, the plum, and the cherry. The first belong to the Linnæan genus *Amygdalus*, and the latter three to that of *Prunus*.

It seems doubtful whether the almond, however different it is in its fructification, is not the same species with the peach. The identity of the peach and the nectarine has been fully established. Specimens raised from the stone have not only borne fruit, having on one part of the tree the downy coat of the

peach, and on another the smooth coat of the nectarine; but they have exhibited varieties even closer than that, for single fruits have been produced with the coat of the peach on the one side, and that of the nectarine on the other.* The identity of the apricot and the plum was also believed by the elder gardeners.

The Peach and Nectarine.

Of the *Peach* (*Amygdalus Persica*) there are two distinct varieties, although there be but little difference in the appearance of the trees, and hardly any in that of the blossoms: these are, the peach with a downy coat, and the nectarine with a smooth one. Of what country the peach actually is a native, it is impossible to ascertain. From the distinctive name *Persica*, bestowed upon it by the Romans, it is very evident, and Pliny expressly states, that they imported the peach from Persia; but whether it was indigenous to Persia, or sent thither from a country still nearer the equator, we have no information. When growing in its natural state, the peach is rather a small tree, with wide spreading branches. The flowers appear before the leaves; they are of a very delicate colour, but of scarcely any scent. The fruit is roundish, with a furrow along one side, and having a very delicate downy cuticle when ripe. Peaches are distinguished into two classes; those which separate easily from the stone or nut, and those which do not. The former are, generally speaking, the best flavoured, though to that there are exceptions. The varieties of the peach are exceedingly numerous, but of late years as many new peaches have probably not been introduced as there have been new varieties of some other fruits. There are

* See Hort. Trans., vol. i.

upwards of two hundred varieties inserted in the Fruit Catalogue of the Horticultural Society. The qualities of the peach appear to depend a good deal upon the soil and climate in which it has for a considerable time been cultivated; and the soil in which the tree is immediately planted should neither be too rich nor too poor,—the former causing the trees to make too much wood, and the latter making the fruit hard and deficient in flavour.

Of the history of the nectarine as little is known as that of the peach; neither is it ascertained which of them was the variety first cultivated. Delicious as the peach is, the nectarine, when of a good sort, and properly cultivated, is superior to it; and though it wants the lusciousness of some of the tropical fruits, perhaps few vegetable productions are more grateful to the palate even of the epicure.

In the warmer parts of Asia the peach is very generally cultivated, and in many it grows abundantly without culture.

On some parts of the American continent also, the peach grows readily and in great plenty. Capt. Head, in his 'Rough Notes,' mentions the beauty and productiveness of the peach-trees which are scattered over the corn-fields in the neighbourhood of Mendoza, on the east side of the Andes; and the same traveller notices dried peaches as an article of food in the mountainous parts, to which they must, of course, be carried from the plains.

In many parts of the United States, peach-trees grow in extensive plantations. They continue without culture; and the fruit is of little value, except in the distillation of peach brandy, and the fattening of hogs. The following account of the peach-orchards in the United States, and of a variety of peach which the describer obtained from that country, was com-

municated to the Horticultural Society in 1815, by Mr. John Braddick, of Thames Ditton :—

" Some years ago, when travelling through Maryland, Virginia, and the neighbouring provinces of the United States of America, I had an opportunity of observing the mode in which the peach-trees of those provinces were cultivated, which was invariably from the stone of the peach, the plant being never budded, but always remaining in a state of nature. In the middle and southern provinces of the United States, it is no uncommon circumstance for a planter to possess a sufficient number of peach-trees to produce him, after fermenting and distilling the pulp, from fifty to one hundred gallons of peach-brandy ; the manufacturing of this liquor, and the feeding of hogs, being the principal uses to which the peach is applied in those countries. A peach-orchard usually contains a thousand or more standard trees. The tree being raised in the manner I have detailed, it is easy to conceive that the fruit growing on them must be an endless variety, scarcely two trees producing exactly alike ; and although by far the greater number of trees, in any of these orchards, will always be found to produce fruit below mediocrity in point of flavour, yet a judicious observer will never fail, among so great a number, to pick out a few trees, the race of which may be considered worthy of preserving."

The peach is said to have been first cultivated in England about the middle of the sixteenth century. Gerard describes several varieties of peach as growing in his garden. Tusser mentions it among his list of fruits in 1557.

In the neighbourhood of Paris much attention is paid to the culture of peach-trees ; and the peaches there are of excellent quality. The principal gardens for the supply of the French capital are at Montreuil,

a village near Paris; and one tree there sometimes covers sixty feet of wall, from the one extremity to the other. The Montreuil peaches are of the finest flavour; and their excellence is properly attributed to the exclusive attention of the people to their culture. The sub-division of labour and skill produces the same results in every art.

The espalier peaches of the Duc de Praslin, near Melun, are stated to be the finest in Europe.*

All the peaches have in the kernel a flavour resembling that of noyau, which depends on the presence of prussic or hydrocyanic acid. The leaves have the same flavour, which they impart by infusion either in water or in spirits.

The facility of raising the peach from the stone has probably tended to its general diffusion throughout the world. This fruit has steadily followed the progress of civilization; and man, "from China to Peru," has surrounded himself with the luxury of this, and of the other stone fruits, very soon after he has begun to taste the blessings of a settled life. There are still spots where ignorance prevents portions of the human race from enjoying the blessings which Providence has everywhere ordained for industry; and there are others where tyranny forbids the earth to be cultivated and produce its fruits. The inhabitants of the Haouran, who are constantly wandering, to escape the dreadful exactions of some petty tyrant, have neither orchards nor fruit-trees, nor gardens for the growth of vegetables. "Shall we sow for strangers?" was the affecting answer of one of them to Burckhardt.

Even in the same land there is a striking contrast between such scenes as Burckhardt thus describes, and the effects of a settled industry, proceeding from a peaceful security. Dandini, in remarking the rich-

* Le Bon Jardinier, 1829.

ness of western Syria, observes, "that it is to an industry less harassed by predatory encroachments than that of any other part of Syria, that the hills of Lebanon owe those fine terraces, in long succession, which preserve the fertile earth; those well-planted vineyards; those fields of wheat, raised by the industrious hand of the husbandman; those plantations of cotton, of olives, and of mulberries, which present themselves everywhere in the midst of the rocky steeps, and give a pleasing example of the effects of human activity. The clusters of grapes are enormous, and the grapes themselves as large as cherries."

One of the greatest blessings that can be conferred upon any rude people (and it is a blessing which will bring knowledge, and virtue, and peace, in its train) is to teach them how to cultivate those vegetable productions which constitute the best riches of mankind. The traveller Burchell rendered such a service to the Bachapins, a tribe of the interior of Southern Africa. He gave to their chief a bag of fresh peach stones, in quantity about a quart; "nor did I fail," says the benevolent visitor of these poor people, "to impress on his mind a just idea of their value and nature, by telling him that they would produce trees which would continue every year to yield, without further trouble, abundance of large fruit of a more agreeable flavour than any which grew in the country of the Bachapins." This is an interesting example of how much good a right-minded and active individual may do to his humbler brethren of the human family. "Why have not every where the names been preserved," says Humboldt, "of those who, in place of ravaging the earth, have enriched it with plants useful to the human race?" It is satisfactory to observe, however, that when men are highly civilized, there is an elasticity in their

mental energies, which makes the destruction of tyranny and war of less permanent injury than when their inflictions fall upon a rude people. Sickler, a distinguished naturalist of Germany, who has paid particular attention to the cultivation of fruit trees, had, in the Duchy of Saxe Gotha, formed three nurseries for fruit trees, one of which contained eight thousand grafted plants. In 1806, this nursery was entirely destroyed by the French, after the battle of Jena: Ney's corps bivouacked in it. After the battle of Leipsic, in 1814, another nursery, planted by the same eminent man, was destroyed by the Cossacks. Yet in 1817 he had planted and reared a third nursery with his own hand,—persevering, in spite of the injuries which he had received in these dreadful contests, to distribute his fine plants, and the knowledge of their cultivation, over his native country.* The labours of such a man will endure when the fame of conquerors is forgotten, or thought worthless, or only remembered to be hated as it deserves.

It has been already stated that some doubts exist as to the difference between the peach and the almond being more than apparent. With reference to this subject, there is a curious fact recorded by the President of the Horticultural Society. The fruit of a sweet almond-tree, which had been obtained from an almond kernel, that had, when in flower, been impregnated with peach pollen, was sown, and produced a tree; this tree bore eight peaches, some of which were perfect, and the others burst at the centre when ripe, as is the case with almonds. The peaches were finely formed and coloured; the flesh white, soft, melting, and of good flavour. This experiment is curious; for though it does not completely establish the fact of the convertibility of an

* See an interesting memoir of Sickler in the Hort. Trans.

almond into a peach, it does so in great part, by shewing that only the pollen is necessary to effect such a change.

The *Flat Peach of China* is perhaps the most singular of the peach tribe. The size of it resembles that of the apple; and the stalk and eye approach so near as to give it the appearance of a ring of flesh, with a stone in the middle. The following description accompanied specimens presented to the Horticultural Society by Mr. Braddick:—

"This fruit is of truly singular form, and perhaps will be best described as having the appearance of a peach flattened by pressure at the head and stalk; its upright diameter, taken through the centre, from eye to stalk, being eleven sixteenths of an inch, consisting wholly of the stone, except the skin; that of its sides is one inch and one-eighth, its transverse diameter being two inches and a half. The head of the fruit is crooked in such a manner, as to look like a broad and rather hollow eye of an irregular and five-angled (or lobed) shape, surrounded by the appearance of the remains of the leaves of a calyx: the whole surface of this eye is roughly marked with small irregular warted lines, like the crown of a medlar. The colour of the skin of the fruit is pale yellow, mottled, or rather speckled with red on the part exposed to the sun, and covered with a fine down. The flesh is pale yellow, having a beautiful radiated circle of fine red surrounding the stone, and extending far into the fruit. The stone is flatly compressed, small, rough, and irregular. The consistence and flavour of the flesh is that of a good melting peach, being sweet and juicy, with a little noyau flavour, or bitter aroma. This peach is cultivated in China, representations of it being continually seen on the papers and drawings received from that country; and it is well known at Canton, where it is esteemed as a good fruit."

The *Almond-tree* has a considerable resemblance to the peach in the form of its leaves, and of its blossoms, only the latter are more variable in colour. It is probable that the almond is a native of the western parts of Asia. The almond is mentioned in the Scriptures as amongst the best fruits of the land of Canaan. It is very plentiful in China, in most of the eastern countries, and also in Barbary. In that country it is the most early bearer of all the fruit trees. It flowers in January, and gives its fruit in April.* It does not appear that the almond-tree (which is now abundantly cultivated for its fruit in Italy, Spain, and the south of France) was so early introduced into the first of these countries as the peach, or that its native region was so well known, "Greek nuts" being the name given to almonds at Rome in the time of Cato.

The fruit of the almond is not so attractive as that of the peach; because, instead of presenting the same delicious pulp as that, the pericarp of the almond shrivels as the fruit ripens; and when the ripening is completed, has become a horny kind of husk, which opens of its own accord. The kernel of some varieties of the almond is not defended by so tough a shell as that of the peach and nectarine; for it is often so tender that the nuts break when shaken together.

In the south of Europe, where the almond is cultivated with as much care as the peach is in this country, its varieties are carefully distinguished. The bitter and the sweet are permanently distinct varieties; and after this leading character is observed, the variety is further distinguished by the form and degree of hardness of the shell. For instance, the French have, "amandier à coque dure"—"amandier à coque demi-dure"—"amandier à coque tendre."

* Shaw's Travels.

In England, almond-trees are chiefly cultivated for the beauty of their early flowers; and for this reason, the common kind, and the double-flowering dwarfs, are preferred. There is something very charming in the peculiarity which belongs to this tree, of blossoming on the bare branches:

> "The hope, in dreams, of a happier hour,
> That alights on misery's brow,
> Springs out of the silvery almond-flower,
> That blooms on a leafless bough."*

One of the most beautiful tales of the Greek mythology (that of the Loves of Phillis and Demophoon) is founded on this property of the almond-tree.

Almond-trees ripen their fruit in England, though the produce is very inferior to that which is imported. The flowers of the productive almond, both the sweet and the bitter, are much less showy than those of the unproductive. Like most of the other nut bearing trees, the almond yields an oil. Between the expressed oil of bitter, and that of sweet almonds, there is little difference; but the bitter almond contains an essential oil, while the sweet almond has none. Owing to the prussic acid which it contains, this essential oil is found, by experiment, to be exceedingly poisonous; and therefore the use of bitter almonds should be carefully avoided in every instance where there is a chance that the essential oil may be separated in the stomach. So very violent is the poison of this oil, that instances are recorded of persons dying in consequence of drinking even a very small portion of spirits flavoured by it; and, in its concentrated state, it is probably not exceeded, in its hurtful effects, even by the essential oil of tobacco itself, or by any of the narcotic vegetable poisons.

* Moore,

According to Haller (*Hist. Plant.*), bitter almonds are a poison to birds and quadrupeds.

Almond oil (the expressed oil) is principally obtained from the almonds of Valentia and Barbary; the Syrian almonds, usually called Jordan almonds, being preferred for the table.

The *Large Fruited Almond* (*var. macrocarpa*) is one of the most beautiful varieties of the almond. The flowers are twice as large as those of the common sort, and remain longer in perfection: the fruit also is larger. There is a specimen in the garden of the Horticultural Society, which has been figured and described by Mr. Lindley in the Botanical Register; who remarks, that this almond is "increased by budding upon plums and other drupaceous plants."

About four hundred and fifty tons of almonds are annually imported into Great Britain, paying a duty of £18,000.

The Apricot—*Prunus Armeniaca.*

The apricot belongs to a very numerous genus of fruit-bearing trees, and trees which are a good deal different in their characters. The genus *Prunus* comprises all the varieties of the cherry, the laurels properly so called, the plums, the sloe, and a number of others that are never cultivated for the sake of their fruit. Many of the genus are poisonous; and though the fruit of some of them is agreeable to the taste, and safe enough when taken in limited quantities, there is none of the family that can be indulged in to excess with impunity. Columella says that the Persians sent the peach to Egypt to poison the inhabitants; and a species of apricot is called by the people of Barbary, 'matza Franca,' or the killer of Christians.* All these evil qualities are, however,

* Shaw.

destroyed by cultivation; for it is the privilege of man not only to distinguish between the good and evil properties of vegetables, but to eradicate the evil, in many cases, by his skill and industry.

The apricot is very widely diffused in Asia, and grows upon the slopes of the barren mountains westward of China. Many species of it are cultivated; and, as they ripen earlier than the peach and nectarine, they are in considerable estimation. Some varieties are exceedingly delicious; and the Persians, in their figurative language, call the apricot of Iran, "the seed of the sun."

It should seem that the apricot was known in Italy in the time of Dioscorides; and that it got its name *precocia* from ripening earlier than some other fruits. The modern Greek name πέρικυκκα is very like the Arabic name *berikach*. The Romans set little value upon the apricot, as appears by an epigram of Martial. If the ancient name is to be retained, a-precoke, as it used to be styled by our most early writers on horticulture, is the classical appellation, and the modern apricot the vulgarism or corruption.

The apricot is said to derive its scientific name from its almost covering the slopes of the Caucasus, the Ararat, and the other mountains in and about Armenia, up almost to the margin of the snow. The general opinion that it is a native of Armenia has, however, been controverted by M. Regnier, a French naturalist, who contends, that as Armenia is a high mountainous country, the climate of which resembles that of middle Europe, it cannot possibly be the country of a tree which begins to flower so early, that its blossoms are often destroyed by the frost, notwithstanding every care of the cultivator. The apricot, too, although it has been cultivated in Europe for many ages, never sprang up from seeds

in any of our forests; neither has it been found wild, either in Armenia or any of the neighbouring provinces. M. Regnier is of opinion that it is a native of Africa, and that its limits appear to be a parallel between the Niger and the range of the Atlas mountains, from whence it has, by cultivation, been carried towards the north.

Apricots are very plentiful, and in great variety, in China; and the natives employ them variously in the arts. From the wild tree, the pulp of whose fruit is of little value, but which has a large kernel, they extract an oil; they preserve the fruit wet in all its flavour; and they make lozenges of the clarified juice, which afford a very agreeable beverage when dissolved in water. The apricot attains the size of a large tree in Japan. It also flourishes in such abundance upon the Oases as to be dried and carried to Egypt as an article of commerce. In those sultry climates, the flavour is exquisite, though the fruit is small.

Gough, in his British Topography, states that the apricot-tree was first brought to England, in 1524, by Woolf, the gardener to Henry VIII. Gerard had two varieties in his garden.

The Plum—*Prunus domestica.*

The plum appears to be still more widely diffused in its original locality than the apricot; and it is much more prone to run into varieties. It is a native of Asia, and of many parts of Europe; and even grows wild in the hedges in some parts of Britain, though possibly it may have found its way there from some of the cultivated sorts, and have degenerated. The plum, and almost all its species, is very apt to run under ground, and produce suckers from the roots. Duhamel says that if plums are

a. Plum. *b. Cherry.*

grafted low, and covered with earth, they push out shoots which may be transplanted.

Plums of various sorts appear to have been introduced into England as early as the fifteenth century. These varieties came to us from France and Italy. The "Green gage" is the *Reine Claude* of France, so called from having been introduced into that country by the wife of Francis I. It is called Gage in England after the name of the family who first cultivated it here. The "Orleans" probably came to us when we held possession of that part of France from which it takes its name. Lord Cromwell introduced several plums from Italy, in the time of Henry VII. The damson, or damascene, as its name imports, is from Damascus.

In some countries, particularly in Alsatia, a considerable quantity of alchohol is produced from plums and cherries by fermentation. Dried plums form a large article of commerce, under the name of prunes and French plums.

There are nearly three hundred varieties of plums, many of which are, perhaps, only dissimilar in name. The Washington, a modern variety, which is stated

in the Pomological Magazine not to be surpassed in richness of flavour, beauty, and other good qualities, by any, is curious in its origin. The parent tree was purchased in the market of New York, some time in the end of last century. It remained barren several years, till, during a violent thunder-storm, the whole trunk was struck to the earth and destroyed. The root afterwards threw out a number of vigorous shoots, all of which were allowed to remain, and finally produced fruit. It is therefore, to be presumed that the stock of the barren kind was the parent of this. Trees were sent to Mr. Robert Barclay, of Bury Hill, in 1819; and in 1821 several others were sent to the Horticultural Society by Dr. Hosack.

The Cherry—*Prunus Cerasus.*

The Cherry is a native of most temperate countries of the northern hemisphere. The small black is found not only in some parts of England, but even in places among the Scottish mountains, where it would be difficult to imagine them to have been carried. It is generally said that the first of the present cultivated sorts was introduced about the time of Henry VIII., and were originally planted at Sittingbourn, in Kent. The cherry-orchards of Kent are still celebrated. It seems, however, that they were known much earlier, or, at any rate, that cherries were hawked about London before the middle of the sixteenth century, in the very same manner as at present. The commencement of the season was announced by one carrying a bough or twig loaded with the fruit. Our present popular song of "Cherry ripe, ripe I cry," is very slightly altered from Herrick, a poet of the times of Charles I. One of our old English games, *cherry-pit*, consisted of pitching

cherry stones into a little hole:—"I have loved a witch ever since I played at cherry-pit."* Shakspeare also alludes to the same custom.

The wild cherry, of which there are a good many varieties, is a much more hardy tree than any of those that produce the finer sorts of fruit; and it is therefore much cultivated for stocks upon which to graft the others, as trees so grafted attain a larger size, are more durable, and less subject to disease. At some of the ruined abbeys and baronial castles there are found cherry-trees, chiefly black ones, which have attained the height of sixty or eighty feet, and continue to produce great quantities of fruit. These ancient sorts are not confined to the warmer parts of the country, but are met with in some of the northern counties of Scotland. Evelyn ranks the black cherry amongst "the forest berry-bearing trees, frequent in the hedges, and growing wild in Herefordshire, and many places."

The cherry is generally understood to have been brought to Rome from Armenia, by Lucullus, the conqueror of Mithridates. This was about sixty-eight years before the Christian era; and such was the fondness for the fruit, that Pliny says, "in less than one hundred and twenty years after, other lands had cherries, even as far as Britain, beyond the ocean." The cherry is spread over Africa. In Barbary it is called "The Berry of the King." Desfontaines (*Histoire des Arbres*) contends in opposition to the received opinion, that the wild cherry is indigenous to France, and of equal antiquity with the oak; nor can we help thinking, from the situation in which we have seen wild cherries, that the same may be the case with parts of the United Kingdom.

* Witch of Edmonton.

The transplantation of fruit-trees from one distant locality to another has been employed by Hume as an argument to prove "the youth, or rather infancy of the world," in opposition to the opinions of those who maintain that this earth has existed, in its present condition, from countless ages:—

"Lucullus was the first that brought cherry-trees from Asia to Europe; though that tree thrives so well in many European climates, that it grows in the woods without any culture. Is it possible, that, throughout a whole eternity, no European had ever passed into Asia, and thought of transplanting so delicious a fruit into his own country? Or if the tree was once transplanted and propagated, how could it ever afterwards perish? Empires may rise and fall; liberty and slavery succeed alternately; ignorance and knowledge give place to each other; but the cherry-tree will still remain in the woods of Greece, Spain, and Italy, and will never be affected by the revolutions of human society.

"It is not two thousand years since vines were transplanted into France; though there is no climate in the world more favourable to them. It is not three centuries since horses, cows, sheep, swine, dogs, corn, were known in America. Is it possible, that, during the revolutions of a whole eternity, there never arose a Columbus, who might open the communication between Europe and that continent? We may as well imagine that all men would wear stockings for ten thousand years, and never have the sense to think of garters to tie them. All these seem convincing proofs of the youth, or rather, infancy, of the world; as being founded on the operation of principles more constant and steady than those by which human society is governed and directed. Nothing less than a total convulsion of the elements will ever

destroy all the European animals and vegetables which are now to be found in the western world."

Several liqueurs are manufactured from cherries. A large black cherry (*Merise noire*) is used in the composition of the *Ratafia* of Grenoble; and the *Maraschino* of Zera is prepared from a particular species of cherry cultivated in Dalmatia. *Kirschwasser*, which is a cheap spirit, forming a considerable article of commerce, is the fermented liquor of a small black cherry.

The whole of the genus *Prunus* yield what is commonly called gum; that of the cherry-tree being the best. But this substance, which is called *cerassin*, resembles *tragacanth*, (the gum of the *Astragalus*,) and is therefore improperly called gum, as the term is usually understood, and applied to gum Arabic.

There are about two hundred and fifty varieties of cherries cultivated in England.

The Chinese cherry (*Prunus pseudo-cerasus*) is a valuable new species of that fruit, introduced into this country so recently as 1819. The following is an extract from the account of this variety, presented to the Horticultural Society by Mr. Knight, their President:—

"I received a plant of the Chinese cherry from the garden of the Horticultural Society in the summer of 1824, after it had produced its crop of fruit; and it was preserved under glass, and subjected to a slight degree of artificial heat till the autumn of that year. It appeared very little disposed to grow; but produced one young shoot, which afforded me a couple of buds for insertion in stocks of the common cherry. Soon after Christmas, the tree was placed in a pine-stove, where it presently blossomed abundantly, and its fruit set perfectly well, as it had previously done

in the gardens of the Society, and it ripened in March. The cherries where middle-sized, or rather small compared with the larger varieties of the common cherry; were of a reddish amber colour, very sweet and juicy, and excellent for the season in which they ripened. The roots of the tree were confined to rather a small pot, and the plant was not even in a moderately vigorous state of growth. I, therefore, infer that the fruit did not acquire either the size or state of perfection which it would have attained if the tree had been larger, and in a vigorous state of growth, and the season of the year favourable."

THE OLIVE—*Olea.*

The Olive is a stone fruit, or rather a double-celled nut, covered by a fleshy pericarpium.

There is something peculiarly mild and graceful in the appearance of the olive-tree, even apart from its associations. The leaves bear some resemblance to those of the willow, only they are

more soft and delicate. The flowers are as delicate as the leaves: they come in little spikes from buds between the leaf-stalks and the spikes. At first they are of a pale yellow; but when they expand their four petals, the insides of them are white, and only the centre of the flower yellow. The matured wood of the olive is hard and compact, though rather brittle, and has the pith nearly obliterated, as is the case with box. Its colour is reddish, and it takes a fine gloss; on which account the ancients carved it into statues of the gods; the moderns make it into snuff-boxes and other trinkets.

The wild olive is found indigenous in Syria, Greece, and Africa, on the lower slopes of the Atlas. The cultivated one grows spontaneously in many parts of Syria; and is easily reared in all parts of the shores of the Levant that are not apt to be visited by frosty winds. Where olives abound they give much beauty to the landscape. "The beautiful plain of Athens, as seen toward the north-west from Mount Hymettus, appears entirely covered with olive-trees."* Tuscany, the south of France, and the plains of Spain, are the places of Europe in which the olive was first cultivated. The Tuscans were the first who exported olive-oil largely, and thus it has obtained the name of Florence-oil; but the purest is said to be obtained from about Aix, in France.

The particular departments of France in which the olive is most successfully cultivated are those of the Mouths of the Rhone, of the Var, of the Gard, and some others; but it does not ripen its fruit to the north-west of a line drawn from the Pyrenees, near Narbonne, to the foot of the little St. Bernard in the Alps; or in that part of France which may be considered as forming a portion of the basin of the

* Olivier,

Mediterranean, and which is inclosed between that sea and the mountains of Cevennes and the Alps.

The proper time for gathering olives for the press* is the eve of maturity. If delayed too long, the next crop is prevented, and the tree is productive only in the alternate years. At Aix, where the olive harvest takes place early in November, it is annual: in Languedoc, Spain, and Italy, where it is delayed till December or January, it is in alternate years. The quality of the oil, also, depends upon the gathering of the fruit in the first stage of its maturity. It should be carefully plucked by the hand; and the whole harvest completed, if possible, in a day. To concoct the mucilage, and allow the water to evaporate, it is spread out, during two or three days, in beds three inches deep. The oil mill is simple. The fruit is reduced to a pulp, put into sacks of course linen, or feather-grass, and subjected to pressure. The oil first expressed is the purest. The oil of the kernel is said to injure that of the fruit, and cause it to become sooner rancid. The growth of olives and the manufacture of the oil offer a considerable employment to many of the inhabitants of France and Italy. The importation of olive oil into Great Britain amounted, in 1827, to about four thousand five hundred tuns, paying a duty of eight guineas per tun.

The olive grows in England; though, in the severity of our winters, it changes its character. In the south, it is an evergreen; but in England, it loses its leaves. Indeed, it needs protection even in the mildest winters; and it is only in the very warmest summers that it will produce fruit a little, which does not ripen, and is of very slight flavour.

In ancient times, especially, the olive was a tree held in the greatest veneration, for then the oil was

* Hillhouse on the Olive Tree.

employed in pouring out libations to the gods; while the branches formed the wreaths of the victors at the Olympic Games. It was also used in lubricating the human body. Some of the traditions say that it was brought out of Egypt to Athens by Cecrops; while others affirm that Hercules introduced it to Greece on his return from his expeditions; that he planted it upon Mount Olympus, and set the first example of its use in the Games. The Greeks had a pretty and instructive fable in their mythology, on the origin of the olive. They said that Neptune, having a dispute with Minerva, as to the name of the city of Athens, it was decided by the gods that the deity who gave the best present to mankind should have the privilege in dispute. Neptune struck the shore, out of which sprung a horse: but Minerva produced an olive tree. The goddess had the triumph; for it was adjudged that Peace, of which the olive is the symbol, was infinitely better than War, to which the horse was considered as belonging, and typifying. Even in the sacred history, the olive is invested with more honour than any other tree. The patriarch Noah had sent out a dove from the ark, but she returned without any token of hope. Then "He stayed yet other seven days; and again he sent forth the dove out of the ark; and the dove came to him in the evening; and, lo, in her mouth was an olive branch plucked off: so Noah knew that the waters were abated from the earth."

The veneration for the olive, and also the great duration of the tree, appears from the history of one in the Acropolis at Athens. Dr. Clarke has this passage in his Travels,* in speaking of the temple of Pandrosus—"Within this building, so late as the second century, was preserved the *olive tree* mentioned

* Vol. vi. p. 246.

by Apollodorus, which was said to be as old as the foundation of the citadel. Stuart supposed it to have stood in the portico of the temple of Pandrosus (called by him the Pandroseum) from the circumstance of the air necessary for its support, which could here be admitted between the caryatides; but instances of trees, that have been preserved to a very great age, within the interior of an edifice inclosed by walls, may be adduced."

The province of Suse, in Morocco, produces great abundance of olive oil, which is stated to be equal in quality to the best Florence oil, when it is expressed from the fruit before it becomes quite ripe. Mr. Jackson, in his 'Account of the Empire of Morocco,' mentions a curious circumstance regarding an extensive plantation of olive-trees in the neighbourhood of Messa, which indicates the great facility with which this tree may be propagated. Being struck with the whimsical arrangement of this large plantation, he inquired the cause of their being so arranged, which was thus explained:—"I learnt from the viceroy's aide-de-camp, who attended me, that one of the kings of the dynasty of Saddia, being on his journey to Soudan, encamped here with his army; that the pegs with which the cavalry picketed their horses were cut from the olive trees in the neighbourhood; and that these pegs being left in the ground on account of some sudden cause of the departure of the army, the olive trees in question sprung up from them. I confess, while I acknowledged the ingenuity of the idea, (for the disposition of the trees exactly resembled the arrangement of cavalry in an encampment), I treated it as fabulous: some time afterwards, however, the following circumstance occurred, which induced me to think the story was not only plausible, but very credible. Having occasion to send for some plants for a garden which I had at Agadeer, or Santa Cruz,

the foulah (gardener) brought, amongst other things, a few bits of wood, without any roots or leaf, about eighteen inches long and three in circumference, which he with a large stone knocked into the ground. Seeing the fellow thus employed, I asked him what he meant by trifling in that way? 'I am not trifling,' said he, 'but planting your pomegranate trees.' I began to take them out of the ground; but some persons who were near assuring me that it was the mode in which they were always planted, and that they would (with the blessing of God) take root and shoot forth leaves the next year, I was at length prevailed on to leave a few in the ground, merely for experiment;—and they certainly did take root, and were in a fair way of becoming good trees when I left Santa Cruz."

Chapter VI.

Nuts.—Walnut; Chesnut; Hazel-Nut.

a. Walnut. *b. Chesnut.* *c. Hazel-nut.*

Nuts, properly so called, are hard dry fruits, containing one or two seeds, and not in any degree fleshy or pulpy. They are often surrounded by a leafy or woody husk, which is called the involucre, enlarged as a covering to the fruit. The kernels of all the esculent nuts are considered as being very nutritious, on account of the quantity of oil that they contain; but on that account they are less digestible than any other vegetable matters. As some of the principal kinds have been already described with considerable minuteness as trees, a very brief account of such will be given.

The Walnut—*Juglans regia.*

The nuts of this tree have, when perfectly ripe, a very agreeable flavour; and the tree being besides

exceedingly valuable as timber, and highly ornamental, it is well worthy of cultivation. In this respect its properties are fully noticed in the preceding part on 'Timber Trees.' The walnuts of commerce are many of them obtained from warmer countries; but were sufficient attention paid to walnut plantations, an abundant supply might be obtained in all the southern parts of England. In some parts of Scotland walnuts come to maturity, but they are by no means general. In the unripe state, walnuts make an agreeable pickle; and an indelible olive dye is obtained from the pericarp of the ripe fruit. The nut of the hickery (*Juglans alba*) is small and of little value; and though the nut of the black walnut of Virginia (*Juglans nigra*) is large, the kernel is very small. It is, however, sweet.

Walnuts or chesnuts may be preserved through the winter, by pitting them in the earth, as is done with potatoes.

The Chesnut—*Castanea vesca.*

The chesnut has a prickly involucre, and the nuts grow in a lengthened cluster, upon twigs. The kernel is large, and enveloped in a tough coat of a tint so peculiar, as to give its name to a particular kind of colour. When raw, the chesnut has a slight trace of walnut taste; but it is much inferior. Roasted, it becomes farinaceous, and resembles a mealy potatoe. The chesnut is, indeed, the most farinaceous, and the least oily, of all the nuts; and therefore, though it may not be so nutritious, it is more easy of digestion.

In the southern parts of the Continent, chesnuts grow so abundantly as to form a very large portion of the food of the common people, who, besides eating them both raw and roasted, form them into puddings and cakes, and even bread. The chesnut produces abundantly in the warmer parts of England;

but though the tree grows in Scotland, the fruit seldom comes to maturity there.

The best kinds of chesnuts are grafted. The late Sir Joseph Banks had some brought from Devonshire to his house at Spring Grove, which bore most plentifully: the fruit was smaller than the Spanish chesnut, but much sweeter.

The Hazel-nut—*Corylus.*

Of this nut there are several species and varieties.

The common hazel (*Corylus avellana*) has the nut small and short; but the tree grows more easily than the filbert, being found wild not only in forests and commons in England, and especially upon the banks of dingles and ravines, but occuring in extensive tracts in the more northern and mountainous parts of the country. Several places, whose soil suits its growth, are called after the hazel,—such as Haselmere, Haselbur, &c. The common hazel is seldom cultivated as a fruit-tree, though perhaps its nuts are superior in flavour to the others, which are more inviting in size.

The filberts, both the red and the white, and the cob-nut, are merely varieties of the common hazel; and have been produced partly by the superiority of soil and climate where they grow, and partly by culture. The filbert is not thicker than the common nut, but it is at least double the length, and has the kernel large in proportion. The cob-nut is the largest of the species, and it is round. The cluster-nut differs from the others only in the fruit being produced in large clusters at the ends of the branches. A particular form of tree receives in some parts of the country (especially in Kent, where the culture of the filbert is carried on with advantage) the name of the dwarf productive nut, though that name indicates rather the mode in which the tree is trained than the va-

riety to which it belongs. Generally speaking, the filbert is but a low grower; but still considerable ingenuity is exerted in keeping it down,—it having been found by general experience that the dwarfing of fruit trees is the most effectual means of ensuring a large and uniform crop, and fruit of superior quality. The trees that are dwarfed are not allowed to exceed seven feet in height; and they are trimmed in the form of a goblet, with an open centre, as is generally done with well-managed gooseberry trees. When the tree comes into proper bearing, this goblet has attained a diameter of about six feet, which is every season covered with filberts, both outside and inside. The nuts are of excellent quality; and it is found by comparison, that a tree treated in this manner, with the ground regularly hoed and cleaned, will produce more than three which are planted in a hedge-row or coppice, and allowed to run wild in the usual manner.

There is something singular in the flowering of the hazel: the male catkin makes its appearance in autumn, and continues to increase till spring, at which time the female ovaries, that are to produce the nuts, make their appearance: this takes place as early as February, and before there is yet a leaf upon the deciduous trees; so that, besides its advantages as a fruit, the filbert may be regarded as an ornamental tree, at that season when groves and coppices have the least beauty.

The word filbert is a corruption of the original English name for this nut, *full-beard*—which was applied to the large and fringed husk, to distinguish it from the closer covering of the common hazel. Our old poet, Gower, assigns a more classical origin to the name:—

"Phillis
Was shape into a nutte-tree,
That all men it might see;

And after Phillis, *Philberd*
This tree was cleped."*

The Constantinople nut (*Corylis colurna*) is a superior nut even to the best variety of the hazel. Its flavour is equal, and its size is more than double. It is a round nut, invested with a deep calyx, or involucre, which covers it almost entirely, and is very much lobed and fringed at its extremity.

L'Ecluse a distinguished gardener, brought the nuts of the *Corylus colurna* from Constantinople, in 1582; and Linnæus states, that in the Botanical Garden at Leyden there was growing in 1736, a fine tree of this species, planted by L'Ecluse. It was cultivated in England by Ray, in 1666. This tree grows naturally in the neighbourhood of Constantinople.

The American nut (*Corylus americana*) is a beautiful species, extensively spread over North America, and which has been cultivated in the neighbourhood of Paris.

The involucra and bottoms of the nuts of all the species and varieties of *Corylus* are extremely austere and astringent when in their green state; and it is doubtful whether they might not then be profitably employed either in the tanning of leather, or perhaps for the same purposes as galls.

The Spanish nuts of the shops are fresh nuts from Spain; the Barcelona nuts are another variety, kiln-dried before exportation.

The Carob-Tree (*Ceratonia siliqua*)

which grows extensively in the south of Europe, particularly in some provinces of Spain, of which Valencia is the principal, bears a fruit called the *carob bean*, which is an important article of commerce. It

* Confessio Amantis.

is chiefly used for the feeding of cattle; but furnishes a nutritive aliment to the poor in times when there is a scarcity of bread corn.

We have thus noticed the most interesting facts connected with the history and properties of the fruits of the temperate climates. We have not attempted to treat the subject with any pretension to scientific classification or description, nor to give any practical directions for their cultivation. Our object has been to direct the popular attention to some of the most interesting, although the most common, of the vegetable substances by which we are surrounded. It is instructive to trace how gradually man has gathered around the dwellings of civilization those fruits which have been scattered by Providence over the most distant parts of the globe; and how he has improved them by long ages of careful cultivation. By the exercise only of such activity and skill has man, under every circumstance, conquered the original difficulties of his lot; and by depending for every comfort and enjoyment upon his own exertion, has he developed and matured the intellectual faculties with which God has endowed him.

It will be naturally observed how greatly we are indebted to the extension of our commercial intercourse for all additions to the species of our fruits, and for almost every improvement in their varieties. The succeeding chapters on Tropical Fruits will exhibit many interesting facts calculated still further to show how commercial industry diffuses blessings over the whole globe; overcomes the obstacles of distance and climate; and unites the entire human race, by common wants and mutual obligations, into one vast family.

Chapter VII.

Fruits common to temperate and tropical Climates. The Orange Genus.

We are about to take a general and rapid view of the fruits which are indigenous to other climates. Many of these are scarcely known in this country except as curiosities; while others are partially cultivated as objects of luxury. Particular fruits, which are scarcely ever seen here in their natural state, such as the date and the banana, supply largely to the necessities of great masses of mankind; and they are thus intimately connected with their moral and social condition. Of the more luxurious fruits, such as the mango and the durion, it is probable that, in the course of time, we may obtain possession of them in the same way that we possess the pine-apple,—that is, by the judicious application of artificial heat. Sir Joseph Banks thought that improvements in the art of forcing fruits would render this period not at all distant. He says, "It does not require the gift of prophecy to foretell, that ere long the akee and the avocado pear of the West Indies; the flat peach, the mandarine orange, and the litchi of China; the mango, the mangostan, and the durion of the East Indies; and possibly other valuable (tropical) fruits, will be frequent at the tables of opulent persons; and some of them, perhaps, in less than half a century, be offered for sale on every market day in Covent Garden."*

* Hort. Trans., vol. i.

It is certainly by no means improbable, that, by further improvements in the art of gardening, we may be enabled to diversify our vegetable stores by many of those choice productions of the tropical countries which are at present known only as curiosities to a few. Many tropical plants, which, at their first introduction, were kept entirely in stoves, are now planted out, and can bear the rigour of our ordinary winters, without any abatement of growth or diminution of beauty; and from this we may reasonably hope that some tropical fruits may in time be so far assimilated to our climate as to ripen in our ordinary summers.

But, while the great number of tropical fruits are of little value to the many, there is a fruit, originally a native of tropical regions, and naturally growing only in countries of a higher temperature than our own, which commerce has made our property in a very remarkable degree. The *orange* may be procured at little more cost than that of the commonest of our domestic fruits; while it is the most refreshing and healthy, perhaps, of all the fruits of the warm countries. It has thus become a peculiar blessing to us: for while it offers a gratification within the reach of the poorest, it is so superior to other fruits, that it cannot be despised for its cheapness, even by the richest. The duty upon oranges is 68,000*l.* per annum, at the rate of 2*s.* 6*d.* for a package not exceeding 5000 cubic inches. Assuming the cubical contents of an orange as ten inches, there are 500 in each package—and thus we see that 272,000,000 of this fruit are annually imported, allowing about a dozen per annum to every individual of the population.

This extraordinary consumption of a production which is brought here from very distant places, is a

natural consequence of certain qualities which fit the orange, in a remarkable degree, for being the universal fruit of commerce. If we would have foreign figs and grapes, they must be dried, for the undried grapes, which we bring even from the short distance of Portugal, are flat and vapid ; the tamarind is a liquid preserve ; the guava must be made into a jelly ; the mango destined for us requires to be pulled before it is ripe, and is pickled ; the date must be dried; and the cocoa nut becomes when here consolidated and indigestible. With regard to the orange, man may have it fresh in every region of the world, and at almost every season of the year. The aromatic oil and the rind preserve it from the effects both of heat and of cold ; and the acridity of the former renders it proof against the attacks of insects. It is true that oranges rot, like other fruits ; but that does not happen for a long time, if the rind is uninjured, and they are kept from moisture, and so ventilated as not to ferment.

Most of the oranges and lemons intended for exportation are gathered while they are still green ; for if the fruit were allowed to become mature it would spoil in the transport. Lemons are sometimes preserved by being impregnated with sea-water. The gathering of oranges and lemons for the British market generally occupies from the commencement of October to the end of December. Oranges are not fully ripe till the spring has commenced. It is remarkable that the orange trees from which the fruit is gathered green bear plentifully every year ; while those upon which the fruit is suffered to ripen afford abundant crops only on alternate years.*

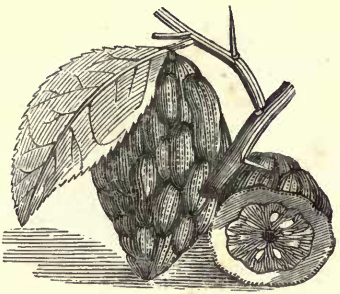
The Citrons are one of the most interesting families of plants. They are all originally natives of the

* Dict. des Sciences Naturelles.

warmer parts of Asia, though they have been long introduced into the West Indies, the tropical parts of America, the Atlantic Isles, the warmer countries of Europe, and even Britain, where they bear the open air during the summer, and, in favourable situations, do not need artificial heat, if kept from the frost through the winter. They are all either small trees or shrubs with brown stems, green twigs and leaves, bearing some resemblance to those of the laurel. We cannot, however, judge of the size of the orange-tree by the specimens we ordinarily see in England. In parts of Spain there are some old orange trees forming large timber ;* in the convent of St. Sabina, at Rome, there is an orange-tree thirty-one feet high, which is said to be six hundred years old ; and at Nice, in 1789, there was a tree which generally bore five or six thousand oranges, which was more than fifty feet high, with a trunk which required two men to embrace it.† The size depends much upon the age of the plant.

There are four distinct species :—The Lemon, or Citron, the Orange, the Mandarin Orange, and the Shaddock ; and of the orange and lemon there are many varieties. They are, even in the East, where they are natives, not a little capricious in their growth ; the fruit, and even the leaves, frequently altering, so that it is not always easy to say which is a distinct species, and which only a variety. They continue flowering during nearly all the summer, and the fruit takes two years to come to maturity, so that for a considerable period of each year, a healthy tree has every stage of the production, from the flower-bud to the ripe fruit, in perfection at the same time.

* Laborde. † Risso.



The Citron.

The *Citron*, when growing wild, is a thorny tree, about eight feet high, with leaves of a pale green: the flowers are white, and have a very agreeable odour. The fruit is oblong, five or six inches long, with a rough yellow rind; the outer part of it contains (as is the case with most of the family) a considerable quantity of highly aromatic and inflammable oil: the pulp is white and edible, but very acid, and preferred when prepared as a sweetmeat. Of a particular variety of the citron a conserve is made which is in great demand by the Jews, who use it in their Feast of Tabernacles. With a little artificial heat in winter, the citron comes to as much perfection in England as in Spain or Italy. There are two varieties noticed—the common and the sweet, but whether they have been produced by natural difference or culture is not known.

The Lemon grows naturally in that part of India which is situated beyond the Ganges; but its transmigration to Europe belongs to the invasion of the West by those mighty caliphs, who, from the heart of Southern Asia, extended their conquests to the foot

The Lemon.

of the Pyrenees, leaving everywhere traces of their power and of their knowledge. The lemon, thus transported by the Arabs into every part of their vast empire where it would grow, was found by the crusaders in Syria and Palestine towards the end of the eleventh century. By them it was introduced into Sicily and Italy; though it is probable that at the same period it was already multiplied in Africa and Spain.* Arabic writers of the twelfth century speak of the lemon-tree as then cultivated in Egypt and many other places. Matthew Silvaticus, a writer of that time, says that the lemon was then spread over all Italy.

In the southern parts of Europe, where the lemon is abundant, there are many varieties.

The rind of the lemon is much smoother than that of the citron; the bark of the tree is less smooth.

* Risso, p. 7.

The Lime.

The *Lime*, or sour lemon, is a small and shrubby tree, the fruit of which is much smaller than that of the citron or lemon, being only about an inch, or an inch and a half in diameter. The lime is not much cultivated in Europe; but it is a great favourite in the West Indies, being more acid and cooling than the lemon. In that country there is a sweet lime, intermediate between the lemon and the sour lime; and botanical writers are of opinion that hybrids or mules are produced between all the varieties, and probably also the species, of the citrons.

The *Orange* is a taller and more beautiful tree than either the citron or the lemon; but, like them, it has prickly branches when in its native country. The orange was originally brought from India.

The precise time at which the orange was introduced into England is not known with certainty, but probably it may have taken place not long after their introduction into Portugal, which was in the early part of the sixteenth century.

The first oranges, it is stated, were imported into

The Orange.

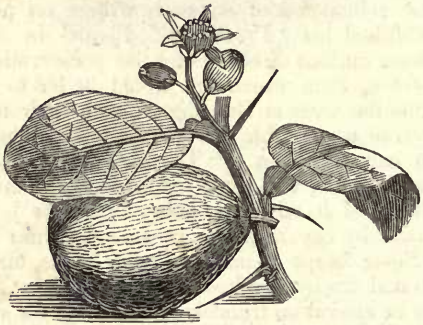
England by Sir Walter Raleigh;* and it is added that Sir Francis Carew, who married the neice of Sir Walter, planted their seeds, and they produced the orange trees at Beddington, in Surrey, of which Bishop Gibson, in his additions to Camden's Britannia, speaks as having been there for a hundred years previous to 1695. As these trees always produced fruit, they could not, as Professor Martyn justly observes, have been raised from seeds; but they may have been brought from Portugal, or from Italy, (the place whence orange-trees have usually been obtained,) as early as the close of the sixteenth century. The trees at Beddington were planted in the open ground, with a moveable cover to screen them from the inclemency of the winter months. In the beginning of the eighteenth century they had attained the height of eighteen feet, and the stems were about nine inches in diameter; while the spread

* Biographia Britannica; Art. Raleigh.

of the head of the largest one was twelve feet the one way and nine the other. There had always been a wall on the north side of them to screen them from the cold of that quarter, but they were at such a distance from the wall as to have room to spread, and plenty of air and light. In 1738 they were surrounded by a permanent inclosure, like a greenhouse. They were all destroyed by the great frost of the following winter; but whether wholly owing to the frost, or partly to the confinement and damp of the permanent inclosure, cannot now be ascertained.

John Parkinson, apothecary, of London, one of the most voluminous of our early writers on plants, who published his 'Practise of Plants' in 1629, gives some curious directions for the preservation of orange-trees, from which one would be led to conclude that the trees at Beddington, with their ample protection of a moveable covering in winter, had not been in existence then. "The orange-tree," says he, "hath abiden, with some extraordinary branching and budding of it, when as neither citron nor lemon-trees would by any means be preserved for any long time. Some keepe them in square boxes, and lift them to and fro by iron hooks on the sides, or cause them to be rowled on trundels or small wheels under them, to place them in an house, or close galerie, for the winter time: others plant them against a bricke wall in the ground, and defend them by a shed of boardes, covered with seare-cloth in the winter; and by the warmth of a stove, or such other thing, give them some comfort in the colder times: but no tent or meane provision will preserve them." The orange trees at Versailles are, during the winter, wheeled into warm places under the terrace; and the same plan is to be pursued with respect to some fine orange-trees at Windsor, which have been lately presented to his Majesty by the King of France. At Hampton

Court there are many orange-trees, some of which are stated to be three hundred years old. They are generally moved into the open air about the middle of June, when the perfume of their blossoms is most delicious. Orange and lemon-trees have been cultivated in the open air in England. For a hundred years, in a few gardens of the south of Devonshire, they have been seen, trained as peach-trees against walls, and sheltered only with mats of straw during the winter. The fruit of these is stated to be as large and fine as any from Portugal.*



The Shaddock.

The *Shaddock* is much larger than the orange, both in the tree and the fruit. The tree is both lofty and spreading, and the fruit is about eight inches in circumference,—some, indeed, much larger. The shaddock is a native of China and the adjoining countries, where the name of "sweet ball" is given to it. There are many varieties—some with the pulp white, others with it nearly red; some that are sweet,

* Hort. Trans., vol. i.

with but little acidity—and some acid, with but little sweetness. The shaddock derived its specific name from having been first carried from China to the West Indies by Captain Shaddock. It has, however, been neglected there, and now but seldom merits its oriental name of sweet ball. The planters have never been remarkable for their knowledge of science, or their skill in the new operations of the arts; and thus, instead of propagating the shaddock by budding, as is done in China, and which is the only way that it can be improved, or even kept from degenerating, they have reared it from seed, and consequently have generally obtained a harsh and sour sort, which is of very little value. It is showy, no doubt, from its size and the appearance of the tree when growing; but it is the least valuable or desirable of the genus produced in the west.

These are the four species of the orange genus usually known in commerce; but, on account of the beauty, the good qualities, and the abundance of these delightful fruits, as well as the length of time that they remain in season, they demand a more detailed account than can, in this sketch, be given of many of the other tropical fruits. The manner, too, in which truth and fable are blended in their common history, renders such an account more desirable; and thus we shall devote a few pages to the further consideration of the genus.

At the time when the people of Europe first visited the Levant in great numbers,—that is, during the crusades for the recovery of Syria from the dominion of the Saracens,—oranges were found abundant in that country. Though they were in reality cultivated trees, their number, and the beauty and goodness of their fruit, naturally caused the adventurers (who were not very conversant with Natural

History, and not a little prone to romance and credulity) to believe and state that these were indigenous to the country and formed a portion of the glories of the "Holy Land."

The fables of the profane writers, and the ambiguity of the descriptions of vegetables in holy writ, helped further to confirm this opinion. As the oranges were of the form of apples, and the colour of gold, in did not require much stretch of imagination to make them the golden apples of the Garden of the Hesperides; and the only point that remained was to settle the locality of that fabled paradise, which was generally laid in the part of Africa which lies between the mountains of Atlas and the southern shore of the Mediterranean. The authority of Moses was called in to confirm the existence of this fruit in Syria, even at the time when the children of Jacob were wandering in the wilderness; and one of the trees borne in the procession commanded in the twenty-third chapter of the book of Leviticus, was considered to have been the orange. The *mala medica* of the Romans, which is mentioned by Virgil, and afterwards by Palladio and others; the *kitron* of the Greeks; and the *citrus* of Josephus, were all understood to mean the same fruit: and, as has been found to be the case with many other substances, the moderns supposed that, because there was an identity of name, there must be an identity of substance,—never reflecting that the name had been imposed by themselves, and that therefore its identity proved nothing.

The fable continued, however; and, though, there was a good deal of writing upon the subject, there was no attempt to examine the authorities with that minuteness which the search of truth demanded, till the nineteenth century. The history of this fruit was first carefully traced by Galessio, who published

his '*Traité du Citrus*,' at Paris, in 1811. He maintains that the orange instead of being found in the north of Africa, in Syria, or even in Media, whence the Romans must have obtained their "Median Apples," was not in that part of India which is watered by the Indus at the time of Alexander the Great's Indian expedition, as it is not mentioned by Nearchus among the fruits and productions of that country. It is not mentioned either by Arrian, by Diodorus, or Pliny; and even so late as the year 1300, Pietro di Cuescengi, a senator of Bologna, who wrote on agriculture and vegetable productions, does not take the least notice of the orange.

The first distinct mention of oranges is by the Arabs; and Avicenna (book v.) not only describes *oleum de citrangula* (oil of oranges) and *oleum de citrangulorum seminibus* (oil of orange seeds,) but speaks of *citric acid* (salt of lemons,) which is contained in all the genus, though more abundantly in that species from which it got its common English name.

According to Galessio, the Arabs, when they penetrated to India, found the orange tribes there, further in the interior than Alexander had penetrated; and they brought them thence by two routs: the sweet ones, now called China oranges, through Persia to Syria, and thence to the shores of Italy and the south of France; and the bitter oranges, called in the commerce of England, Seville oranges, by Arabia, Egypt, and the north of Africa to Spain.

It does not appear that the orange was originally a Chinese fruit, as it is not mentioned by Marco Polo, the father of modern travellers, who is so circumstantial in describing all the other wonders of that country.

Now these facts certainly go far to shew that the orange was not known to the ancients either in Eu-

rope or in Syria; but that we are indebted for the first knowledge of it to the Arabs, who, with their zeal to propagate the religion of the Koran, were as anxious to extend the advantages of agriculture and medicine. The sweet orange which they introduced was not, strictly speaking, that which has since been called the China orange, and under that name introduced into Spain, Portugal, St. Michael's the other Atlantic isles, and the West Indies; but rather the orange which was known in Italy before Vasco de Gama had doubled the Cape of Good Hope.

The orange is said to have been found by the Portuguese upon the east coast of Africa; but it is not known whether it had been indigenous there, or disseminated by the Arabs. When the Portuguese reached India, they found the orange there, and also in China, which was visited for the first time by sea in the early part of the sixteenth century.

Although the oranges of St. Michael, in the Azores, are now the best that are to be met with in the European market, they are not indigenous productions of that island; but were sent there by the Portuguese, as the same fruit was originally sent to the American continent by the Spaniards. In the middle of a forest on the banks of the Rio Cedeno, Humboldt found wild orange trees, laden with large and sweet fruit. They were, probably, the remains of some old Indian plantations; for the orange cannot be reckoned amongst the spontaneous vegetable productions of the New World.

But, in whatever way oranges were first introduced into those parts of the world of which they are not natives, they are now very widely diffused; and wherever they are found they are among the most ornamental of trees, and the most delightful of fruits. The species and varieties have also been greatly multiplied; but whether from their proneness

to produce varieties, from some original differences, or from difference of soil and climate, cannot now be ascertained. Including all the different species, Risso, an eminent naturalist at Nice, (and from his living in a country producing oranges, he had the best opportunities of examining and studying them,) has, in a very elegant and elaborate natural history of oranges, published at Paris in the year 1818, enumerated, described, and, with respect to all the more important sorts, figured no fewer than one hundred and sixty-nine varieties : these he has divided into eight species : sweet oranges, bitter oranges, bergamottes, limes, pampelucos, sweet limes, lemons, and citrons.

Of the first of these there are no fewer than forty-three varieties ; though, in the opinion of Galessio, they are all derived from the common orange. The others are, generally speaking, more acid in their flavour ; though some of them, such as the bergamottes, from the rind of which the celebrated oil of bergamot is obtained, are highly perfumed.

Of the bitter oranges Risso enumerates thirty-two varieties ; of the bergamottes, five ; of the limes, eight ; of the pampelucos, six ; of the sweet limes, twelve ; of the lemons, forty-seven ; and of the citrons, seventeen.

There is something peculiar in the organization of all the fruit of the orange tribe. The rind or external pericarp of them all is a spongy texture, containing but little juice or sap of any kind in its substance ; but the external surface is covered, or tuberculated over, with little glands that secrete a volatile oil which is very inflammable, more or less acrid according to the species, and of a very strong and pungent scent.

The family of the oranges, in some places in many of their varieties, are now cultivated in Portugal, in Spain, in France, in Italy, and in Greece. In the

first two countries they especially abound—in Algarve, and in the fine plains of Andalusia, on the banks of the Guadalquivir. The latter is the place from which the bitter, or Seville, oranges are chiefly obtained. In Algarve and Andalusia the orange-trees are of great size ; and extensive orchards of oranges have formed the principal revenue of the monks for several centuries. In Cordova, the seat of Moorish grandeur and luxury, there are orange trees still remaining, which are considered to be six or seven hundred years old : and in that province, whose craggy mountains are covered with gardens, and vineyards, and forests abounding in fruit, the flowers of the orange fill the air with their perfume, and lead the imagination back to those days which the Moorish poets and historians delight in describing, when the land which they conquered was adorned with all the refinements of their taste and intelligence, and the luxuries of the East were naturalized in the most delicious regions of the South. The trunks of the old trees of Cordova have begun to decay ; and when they get diseased, they are crusted with a kind of lichen, which is supposed to be peculiar to the orange. In France, the orange country is chiefly Provence, or that part of the south which lies to the eastward of the Rhone ; and plantations or groves of oranges are the most abundant and the most beautiful on the banks of the Var, and especially in the environs of Nice, where the species are very many, and come to great perfection. To the west of the Rhone, the country along the coast is flat, sandy, and barren ; and on the plains of Languedoc, that lie interior of this barren tract, the olive thrives better than the orange, apparently because there are no secondary mountains between the cold heights of the Cevennes and the plains. The country to the eastward of the Rhone is much better adapted for choice

vegetables, both in soil and in aspect. In the western, or French part of it, the Alps descend gradually, by successive elevations, from the high summits of Mont Blanc, Mont Rosa, and St. Bernard, to the sea. Thus the low grounds are finely exposed to the southern sun ; and, being at the same time sheltered from every quarter whence a cold wind could come, the vegetation is at once luxuriant and choice. The finest bulbous flowers, the myrtle, the cactus, and many others, give more the air of the perpetual summer of the tropical countries, than is to be found perhaps in any other country of Europe—certainly in any other of the same extent.

The glory of that delightful country is the orange, which, when full grown, attains the height of about five and twenty feet, and is graceful in all its parts. The trunk and older branches are of a delicate ash colour ; the twigs of so soft a green that they almost appear transparent ; the leaves are moderately large, beautifully shaped, of a fine healthy green, and shining on the upper sides, while the under ones have a slight appearance of down. The flowers, which are in little bunches, and very graceful in their form, are, in the sweet oranges, of a delicate white, and, in the more acid varieties of the family, lightly marked with pink. Some plants have a more powerful odour, and are for the moment more rich ; but there is a freshness in the aroma of an orange-grove which never offends or cloys ; and as the tree is at one and the same time in all stages of its bearing—in flower, in fruit just set, and in golden fruit, inviting the hand to pull and the palate to taste,—it is hardly possible to imagine any object more delightful. The perfumes of Arabia do not exceed the fragrance of the groves on the north of the Mediterranean, in which the beautiful white Provence rose, the tuberose, and countless other flowers, blend their sweets with that

of the orange ; and where, with all this richness, the pestilent airs of the tropics, and even the *sirocco* of the southern parts of Italy, are altogether unknown. This delightful fertility and fragrance accompany the chain of the Apennines round the whole gulph of Genoa, and until, upon the boundary of the plain of Tuscany, they subside in elevation, and bend more toward the Adriatic.

Tuscany is further to the south ; but the climate and the vegetation cannot be compared to those of the little valleys of Provence and Liguria, especially the latter. About Florence, there are still orange-trees in the gardens ; but there are none of those aromatic groves and plantations which are found further to the west. Nor are the causes difficult to find out. There is an enemy on each side of the plain of Tuscany, which will not allow the orange to arrive at perfection. The gales that come from the south-east, over the sandy shores near Leghorn, are not adapted for a plant which, as well as heat and pure air, requires a considerable quantity of moisture; and the winds from the north, that are cooled in passing over the Adriatic, are not so genial as those from the Alps, that are warmed in passing over the vale of Lombardy. But still the olives, the grapes, and the melons of the vale of the Arno, in so far compensate the inhabitants for the want of the orange.

Eastward of Tuscany, though the coast of Italy inclines still further to the south, it is even less adapted for the production of the orange ; the sea-coast is barren, the interior is dreary, and over the whole the pestilent *malaria* creeps, forbidding man to approach even for the cultivation of the fields ; and thus it may be that, ere long, the arid downs by the sea will meet the marsh of the interior, and the centre of Italy shall be desolation to the very base

of the Apennines. After the gulf of Gaeta is passed, and the shelter of the more elevated mountains of Calabria is obtained, orange groves again make their appearance.

Thus the locality of the orange depends fully as much upon situation and soil as upon latitude; and therefore we need not wonder that, considering the many and varied lands in which it is cultivated, there should be so many varieties of its fruit. There is no absolute reason for supposing that the sweet and the bitter orange were originally different; and even now they are not so different as two mushrooms of the very same variety,—the one produced upon a dry and airy down, and the other upon a marsh. Now, if it be true that the bitter orange of Seville came, by successive removals, from the head of the Persian Gulf, along the margin of the salt desert, till it reached the states of Barbary, where it was transplanted into Spain; if the sweet orange of Malta, Italy and France came through the more fertile parts of Persia and Syria; and if the orange of India and the Azores came direct from China; it would follow that each should have those qualities which we find in it; and that the opinion of Galessio is borne out by the only evidence which the case admits.

Looking at the facts, we are induced to infer, that, if the temperature be sufficiently high for maturing its flavour, the orange is delicious in proportion to the uniform salubrity of the air; and that those high temperatures which force a very large expansion of the fruit are against the fineness of its quality. In this respect, we have an opportunity of contrasting both the oranges of islands and those of continents. St. Michael's, in the Azores, and Malta, are both small islands; the former always exposed to the equalizing breezes, which, from what-

ever quarter they blow, are always wafted across the expanse of the Atlantic; and the latter lying near the dry and sultry shores of Africa, and, of course, subjected to more changes of season and a higher temperature. There is also some difference in the soil. Whether it be the decomposition of the rock, or saline particles, brought by the same pestilent wind that withers the south of Italy and Sicily with the *sirocco*, it is well known, that under the artificial earth (brought originally from Sicily) which forms the soil of Malta, there gathers a crust; and that if the earth be not trenched, and this crust removed at the end of a certain number of years, it ceases to be productive, or the produce becomes so bitter, that it is not healthful. St. Michael's has no such disadvantage; the soil there is native and fertile, and deposits nothing calculated to injure its fertility, or impair the qualities of its produce.

The oranges of the two islands are such as one would expect from those differences: the Maltese orange is large, the rind is thick and spongy, the glands that secrete the volatile oil are prominent, the pulp is red, and there is a trace of bitterness in the taste; while the St. Michael's orange is small, the rind is thin and smooth, the glands less prominent, the volatile oil in smaller quantity, and the lighter coloured pulp more sugary and delicious. Some allowance must no doubt be made for the original differences of those oranges, regarding them as having come in the manner stated by Galessio; but they have now been long enough in both islands for having their qualities modified by the different climates and soils.

The modifications produced by differences of soil and climate, in the same vegetable, are among the most important inquiries in the science of plants; and they are at the same time among the most

difficult, and certainly the least attended to. One principal source of the difficulty lies in the observer being as much changed as the thing observed. Those who are parched with thirst do not stop to analyze the water, or descant upon the flavour of whatever beverage they may have recourse to for slaking it. The removal of the painful sensation is to them far more delicious than the purity of the most limpid spring, or the flavour of the choicest wine. Just so with man when he is panting under a burning atmosphere: the fruit which is most delicious to him is that which is most cool. This necessary change in the judge, as well as the thing judged of, must never be omitted when we come to compare the fruits of different countries as reported of by those who have enjoyed them there; and we never can be certain of their real merits till we have them decided by the same individual under the same circumstances. To take a case in point: a guava, apart from its rarity, is certainly not in this country any thing comparable to a peach; and yet those who have been in tropical countries talk in raptures of the guava, and say that the fruit grown here is inferior and degenerated. But they should bear in mind, that in the tropical countries there is the tropical zest, as well as the tropical flavour. The man who traverses a mountain country in the north, heeds not the glittering fountains that issue from every rock around him; but send him from Suez to Bassora, or from Morocco to Fezzan, and he would remember them with veneration.

But, again, we have a further confirmation when we compare the continental oranges. The climate of the slopes and valleys of the Estrella, near the lower Tagus, and that of the Maritime Alps, and the Apennines, in Provence and Liguria, are certainly very different from the climate of Andalusia. The

diversities of surface, and the vicinity of the sea, keep the air over the former places in continual play and motion, and prevent those intense heats which unquestionably (though by a process which chemistry has not yet fully investigated) render the juices of plants acid, acrid, or saline; while, from the wider extent of Andalusia, and its comparative distance from the ocean, the air over it is, in the warmer months, much more quiescent.

These considerations will, to a certain extent, explain why there are so many varieties in a fruit, which, according to the authorities, appear all to have come from the same part of the world; and a further extension of these considerations would form a criterion of the situations in which it would, or it would not, be desirable to cultivate the orange.

Chapter VIII.

Fruits common to temperate and tropical Climates continued. The Date.

The Date—*Phœnix dactylifera.*

The date is one of those plants which, in the countries that are congenial to their growth, form the principal subsistence of man; and its locality is so peculiar that it cannot, strictly speaking, be classed either with the fruits of the temperate climates or with those of the tropical. It holds a certain intermediate place; and is most abundant in regions where there are few other esculent vegetables to be found.

There is one district where, in consequence of the extreme aridity of the soil, and the want of moisture in the air, none of the Cerealia will grow; that district is the margin of the mighty desert which

extends, with but few interruptions, from the shores of the Atlantic to the confines of Persia, an extent of nearly four thousand miles. The shores, the banks of the rivers, and every part of this region in which there is humidity, are exceedingly fertile; and with but unskilful culture produce the most abundant crops and the choicest fruits. But along the verge of the desert, and in the smaller oases or isles which here and there spot that wilderness of sand, the date palm is the only vegetable upon which man can subsist. The lofty summits of the mountains of Atlas form an effectual barrier to the humid winds from the sea. Accordingly, the richer vegetation extends only as far to the south of them as the courses of the streams that are fed by the mountain snows; and these streams are soon evaporated by the air, or absorbed by the thirsty soil. The more lowly vegetables on that soil are chiefly of a saline and succulent description, such as euphorbias, salsolas, and cactuses, which retain their own humidity in consequence of their smooth and close rinds, without much aid from external moisture; but their juices are in general too acrid, or too much impregnated with soda, for being of any use as food. Over these, the date-palm raises its trunk and spreads its leaves, and is the sole vegetable monarch of the thirsty land. It is so abundant, and so unmixed with any thing else that can be considered as a tree in the country between the states of Barbary and the desert, that this region is designated as the Land of Dates (Biledulgerid;) and upon the last plain, as the desert is approached, the only objects that break the dull outline of the landscape are the date-palm and the tent of the Arab. The same tree accompanies the margin of the desert in all its sinuosities; in Tripoli, in Barca, along the valley of the Nile, in the north of Arabia, and in the south-east of Turkey.

This region of the date has perhaps remained for a longer period unchanged in its inhabitants and its productions than any other portion of the world. The Ishmaelites, as described in Scripture history, were but little different from the Bedouins of the present time; and the palm-tree (which in ancient history invariably means the date) was of the same use, and held in the same esteem, as it is now. When the sacred writers wished to describe the majesty and the beauty of rectitude, they appealed to the palm as the fittest emblem which they could select. "He shall grow up and flourish like the palm tree" is the promise which the Royal Poet of Israel makes for the just.

Even among the followers of other faiths, the palm has always been the symbol held in the greatest veneration. It is recorded of Mahomet that, like the psalmist, he was accustomed to compare the virtuous and generous man to the date-tree: "He stands erect before his Lord; in every action he follows the impulse received from above; and his whole life is devoted to the welfare of his fellow creatures." The inhabitants of Medina, who possess the most extensive plantations of date-trees, say that their prophet caused a tree at once to spring from the kernel at his command, and to stand before his admiring followers in mature fruitfulness and beauty.* The Tamanaquas of South America have a tradition that the human race sprung again from the fruits of the palm, after the Mexican *age of water*. The usefulness of the tree has thus caused it to be the subject of universal veneration. In ancient times, and in modern, the palm has been the symbol of triumph. The Jews carry it on a solemn festival in commemoration of their fathers having gained possession of the promised land;† and the Christians in remem-

* Burckhardt's Arabia.

† Judæa was typified by the palm-tree upon coins of Vespasian and Titus.

brance of that more glorious victory, when the Saviour rode into Jerusalem amid the jubilations and hosannahs of the people.

And the tree is not unworthy of those honours which mankind have in all ages bestowed upon it. Indeed, the worthiness of the tree must have been the cause of those honours. Rearing its stem, and expanding its broad and beautiful shade where there is nothing else to shelter man from the burning rays of the sun, the palm-tree is hailed by the wanderer in the desert with more pleasure than he hails any other tree in any other situation. Nor is it for its shade alone, or even for its fruit, that the palm is so desirable in that country; for wherever a little clump of palms contrast their bright green with the red wilderness around, the traveller may in general be sure that he shall find a fountain ready to afford him its cooling water.

Nor is it only when standing alone in the desert that the palm is a majestic tree. Palms form the shade and the beauty of many of the tropical forests. Some of them are among the tallest of trees; and when the margin of a river is spoken of as more than usually delightful, we allude to its "palmy side."

The *Cucurito*, a palm of South America, throws out its magnificent leaves over a trunk a hundred feet high. This family of plants diminish in grandeur and beauty as they advance towards the temperate zone; and Humboldt says that those who have only travelled in the north of Africa, in Sicily, and in Murcia, cannot conceive how the palms should be the most imposing in their forms of all the trees of the forest. The palms of South America furnish food in a variety of ways to the people; so that in those wild districts, the assertion of Linnæus forces itself upon the mind,—that the region of palms was the first country of the human race, and that man is essentially *palmivorous*.

The date-palm, though some of the family are more majestic, is still a beautiful tree. The stem of it shoots up, in one cylindrical column, to the height of fifty or sixty feet, without branch or division, and of the same thickness throughout its whole lenght. When it attains this height, its diameter is from a foot to eighteen inches. From the summit of this majestic trunk it throws out a magnificent crown of leaves, which are equally graceful in their formation and their arrangement.

> "Those groups of lovely date-trees bending
> Languidly their leaf-crowned heads,
> Like youthful maids, when sleep descending
> Warns them to their silken beds."*

The main stems of the leaves are from eight to twelve feet long, firm, shining, and tapering; and each embraces, at its insertion, a considerable part of the trunk. The trunk of the palm is, in fact, made up of the remains of leaves, the ends of which are prominent just under the crown, but more obliterated toward the root of the tree. The bottoms of the leaves are enveloped in membranous sheaths, or fringed with very tough fibrous matter. These leaves are pinnated, or in the form of feathers, each leaf being composed of a great number of long, narrow leaflets, which are alternate, and of a bright lively green. Near the base of the leaf, these leaflets are often three feet long; but even then they are not one inch in breadth; neither do they open flat, but remain with a ridge in the middle, something like the keel of a boat. When the leaves are young they are twisted together, and matted up with loose fibres, which open and disperse as the leaf expands. The young leaflet is also armed at the extremity with a hard black spine, or thorn. They are more stiff and firm than the leaves of any other tree.

* Moore.

The trunk of the palm, though it is in some parts remarkably hard and durable, can hardly be considered as timber. It consists of longitudinal fibres, which are not so much interwoven as those of the branching trees; but have their interstices filled with a sort of pith, or medullary substance, when young, that is near the top, where the young leaves are in the progress of formation. This medullary substance is a sort of sap; but in the older portions of the tree it consolidates, though it always remains granular, and, as is the case with the pith of trees, is as easily divided across as longitudinally. Generally speaking, the medullary part of the palm is much lighter in the colour than the fibrous part; and thus well consolidated palm trunks have a beautifully mottled appearance when cut across. The wood of the areca palm, or cabbage palm of South America, is sometimes used in ornamental furniture, under the name of cabbage wood; but it does not answer very well, as the ends of the fibres are too hard, and the medullary matter too soft, for holding glue. For the same reason, the surface is very difficult to polish, and cannot be preserved without varnish.

The flowers come out in large bunches, or spikes, from between the leaves; they are at first inclosed in a spatha, or sheath, which opens to let them expand, and then shrivels and withers.

The date-palm is a dicecious tree, having the male flowers in one plant, and the female, or fruiting ones, in another. The male flowers are considerably larger than the female; and the latter, instead of stamens, have, in the centres of them, the rudiments of the dates, about the size of small peas.

The two distinct sexes of the date-tree appear to have been known from the remotest antiquity, as they are noticed by all the ancients who describe the tree. It is not a little remarkable, that there is a

difference in the fructification of the wild date and the cultivated, though both are precisely the same species. Wild dates impregnate themselves; but the cultivated ones do not, without the assistance of art. Theophrastus and Pliny mention this fact; and in every plantation of cultivated dates, one part of the labour of the cultivator consists in collecting the flowers of the male date, climbing to the top of the female with them, and dispersing the *pollen* on the germs of the dates. So essential is this operation, that though the male and female trees are growing in the same plantation, the crop fails if it be not performed. A very remarkable instance of this is related by Delile, in his Egyptian Flora. The date-trees in the neighbourhood of Cairo did not yield a crop in the year 1800. The French and Turkish troops having been fighting all over the country in the spring, field labour of every kind was suspended, and amongst the rest, the fecundation of the date. The female date-trees put forth their branches of flowers as usual, but not one of them ripened into edible fruit. The pollen of the male trees appears to have been scattered over the country by the winds; and, as it had not been sufficiently abundant for reaching the germs so as to ensure fructification, an almost universal failure was the consequence. The Persians, according to the elder Michaux, who travelled in the country, were more provident than the Egyptians. In a civil war, which was attended with all the ruinous effects of anarchy, the male date-trees of a whole province were cut down by the invading troops, that the fructification of this necessary of life might be stopped. But the inhabitants, apprehending such a result, had been careful previously to gather the pollen, which they preserved in close vessels; and thus they were enabled to impregnate their trees when the country was freed from the destroying army. It

is said that the pollen had thus preserved its powers during nineteen years.*

Pontanus, an Italian poet of the fifteenth century, gives a glowing description of a female date-tree, which had stood lonely and barren, near Otranto, in Italy, until a favouring wind wafted toward it the pollen of a male that grew at a distance of fifteen leagues. Father Labat, in his account of America, relates a story of a date-tree in the island of Martinico. There were palm-trees of various other kinds in the island, but there was only one date-tree, which grew near a convent. That tree produced fruit which was grateful enough to the taste; but when an increase of the number of the date-trees was wanted, not a single one would grow from the seed; and thus, after a number of unsuccessful trials, they were obliged to send to Africa for dates, the stones of which grew readily, and produced abundantly.

Four or five months after the operation of fecundation has been performed, the dates begin to swell; and when they have attained nearly their full size, they are carefully tied to the base of the leaves, to prevent them from being beaten and bruised by the wind. If meant to be preserved, they are gathered a little before they are ripe; but when they are intended to be eaten fresh, they are allowed to ripen perfectly, in which state they are a very refreshing and agreeable fruit. Ripe dates cannot, however, be kept any length of time, or conveyed to any very great distance, without fermenting and becoming acid; and therefore those which are intended for storing up, or for being carried to a distant market, are dried in the sun upon mats. The dates which come to the European market from the Levant and Barbary are in this state; and the travellers in the de-

* Annales du Museum.

sert often carry with them a little bag of dried dates, as their only or their chief subsistence during journeys of many hundred miles. In parts of the East, the dates that fall from the cultivated trees are left on the ground for the refreshment of the wayfaring man.

In the Hedjaz, the new fruit, called *ruteb*, comes in at the end of June, and lasts two months. The harvest of dates is expected with as much anxiety, and attended with as general rejoicing, as the vintage of the south of Europe. The crop sometimes fails, or is destroyed by locusts, and then a universal gloom overspreads the population. The people do not depend upon the new fruit alone; but during the ten months of the year when no ripe dates can be procured, their principal subsistence is the date-paste, called *adjoue*, which is prepared by pressing the fruit, when fully matured, into large baskets. "What is the price of dates at Mekka or Medina?" is always the first question asked by a Bedouin who meets a passenger on the road.*

There is, indeed, hardly any part of the tree which is not serviceable to man, either as a necessary or a luxury. When the fruit is completely ripened, it will, by strong pressure, yield a delicious syrup, which serves for preserving dates and other fruits; or the fruit may be made into jellies and tarts. The stalks of the bunches of dates, hard as they are in their natural state, as well as the kernels, are softened by boiling, and in that condition are used for feeding cattle. Dates, with the addition of water, afford by distillation a very good ardent spirit, which, as it does not come within the prohibition of the Koran against wine, is much used in some of the Mahommedan countries, and answers the same purpose of false excitement as the brandy or the malt spirits of other nations. Palm wine is also

* Burckhardt's Arabia.

made from the date: this is also without the statute of the Prophet. It is known in Egypt by the name of *lakhlsy*. It is the sap or juice of the tree, and can only be obtained by its destruction; so that such trees only as are unproductive are selected for obtaining it. The time chosen for this purpose is when the tree is in the most active state of vegetation. The crown is then cut off, and a cavity scooped in the top of the trunk. As the sap rises, it exudes into this cavity, at the rate of nearly a gallon a day for the first two weeks; after which it gradually diminishes; and at the end of six weeks or two months it stops entirely, and the tree, which has become by the operation completely dry, is cut down for firewood, or for any other of the purposes to which the trunk of the palm is applied. When the juice first exudes from the tree, it is remarkably sweet, but it soon ferments and becomes vinous, with a certain degree of acidity. This juice may also be distilled into an ardent spirit; in fact, the genuine arrack, or rack, of the East is obtained from the juice of palms. In Egypt and Arabia the date-trees that have become unproductive, through age or any other circumstance, are commonly disposed of in this manner. What is called the *cabbage* of the palm is esculent in many of the species, and in the date among others. The cabbage is a conical tuft in the centre of the crown of leaves, and is formed of the future leaves in their undeveloped state. When the outside is removed, this part of the date-tree tastes very much like a fresh chesnut; but, like the palm juice, it is costly, being obtained only by the destruction of the tree; and therefore it is not used except in those trees which are cut for the sake of the sap or juice.

The fibrous parts of the date-tree are made into ropes, baskets, mats, and various other articles of domestic use; and so are the strings or stalks that

bear the dates. The cordage of the ships navigating the Red Sea is almost exclusively of the inner fibrous bark of the date-tree. The trunk answers very well for posts, railings, and other coarse purposes; but it is not fit for being worked into planks, as the fibrous nature of it makes it easily split lengthwise into threads. The medullary part is much more abundant and soft toward the centre of the tree than toward the circumference; and, therefore, when it is to be used as timber, the trunk is generally cleft in two, down the middle, for the purpose of allowing the heart to dry and harden.

The medullary part of the date-tree is partly farinaceous, and soluble in water; and a nutritious substance may be obtained from it, resembling in consistency the *sago* which is obtained from another kind of palm. In the proper date-tree, however, it is small in quantity, and by no means good in quality. From another, and a much smaller species, (*Phœnix farinifera*,) which is a native of the East Indies, the supply is much more abundant. This farinaceous date-tree grows upon the dry and sandy parts of the east or Coromandel coast of the peninsula of Hindostan. It is a very low tree, or rather a great leafy bush; for the trunk is never above a foot and a half or two feet in height, and the leaves completely conceal it. This palm is of a much deeper green, and has the leaves much narrower, than those of the date. It fruits and flowers nearly in the same manner. The berries are about the size of kidney beans, and of a shining black; they have not much pulp, but what they have is sweet and mealy. In times of scarcity the natives of Hindostan have recourse to the wood of this palm for food. When the stem is divested of the leaves, and of the brown fibrous matter with which their roots are enveloped, it is about eighteen inches long, and six in diameter

where thickest. The outside of it consists of woody fibres, of a white colour, and very much matted together, and within these the farinaceous matter is contained. To obtain that, the natives split the trunk into longitudinal pieces, dry them, beat them in mortars, and then sift the mass to separate the fibres. After this, the farina is ready for being boiled into gruel, or *congee*, as it is called in India; but it is bitter, and far inferior to sago. It has, however, occasionally been of much use, and saved the lives of the people at times when famine has threatened them with destruction.

The true sago palm of Asia (*Sagus*) offers a greater quantity of nourishing matter than is furnished by any other plant, except the banana. The single trunk of a tree of this species, in its fifteenth year, sometimes furnishes six hundred pounds of sago. In the dialect of Amboyna the word sago signifies farini (meal). Mr. Crawford in his 'History of the Indian Archipelago,' has calculated that a single acre of land will support four hundred and thirty-five sago palms, which will annually produce 120,500lbs. of sago.

The northern bank of the Orinoco, the great river of South America, is covered with palms of the Mauritia, which also produce farinaceous matter, or sago. The whole country in which they abound is subject to inundations; and the fan-like branches of these trees look like a forest which rises out of the bosom of the waters. The navigator who passes along the *delta* of the Orinoco is surprised to see the tops of these trees lighted with fires. They are kindled by a people (the Guanacas) who have remained for ages in these marshy districts,—secured from the floods by living in the palms. In the branches they suspend mats, which they fill with clay, and on this damp hearth kindle the fires which

are necessary for their comfort. Sir Walter Raleigh saw and described these people. The palm offers to this rude race, as well as to other tribes who inhabit the Gulph of Darien and the watery lands between the Guarapitha and the mouths of the Amazon, a safe habitation amidst the great inundations to which those countries are subject. But it affords them also, in its fruit, its farinaceous bark, its sap abounding with sugar, and its fibrous stalks,—pleasant food to eat, wine to drink, and thread to make cordage and hammocks. "It is curious to behold," says Humboldt, "in the lowest stage of human civilization, the existence of a whole race depending upon a single species of palm, in a similar degree with those insects which subsist but upon one species of flower."*

Even the leaves of the date-palm have their uses; their great length and comparatively small breadth, and their toughness, render them very good materials for the construction of coarse ropes, baskets, panniers, and mats. On the continent of Europe, palm-branches are a regular article of trade; and the religious processions, both of Christians and Jews, in the greater part of Europe, are supplied from some palm-forests near the shores of the Gulph of Genoa.

The cultivation of the date-tree is an object of high importance in the countries of the East. In the interior of Barbary, in great part of Egypt, in the more dry districts of Syria, and in Arabia, it is almost the sole subject of agriculture. In the valleys of the Hedjaz there are more than a hundred kinds of dates, each of which is peculiar to a district, and has its own peculiar virtues. Date-trees pass from one person to another in the course of trade, and are sold by the single tree; and the price paid to a girl's father, on marrying her, often consists of date-trees.†

The palm is not wholly confined to the warmer

* Voyages, liv. viii. chap. xxiv. † Burckhardt's Arabia.

latitudes, though in those only it matures its fruit. There are greenhouse specimens in many parts of England. Some of the more luxuriant parts of the province of Valencia, in the south-east of Spain, have very fine forests of date-palms, from which, as well as from the neighbourhood of Genoa, palm-branches are exported. There are date-palms upon the coast of Gallicia, near Ferrol and Corunna ; but the fruit on them does not come to maturity. There is abundance of palms in the gardens of Naples ; and they are still finer and more numerous in that part of Sicily in the neighbourhood of Palermo, which, from the fertility of its soil, and the variety and beauty of its productions, has the name of "the golden shell." They are also to be met with in some parts of the south of France, though they rarely, if ever, ripen their fruit in that country. There are, in particular, two very majestic specimens growing in the open air in the Botanical Garden at Toulon; but these, so far as we have heard, have not yet flowered. As greenhouse plants, with heat in the colder season, they have been introduced into England for about a century ; and the celebrated Miller, of the Botanical Garden at Chelsea, is reported to have been the first cultivator. The Messrs. Loddiges, of Hackney, have palms of considerable height growing under glass ; there are also some fine palms at the Botanical Garden at Kew.

The date-palm is a very slow growing tree ; and even in the soil and climate that are most congenial, old trees do not gain above a foot in height in five years, so that, supposing the increase uniform, the age of a tree, sixty feet high, cannot be less than three hundred years. Dr. Shaw says that the palm of Barbary usually falls about the latter end of its second century.

Chapter IX.

Fruits common to most countries within or near the tropics. Plantain, or Banana; Tamarind; Guava. Fruits of Africa. Akee; Negro Peach; Monkey's Bread.

The plantain, or banana (though they are thought by some to be distinct species), are generally spoken of together, as having more points of resemblance than of dissimilarity. They grow in the same regions, and are applied to the same uses.

The Plantain—*Musa paradisiaca.*

The *Plantain* is of considerable size: it rises with a herbaceous stalk, about five or six inches in diameter at the surface of the ground, but tapering upwards to the height of fifteen or twenty feet. The leaves are in a cluster at the top; they are very large, being about six feet long and two feet broad: the middle rib is strong, but the rest of the leaf is tender, and apt to be torn by the wind. The leaves grow with great rapidity after the stalk has attained its proper height. The spike of flowers rises from the centre of the leaves to the height of about four feet. At first the flowers are enclosed in a sheath, but, as they come to maturity, that drops off. The fruit is about an inch in diameter, eight or nine inches long, and bent a little on one side. As it ripens it turns yellow; and when ripe, it is filled with a pulp of a luscious sweet taste.

The Plantain—(Musa paradisiaca).

The Banana—*Musa sapientum.*

The *Banana* is a shorter and rounder fruit than the plantain : the stem is also different,—that of the plantain being wholly green, while the banana is spotted with purple. The banana is not so luscious as the plantain, but it is more agreeable.

Having thus observed the slight differences in these plants, we shall proceed to their general character ;—in which notice we shall confine ourselves to the use of the word banana.

The banana, as we have indicated by the heading of this chapter, is not the property of any particular country of the torrid zone, but offers its produce indifferently to the inhabitants of equinoctial Asia and America, of tropical Africa, and of the islands of the

The Banana—(Musa sapientum).

Atlantic and Pacific Oceans. Wherever the mean heat of the year exceeds 75° of Farenheit, the banana is one of the most important and interesting objects for the cultivation of man. All hot countries appear equally to favour the growth of its fruit; and it has even been cultivated in Cuba, in situations where the thermometer descends to 45° of Farenheit. Its produce, as already mentioned, is enormous. The banana, therefore, for an immense portion of mankind, is what wheat, barley, and rye are for the inhabitants of Western Asia and Europe, and what the numerous varieties of rice are for those of the countries beyond the Indus.*

The banana is not known in an uncultivated state. The wildest tribes of South America, who depend

* Humboldt's Political Essay on New Spain—Black's Translation, vol. ii.

upon this fruit for their subsistence, propagate the plant by suckers. Yet an all bountiful Nature is, in this case, ready to diminish the labours of man—perhaps too ready for the proper developement of his energies both physical and moral. Eight or nine months after the sucker has been planted, the banana begins to form its clusters; and the fruit may be collected in the tenth and eleventh months. When the stalk is cut, the fruit of which has ripened, a sprout is put forth, which again bears fruit in three months. The whole labour of cultivation which is required for a plantation of bananas is to cut the stalks laden with ripe fruit and to give the plants a slight nourishment, once or twice a year, by digging round the roots. A spot of a little more than a thousand square feet will contain from thirty to forty banana plants. A cluster of bananas produced on a single plant, often contains from one hundred and sixty to one hundred and eighty fruits, and weighs from seventy to eighty pounds. But reckoning the weight of a cluster only at forty pounds, such a plantation would produce more than four thousand pounds of nutritive substance. M. Humboldt calculates that as thirty-three pounds of wheat and ninety-nine pounds of potatoes require the same space as that in which four thousand pounds of bananas are grown, the produce of bananas is consequently to that of wheat as 133: 1, and to that of potatoes as 44: 1.

The banana ripened in the hothouses of Europe has an insipid taste; but yet the natives of both Indies, to many millions of whom it supplies their principal food, eat it with avidity, and are satisfied with the nourishment it affords. This fruit is a very sugary substance; and in warm countries the natives find such food not only satisfying for the moment, but permanently nutritive. Yet weight for weight,

the nutritive matter of the banana cannot at all be compared to that of wheat, or even of potatoes. At the same time, a much greater number of individuals may be supported upon the produce of a piece of ground planted with bananas, compared with a piece of the same size in Europe growing wheat. Humboldt estimates the proportion as twenty-five to one; and he illustrates the fact by remarking that a European, newly arrived in the torrid zone, is struck with nothing so much as the extreme smallness of the spots under cultivation round a cabin which contains a numerous family of Indians.

The ripe fruit of the banana is preserved, like the fig, by being dried in the sun. This dried banana is an agreeable and healthy aliment. Meal is extracted from the fruit, by cutting it in slices, drying it in the sun, and then pounding it.

The facility with which the banana can be cultivated has doubtless contributed to arrest the progress of improvement in tropical regions. In the new continent civilization first commenced on the mountains, in a soil of inferior fertility. Necessity awakens industry, and industry calls forth the intellectual powers of the human race. When these are developed, man does not sit in a cabin, gathering the fruits of his little patch of bananas asking no greater luxuries, and proposing no higher ends of life than to eat and to sleep. He subdues to his use all the treasures of the earth by his labour and his skill;—and he carries his industry forward to its utmost limits, by the consideration that he has active duties to perform. The idleness of the poor Indian keeps him, where he has been for ages, little elevated above the inferior animal;—the industry of the European, under his colder skies, and with a less fertile soil, has surrounded him with all the blessings of society—

its comforts, its affections, its virtues, and its intellectual riches.

In a very interesting and instructive paper by Mr. John Lindley, 'On the Tropical Fruits likely to be worth cultivating in England,'* it is stated, upon the authority of Mr. Crawford, that some of the varieties of the banana possess an exquisite flavour surpassing the finest pear; and that others in the East Indies have been compared to an excellent reinette apple, after its sweetness has been condensed by keeping through the winter. Of these varieties there are so many, that they would be as difficult to describe as the sorts of apples and pears of Europe. The banana has frequently produced its bunches of yellow fruit in hothouses in this kingdom; particularly at Wynnstay, the seat of Sir W. W. Wynn; and at Messrs. Loddiges', at Hackney: and, according to Mr. Lindley, "it appears probable that there will be as little difficulty in ripening the fruit, as that of any tropical tree whatever."

The Tamarind—*Tamarindus Indica.*

The tamarind-tree is a native both of the East Indies and of tropical America, and probably also of Arabia and some parts of Africa. It was very early introduced into this country; for Gerarde, whose Herbal was published in 1633, makes mention of it as growing here. It does not often flower in England, though it has done so in the Royal Gardens at Kew. It is, however, a common ornament of our hothouses. Where it is a native, it grows to be a large tree, and affords excellent timber—heavy, firm, hard, and durable. The stem is large, covered with brown bark, and divides into many branches; the

* Hort. Trans., vol. v.

The Tamarind—(Tamarindus indica.)

leaves are not unlike those of the mountain ash, only they are of a brighter green, and the leafets are closer to the mid-rib. The leaflets are small, but the number in a leaf (sixteen or eighteen pairs in a leaf, with an odd one at the extremity) give the tree a very light and elegant appearance. The flowers come out from the sides of the branches in loose bunches, and are followed by the pods, of which there are generally about five or six on a bunch. The pods of the West India tamarinds are, on an average, about three inches long, and contain about three seeds; those from the East are about double the size.

The pulp in which the seeds of the tamarind are inclosed, contains more acid than any other vegetable substance, in a natural state, with which we are acquainted; and therefore it is used both for sharpening food and drink; and for medicinal purposes. Niebuhr says, "the tamarind is equally useful and agreeable. It has a pulp of a vinous taste, of which a wholesome refreshing liquor is prepared; its shade shelters houses from the torrid heat of the sun; and

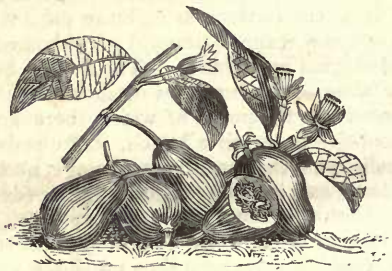
its fine figure greatly adorns the scenery of the country." Its refreshing properties has given it a place in our poetry:

"The damsel from the tamarind-tree
Had pluck'd its acid fruit,
And steep'd it in water long;
And whoso drank of the cooling draught,
He would not wish for wine."*

Mandelslo, an old traveller, says, that as soon as the sun is set the leaves of the tamarind close up the fruit to preserve it from the dew, and open as soon as that luminary appears again:

"'Tis the cool evening hour:
The tamarind, from the dew
Sheaths its young fruit, yet green."†

The East India tamarinds are preserved without sugar, and therefore they are the best for medicinal use. About forty tons of tamarinds are annually imported into Great Britain.



THE GUAVA—*Psidium pyriferum.*

The botanists enumerate eight or nine species of the guava, some of them natives of the East Indies, and other parts of Asia; some of the West Indies;

* Thalaba, † Ibid.

and others, among which are the kinds most valued as fruit, common to both continents.

The *white Guava* (*Psidium pyriferum*) is the best and also the most abundant in the West Indies. When wild, the white guava is a shrub rather than a tree, as it seldom exceeds eight or nine feet in height; but, when introduced into gardens, it attains the size of an ordinary apple-tree, with a trunk about six feet high, and six inches in diameter. The wood is very hard and tough; the leaves are from two to three inches long, and grow in pairs opposite each other; the flower is white, and has a very agreeable flavour; the fruit is rather bigger than a hen's egg, of a sulphureous yellow, very smooth, and has a peculiar smell; it is covered with a rind of some thickness, within which are the seeds, contained in a pulp without any shell. The pulp is flesh coloured, sweet, aromatic, and very grateful to the palate. It is used as a dessert fruit, and also preserved with sugar; and guava jelly is esteemed one of the finest conserves that come from the West Indies. By proper culture it may be brought to be a large and handsome tree; but when wild, it remains shrubby, and overruns the land.

The *red Guava* (*Psidium pomiferum*) is a much larger tree than the white; the trunk often attaining the height of twenty feet. On poor soils, however, it is apt to be rugged and shrubby. The leaves are of a light green; the flowers white; the fruit shaped like a pomegranate, and having an agreeable odour when ripe. As a fruit, however, many of the authorities represent it as being very much inferior to the white guava: but it is probable that they have found it in the wild state, for it appears to be much improved by culture.

The mountain guava, found in the woods of Jamaica, is not much esteemed as a fruit tree; but it

grows to a large size; the wood is of a beautiful dark colour, finely curled, easily worked, susceptible of a high polish, and therefore much valued as a timber-tree.

In a paper read to the Horticultural Society, Mr. Cattley of Barnet, gives an account of a previously undescribed species of guava. The fruit is nearly spherical, of a fine deep claret colour, growing at the insertion of the leaves, and contains from twenty to thirty seeds, inclosed in a pulp, which is sweet, and slightly acid. Independently of the value and beauty of the fruit, this is a highly ornamental plant, may be propagated freely by cuttings, and bears at the age of eighteen months. It is understood to have come from South America, and has an external texture resembling the fig: its internal consistence and flavour bear a considerable resemblance to those of the strawberry. With proper treatment, it is one of the most free growing of all the tropical fruits.

This guava, which has received the name of *Psidium cattleyanum*, promises to become a very valuable addition to stone fruits; and, both for its appearance and its flavour, merits attention. There is a specimen in one of the hot-houses belonging to the Horticultural Society, which is as thriving and elegant a tree as can well be imagined. The tree is about ten feet high, and trained something in the fan shape, till the outside branches have a width of sixteen feet. The bark of the tree is of a soft ash colour, with a very slight trace of brown, and smooth, but not glossy. The leaves are beautiful and vigorous, and, when we last saw it (18th May), a great profusion of well set fruit was in progress—a greater number, indeed, than we recollect ever to have seen upon any other delicate hot-house tree. That the fruit would, properly managed, come to the same maturity in the average of situations, in this country,

as in those places of which it is a native, there cannot be the least doubt; and it has this advantage over most other fruit trees, whether indigenous or exotic, that it produces two crops in the year.

We have already had to describe many fruits which are indigenous to *Africa*, in noticing those of the temperate climates. As we leave the northern parts of that continent, and approach the Equator, the date, the vine, and the fig, are no longer seen. There is, indeed, a fruit, that of the Lote-tree (*Rhamnus lotus*), which bears some resemblance to the berries of Europe, and which Mungo Park described as excellent. This plant is raised in our green-houses. The *Cream-fruit* of Sierra Leone, described by Dr. Afzelius to the African Society, grows on a lofty tree, and yields a quantity of fine white juice, from which it obtains its name. The fruits of the interior of Africa have been but little examined by Europeans; and their very names are unknown to us, with a few exceptions. They are, probably, of little worth. Of those that have not been found in any other quarter of the world, the most singular are the following :—

The Akee—*Blighia sapida.*

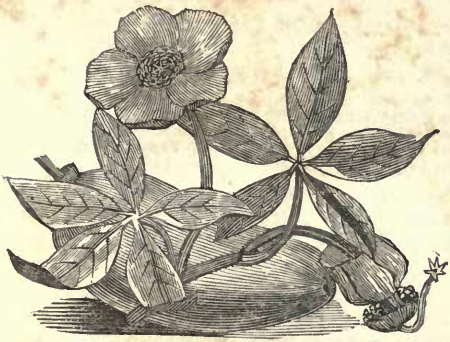
This is a native of Guinea, from whence it was carried to Jamaica by Captain Bligh in 1793. It has grown well in the West Indies, and is there much esteemed as a fruit. It was introduced into England in 1793. The leaves of the akee are something similar to those of the ash : the flowers are small and white, and are produced in branched spikes. The fruit is oblong, ribbed, and compressed in the middle, of a dull orange colour, and contains several large seeds, to the end of which is attached

The Akee—(Blighia sapida).

a rich and slightly acid arillus (the outer coat of a seed lightly attached to it), which is the part eaten.

The Negro Peach, or Edible Peach.

The tree on which the negro peach is produced is very handsome, with lanceolate leaves, resembling those of the orange. The flowers are white, and grow closely clustered in little round heads, like those of the American button-wood, so common in shrubberies. The tree has flowered in the gardens of the Horticultural Society, but has not borne fruit in this country. The fruit is about the size of an ordinary peach, but very different in colour and qualities. Externally and internally it is brown, of varying shades: its form is irregular, and the whole surface covered with tubercles. About one-third of the diameter in the centre consists of a very firm and somewhat dry pulp, of a flavour resembling an apple. Between that and the rind, the pulp is of softer consistency, full of seeds and fibres, and has a flavour resembling the strawberry.



MONKEY'S BREAD—*Adansonia digitata.*

This tree is a native of the western coast of Africa, and also of Egypt. In the former country it is described by Adanson as being a tree of large dimensions and singular economy. The trunks were about twelve or fourteen feet high, but of the vast circumference of sixty or seventy feet. The lateral branches were forty or fifty feet long, of the thickness of a great tree, and with their remote branches touching the ground ; while some of the roots that had been laid bare were upwards of a hundred feet long, and even then were not exposed for their whole length. The fruit is from nine to twelve inches long, and about four in diameter, of a brownish colour, and rather pointed toward the extremities. The pulp is a little farinaceous, mixed with fibres : when recent, it has a very refreshing, acid taste ; and eaten with sugar, it is both pleasant and wholesome. It retains its cooling qualities when dry ; and, on that account, the physicians of Cairo administer it in fevers and other diseases.

Chapter X.

Fruits of the West India Islands, and the South American Continent.—Pine-Apple; Mammee; Alligator-Pear; Anchovy Pear; Custard-Apples; Wild Plums; Star-Apple; Cactus; Papaw; Grenadillas; Cocoa-Nut; Cashew-Nut; Juvia.

The Pine-apple—*Bromelia.*

The earliest exchanges of tropical plants that took place between the Portuguese in the east, and the Spaniards in the west, have not been recorded with

perfect accuracy, so that we are not absolutely certain that the pine-apple may not be a native of some parts of Asia, and even of Africa, as well as of America. That it is a native of the West is certain, however, as all the varieties, except some of the trivial ones arising from cultivation, are found wild on the continent or the islands of that quarter of the world.

The Bromelias have been variously described;—some having formed them into three or four distinct genera, and others considered them as only species of one. In the *Hortus Kewensis*, in the formation of which the very best authorities have been consulted, six species are enumerated ; and, with the exception of the *Bromelia humilis* (dwarf,) they are all there represented as being natives either of South America or the West Indies. Only one of the species is of any value in cultivation, the others being merely wild plants. The cultivated species is the *Ananas;* but it may be as well first to mention the others. They are the *pinguin*, or broad-leaved; the *karata*, or upright-leaved; the tongue-leaved, the red-breasted, and the dwarf.

In the form and combination of their leaves, all the bromelias have some resemblance to each other, and also to the aloe; but the only species in which the seeds are united into one fleshy and esculent strobile, or pine, is the ananas.

The *Pinguin* species have the leaves very short and strong about the root, and their edges are armed with strong crooked spines. The fruits are detached ; each about the size of a walnut. The pulp is sweet, but it is at the same time so sharp as to be absolutely corrosive. A tuft of leaves growing above the fruit makes the pinguin look something like the pine-apple, when seen at a distance; but the detached fruit soon distinguishes it upon a closer inspection. Though not edible, the pinguin is not without its use. It

grows readily and abundantly in the West Indies, both on the fertile savannahs and the mountains. It is hardy, and is formidable with its spines, and thus it answers well for hedges. The fibres of the leaves, too, are very tough and strong; and, when freed from the pulpy matter, they are made into ropes. A small portion of the juice mixed with water forms a very cooling draught; and some of the varieties, which grow so plentifully about Campeachy that it is hardly possible to move amongst them, have their fruit in clusters, and are not unpalatable.

The *Karata* grows in woods, under trees, both in the West Indies and on the continent of America. The leaves are six or seven feet long; the fruit of an oval form, and from two to three hundred in number upon a single plant. Before it is ripe the fruit is sour and acrid, but when ripe it is not unpleasant. Until the fruit is ripe it is defended by the spines of the leaves, so as to be quite secure against injury.

The tongue-leafed, the red-branched, and the dwarf, are smaller species. The first and second very much resemble some of the species of aloe in their forms, and are found in most of the West India islands.

The *Ananas*, or pine-apple, properly so called, is now so generally known in this country, (being cultivated in hot-houses and pits almost from Cornwall to Caithness,) that no minute account of it is necessary. When of a good sort and healthy, it is accounted the best, at least the most luscious, fruit that this country produces; and, with careful cultivation, is equal in quality to that of places where it is a native. It is said even to be superior, because the English gardeners may, by skilful treatment and choice of sorts, more than make up for the want of sun and the deficiency of natural temperature.

It has been said that the pine-apple was brought from Brazil, first to the West Indies, and thence to the East; but the evidence is not complete. It was known in Holland some time before its introduction into this country; and even about its introduction here there are some disputes. The picture of King Charles II., with his gardener presenting him with a pine, said to be the first grown in England, is rejected by the better informed authorities; and the pine, if ever such a fruit was offered to that monarch, is supposed to have been brought from Holland, or the pine to have been presented, and the picture drawn, before his return to this country. Mr. Bentinck, the ancestor of the Duke of Portland, is, according to the best accounts, supposed to have first introduced and cultivated the pine in the year 1690; and this is rendered the more likely, from the fact that he was previously acquainted with the fruit in Holland. And yet the cultivation of the pine had made so little progress in England a quarter of a century later, that Lady Mary Wortley Montagu, on her journey to Constantinople in 1716, remarks the circumstance of pine-apples being served up in the dessert, at the Electoral table at Hanover, as a thing she had never before seen or heard of.*

Pine-apples have been grown in this country of an extraordinary size. One of the New Providence kind, that weighed nine pounds, four ounces, was presented to his Majesty, in June, 1820, by John Edwards, Esq., of Rheola, Glamorganshire, where it was grown. In July, 1821, another Providence pine is mentioned, in the Transactions of the Horticultural Society,† to have weighed ten pounds eight ounces: it was grown by Mr. Buchan, gardener to Lord Cawdor, at Stackpool Court, Pembrokeshire.

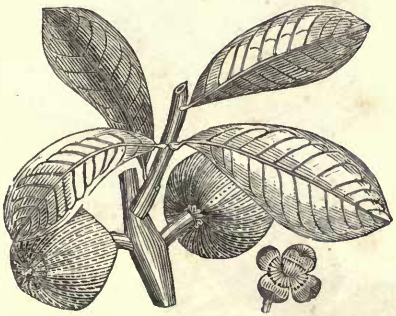
* Letters of Lady M. W. Montagu. † Vol. v. p. 264

It was ten inches and a half high, exclusive of the crown and stalk, and twenty-two inches in circumference. From the extraordinary size and beauty of the fruit, it was thought proper by the Fellows of the Horticultural Society to present it to his Majesty, which was accordingly done; and it was served up in the dessert at the royal table at the Coronation banquet. Mr. Buchan raised three other pines of extraordinary weight in the same season: one weighed ten pounds, six ounces; another, ten pounds two ounces; and a third, nine pounds eight ounces; making the total weight of the four, forty pounds eight ounces.

In the Indian Archipelago, and in China, an extra-

Many-headed Pine.

ordinary monstrous state of the pine-apple is sometimes seen, called "the many-headed pine." It is caused by the plant producing branches bearing fruit at each point where, under common circumstances, it produces single flowers. There are fine specimens preserved in spirits in the Library of the Horticultural Society, and the plant itself is in their garden.



THE MAMMEE—*Mammea Americana.*

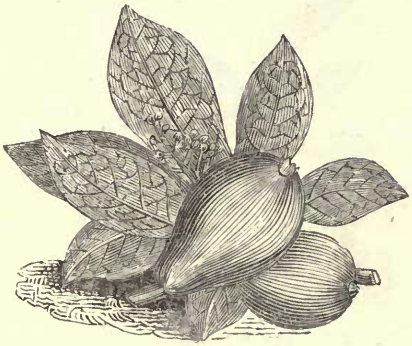
The mammee is a native of the West Indies, where it grows to a large tree, sixty or seventy feet in height. It is a handsome, straight-growing tree, with a spreading head, and the leaves are oblong and obtuse, with very many fine, closely set, parallel veins. The fruit of the mammee is yellow, not unlike one of the largest russet apples, either in shape or in size. The skin, which easily peals off, and the seeds, of which there are two or three in the centre, are resinous, and very bitter; but the pulp under the skin, which, when ripe, is of a deep yellow, resembling that of the finest apricot, and of considerable consistency, is very fragrant, and has a delicious flavour. To people with weak stomachs it is said to be more delicious than healthful; but still it is highly

prized, very abundant in the West India markets, and accounted one of the best native fruits they have. The mammee was found by Don in the vicinity of Sierra Leone; but whether native there, or imported from America, cannot be ascertained. It was introduced into England in 1735.

THE ALLIGATOR PEAR—*Laurus Persea.*

The Avocado, or Alligator Pear, grows upon a tree about the size of the common apple. It is a native of the West Indies. The leaves are oblong and veiny, the flowers of a yellowish green colour, and the fruit, which is the size of a large pear, is considered the most delicious in the world. It contains a kernel, inclosed in a soft rind; and the yellow pulp, which is firm, has a delicate rich flavour of the peach, but infinitely more grateful. It is sometimes called Vegetable Marrow, and is eaten with pepper and salt. It appears necessary, on account of the richness of the pulp, to apply some spice or acid, and thus lime-juice is also frequently added to

it, mixed with sugar. Of the three kinds, the red, the purple, and the green, the latter is the best. The fruit is eaten with avidity, not only by men, but by birds and quadrupeds.



THE ANCHOVY-PEAR—*Grias cauliflora.*

The Anchovy pear is a fruit also much esteemed in the West Indies, of which islands it is a native. The tree on which it grows is tall, upright, and handsome; rising to the height of about fifty feet, with leaves two or three feet long. It bears large whitish flowers, that come from the stem; and these are followed by the fruit, which is of considerable size, brownish, having a kind of pulp over a single oval kernel. The fruit very much resembles the mango in taste; and, like that, it is often made into pickles before it is ripe. The tree grows in the moist parts of Jamaica, and other places of the West Indies; where, in addition to the value of its fruit, it is a highly ornamental tree. It may be reared in England, by the joint effects of bark and the heat of a stove, as is done with the pine-apple. In the West Indies

it grows readily from the kernel, and is often cultivated in clumps.

THE CUSTARD APPLE—*Anona muricata*—*Anona squamosa.*

Ten or twelve species of the custard-apple are enumerated. They are natives of the tropical parts of Africa, Asia, and America; but the better sorts are more abundant in the latter part of the globe.

The *Sour sop*, rough custard-apple (*Anona muricata*), is a middle-sized tree, growing abundantly on the savannahs in Jamaica; and bearing a large oval fruit of a greenish yellow colour, covered with small knobs on the outside, and containing a white pulp, having a flavour compounded of sweet and acid, and very cooling and agreeable. It is, however, too common to be much esteemed by the wealthier people, though it is much sought after and relished by the negroes. The odour and taste of the whole plant are very similar to those of the black currant. It

was early introduced into England, but has not come into cultivation as a fruit tree.

The *Cherimoyer* (*Anona Cherimolia*) is a native of the continent of America; and in Peru it is accounted one of the best fruits they have. Humboldt speaks of it with high praise; but Feuillée, another traveller in South America, says an European pear or plum is worth all the Cherimoyers of Peru. The tree which produces this fruit has a trunk about ten feet high; the leaves are oval, and pointed at both ends; the flowers are solitary, very fragrant, and of a greenish colour; the fruit of considerable size, somewhat heart-shaped, rough on the outside, and grayish brown, or even nearly black, when ripe. The flesh, in which the seeds are contained, is soft, sweet, and pleasant, and highly esteemed both by natives and foreigners. It has been introduced into England for about a century, but not cultivated as a fruit tree. In the south of Spain, it is occasionally found in gardens, where it bears its fruit as an orchard-tree.

The *sweet sop* (*Anona squamosa*) is a very small tree, being, in many situations, little better than a bush. It is found both in the East and the West Indies. The fruit is almost the size of the head of an artichoke, scaly, and of a greenish yellow colour. The rind is strong and thick; but the pulp is delicious, having the odour of rose-water, and tasting like clotted cream mixed with sugar. It is, like many other fruits, said to have a much finer flavour in the Indian Archipelago than in the West Indies. It, too, was early known in England, but has not become general.

The *Alligator apple* (*Anona palustris*) grows wild in the marshes of Jamaica. The fruit is shining and smooth in appearance, and sweet and not unpleasant to the taste; but it is a strong narcotic, and therefore, not generally eaten. One thing worthy of

remark is, that the wood of the alligator apple-tree is so soft and compressible, that the people of Jamaica call it cork-wood, and employ it for stoppers.

Wild Plums—*Achras.*

There are various species of the wild plum in the West Indies, some of them timber-trees of large dimensions; but those most valued for their fruit are the sappodilla plum (*Achras sapota*), and the mammee sapota (*Achras mammosa.*)

The *sappodilla plum* is a large and straight tree, which runs to a considerable height without any branches, with a dark gray bark, very much chapped. The leaves are smooth and beautiful, and the flowers white and bell-shaped. The fruit resembles a bergamot pear in shape and size, but in colour is like a medlar, and is similar also to that, in being eaten when it is beginning to decay.

The *mammee sapota* grows on a much smaller tree, with larger leaves and flowers of a cream-colour; the fruit about the same size as the former, but brownish when ripe, and containing a pulp resembling marmalade of quinces in consistency, and of a very delicious flavour. On account of this the tree is sometimes called the marmalade-tree, and is, in all probability, the same which Stedman, in his account of Surinam, calls the *marmalade box.* It is a native of the West Indies and the adjoining coast, and is very much cultivated in the gardens there for the sake of its fruit.

Star Apple—*Chrysophyllum Cainito.*

This is also a native of the West Indies. It grows on a moderately-sized spreading tree, with slender, flexile branches. There are some species, or, at least varieties of the fruit. The star apple, properly so called, bears fruit resembling a large

apple, which, in the inside, is divided into ten cells, each containing a black seed, surrounded by a gelatinous pulp. The West Indian damson plum has small fruit, and is chiefly found in the woods. The milky juice of the star apple, both of the tree and the fruit, before it is ripe is remarkably astringent; but, when the fruit ripens, it is sweet and very agreeable to the taste.

MELON THISTLE, TORCH THISTLE, CREEPING CEREUS, INDIAN FIG, OR PRICKLY PEAR. *Cactus.*

The *cactus* is a very numerous and very singular genus of vegetables. With the exception of, perhaps, one species, the common prickly pear, which is found in the south of Europe, in Barbary,* and in some parts of North America, they are all natives of the West Indies. In the warmer parts of the American continent they are found growing upon the bare rocks, without soil, and apparently, in many instances, without humidity. The leaf-like stems are thick, succulent, generally covered with spines; and the individual masses, which are often fantastically joined together by narrow necks, have some resemblance to the fruit of the cucumber. These stems or leaves are, in all their singular varieties, perennial; and, from their succulent nature, they can live almost without water. The stems are jointed, and generally armed with bunches of sharp spines intermixed with bristles; they produce flowers on proper foot-stalks, or adhering to the stem; some of these flowers are of great beauty; and the fruit by which they are followed is, in several of the species edible.

The small melon thistles are covered with tubercles or warts all over, and the flowers come out between them; while on the great melon thistles, which are of an oval or globular form, the spines are arranged

* See Shaw's Travels, vol. i. p. 266.

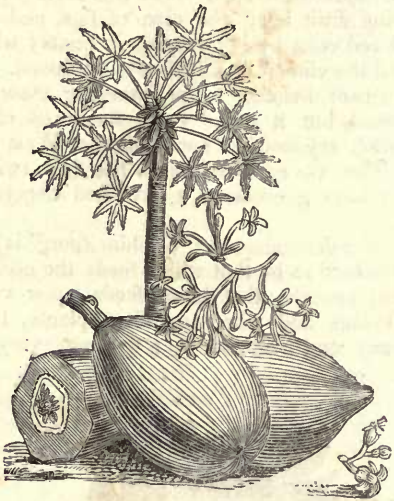
in rows along a kind of ribs. The torch thistles rise to a greater height, in prismatic or cylindrical stalks, with projecting ribs; and they are very much jointed and branched. The creeping cereuses are like the former, only the stems are much slenderer, and the joints much more flexible, so that they cannot support themselves, but lie along the ground, or climb up trees, in doing which they throw out roots from the stem, like ivy. The Indian figs have the portions or lobes of the stem flattened, like the sole of a shoe; they are scattered over with spines; and the flowers are produced from the extremities of the remotest branches. The *Phyllanthus*, or spleen-wort leaved, has the lobes flattened so as to resemble leaves indented at the edges, and without any spines, the flowers appearing nearly in the indentations; while the Barbadoes gooseberry (*Cactus pereskia*) has a round stalk, with leaves which are thick and flat, and come alternately from the stalk; the spines are large and stiff, and appear chiefly at the junctions of the leaves with the stem; at which places, also, the flowers make their appearance. The flowers vary in form, some being pitcher-shaped, and some elongated; and many of them are of the most brilliant colours. The fruit varies from the size of a currant to the size and shape of a fig; from which latter circumstance, and their being natives of the West Indies, and the adjoining countries, they are called Indian figs. Throughout the West Indies, Mexico, and the other cultivated parts of tropical America, the larger species of the cactus are used for hedge-rows, the strength of the stems, and formidable armature of the spines, rendering a hedge of them proof against animals.

The fruit of several of the species is eaten; but those which are most esteemed are the *opuntia*, or Indian fig; the *triangularis*, or strawberry-pear

and the *C. speciossissimus*. The first is the prickly pear, having fruit about the size of figs, and internally of a red colour ; but varying in quality with the variety and the climate in which it is produced. The strawberry-pear belongs to the creeping class ; the fruit is small, but it is the finest flavoured of any, and is much relished in some of the West India islands. The *C. speciossissimus* has fruit twice as large as a large gooseberry, green, and exceedingly delicious.

The species denominated " Cochinellifer," is generally understood to be that which feeds the cochineal insect ; but probably that insect feeds upon various sorts of cactus and other succulent plants, though its efficiency and brilliance as a dye may vary with the plant.

Strawberry Pear.



THE PAPAW—*Carica papaya.*

Though the papaw-tree is now found in the East as well as in the West, it is generally understood to be a native of America, and to have been carried to the East about the time of the first intercourse between the two continents. The papaw rises with a hollow stem to the height of about twenty feet, after which it has a head composed, not of branches, but of leaves and very long foot-stalks. The male and female flowers are on different trees: the female flowers are bell-shaped, large, generally yellow, and followed by a fleshy fruit, about the size of a small melon. The tree, and even the fruit, are full of an acrid milky juice; but the fruit is eaten with sugar and pepper, like melon; and when the half-grown fruit is properly pickled, it is but little inferior to the pickled mango of the East Indies. There are many

forms in the fruit, and some varieties in the colour of the flower of the papaw : and there is also a dwarf species ; though, as this has been observed chiefly in acrid situations, it may be the common sort stunted for want of moisture.

GRENADILLAS—*Passiflora.*

The passifloras are a very numerous race; they are mostly natives of the West Indies and the tropical parts of America, from which some of the species have been introduced into this country, chiefly on account of the beauty of their flowers. Few of the species bear fruit in this country.

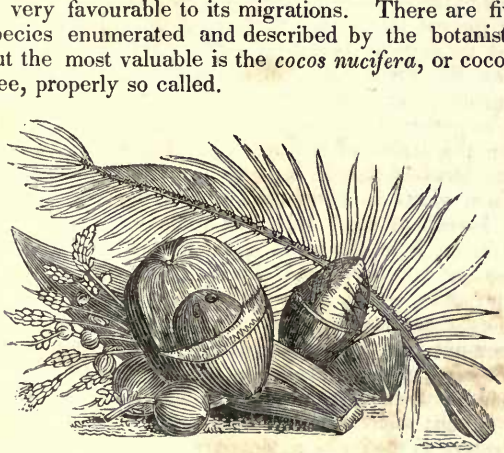
The grenadillas with which we are best acquainted are those of the West India islands, the chief of which are the *purple-fruited* (*Passiflora edulis*)—

the *Passiflora quadrangularis*—and the *water-lemon* (*Passiflora laurifolia*). The stem of the first is herbaceous, the fruit round, of a light purple, when ripe, with a whitish and rather pleasant pulp. The *Passiflora quadrangularis* is the most valuable for cultivation here ; and it has borne fruit in the gardens of the Horticultural Society. The water-lemon is a larger and more woody plant : the flowers are handsome, and very fragrant ; and the fruit something in the shape and of the size of a lemon, full of a watery but very agreeable tasted juice, whence the name. The plant grows wild in the woods, but is often cultivated for the sake of its fruit. It was introduced into England about the same time with the pine-apple, but it has not met with equal attention.

On the American continent, and especially in Brazil, where the productions of the vegetable kingdom are very numerous and luxuriant, there are many varieties of grenadilla, if not distinct species, with which botanists do not appear to be very well acquainted ; indeed, the forests and savannahs of Brazil appear to offer the richest harvest for botanical research of any places now on the surface of the globe. *Piso*, in his natural history of Brazil, enumerates and gives figures of several sorts of grenadilla, under the name of Murucuja. One, he says, has five-lobed leaves and purple flowers, with oblong fruit, larger than any European pear, filled with a mucilaginous pulp, of a scent and flavour that nothing can exceed. Another has the same leaf and flavour, but fruit in the form and size of an apple, the pulp of which has a vinous flavour. There are many other sorts, but these are described as the best. The grenadillas generally, which are called *parchas* by the Spaniards, have a pleasant sweetish acid, with a fragrance something between that of a melon and a strawberry.

Cocoa-nut—*Cocos.*

The cocoa-palm is supposed to be a native of the south-east of Asia, and is found wild in some of the small islands off the shores; but it has been introduced into almost every part of the tropical regions. Its quality of bearing the neighbourhood of sea water is very favourable to its migrations. There are five species enumerated and described by the botanists; but the most valuable is the *cocos nucifera*, or cocoa-tree, properly so called.



Cocoa nut—(Cocos nucifera.)

The *nucifera* is a very tall tree, the trunk of which is composed of hard and strong fibres, which cross each other like net-work. There are, strictly speaking, no branches; but the leaves are from twelve to fourteen feet long, with a very strong middle rib, to each side of which the sword-shaped leafets are attached. The flowers come out round the top of the trunk, each cluster inclosed in a long spatha or sheath. When these have arrived at maturity, the sheath opens, and the male flowers gradually fall off, leaving the embryo fruit. In a moist and fertile soil the cocoa-palm bears in four years; in a dry region fruit is not produced

till it has been planted ten years. The fruit consists externally of a thin but tough rind, of a brownish-red colour; beneath which there is a quantity of very tough fibrous matter, of which cordage and coarse sail-cloth are sometimes made. Burckhardt says that ships coming from the East Indies to Djidda have cordage made of the cocoa-nut tree. Inclosed within this fibrous mass is the shell, of great firmness, and used for many domestic purposes. While the nut is green, the whole hollow of the shell is filled with an agreeable, sweetish, refreshing liquor. When the nut is gathered, a formation of albumen takes place upon the inside of the shell, producing that white, firm, pleasant-tasted, but rather indigestible, substance, which is called the kernel of the nut. Like the kernels of most nuts, that of the cocoa is very nutritious, from the great quantity of fixed oil that it contains; but that is also the ingredient to which its indigestible quality is owing. A tree generally furnishes about an hundred cocoas. The stem of the cocoa-nut tree is very tough and durable, and used for constructing the abodes of the people in the warm countries where it grows, and the leaves are employed as thatch; while the ribs answer the same purpose as osiers in the making of baskets and other wicker-work. The tender shoots at the top of the cocoa-nut tree may be used as esculents, and are very tender and delicate; but they are costly, as they cannot be obtained except at the expense of the tree.

The finest arrack in the East Indies is made from the juice of the cocoa-nut tree. This juice, before it is distilled, is called *toddy;* and those trees from which it is to be obtained are not suffered to bear fruit. There are two ways of obtaining the toddy: they either cut off the monthly shoot from which the fruit would be produced, and collect the sap in jars from the wound; or they make a perforation in the trunk

of the tree, which they keep plugged up, unless when they are about to collect the sap. When put in vessels, and kept out of the sun, the toddy undergoes the vinous fermentation, and is fit for distilling; but if it be exposed to the sun, it undergoes the acetous fermentation, and is changed into vinegar.

The cocoa-palm generally reaches the age of from eighty to a hundred years; and its average height is about eighty feet. Its growth is thus more rapid than the other palms.

The other species of cocoa are not so valuable. *Cocos butyracea* is very mucilaginous, and also very oily. The pulp of the nuts is used for fatting hogs; and the natives of South America make a sort of butter from it. The Guinea cocoa-nut (*Cocos guineensis*) is much smaller than the others, the trunk not being above one inch in diameter, and twelve feet high. It is tough and hard, and covered with prickles; when cleared of the bark it is made into walking-sticks, which are black, strong, light, and take a fine polish. It grows abundantly in the island of Tobago, after which island the sticks used to be named in France. The fruit is about the size of a cherry: it may be eaten, but it is very acid, and not pleasant; though the wild hogs in Jamaica devour it greedily. In some parts of America a sort of wine is made from it. It is found most plentifully in the northern parts of Colombia. The *great maccaw-tree* (*Cocos aculeata*) grows abundantly in the West India islands. It is a large palm, the trunk being from a foot to a foot and a half in diameter, and rising to the height of about thirty feet. The fruit is small, of a globular form, but a little flattened, and not more than an inch in diameter. The pulp that surrounds the nut has an astringent taste, but the kernel is pleasant. The *Cocos nypa* is thick, but very low; and in its fruit resembles the cocoa-nut,

only the nuts are smaller. It grows in salt marshes and by the mouths of rivers, in the south-eastern parts of Asia.

All the species yield fixed oil: that of the cocoa-nut is clear and sweet; and some are of opinion that the true palm oil is obtained from the great maccaw-tree.

It would be strictly proper to give here some account, for which there are very interesting materials, of the chocolate-tree and the coffee-tree; but we reserve them for another portion of this work.

The Cashew-nut—*Anacardium occidentale.*

The cashew-nut-tree bears a considerable resemblance to the walnut, and the leaves have nearly the same scent. The fleshy receptacle, vulgarly called apple, which the tree produces, is of an agreeable

The Cashew-nut—(Anacardium occidentale.)

subacid flavour, and may be fermented into a kind of wine, or distilled into arrack. The nut, of a kidney shape, is attached to the end of the apple; it is inclosed in two shells, between which there is a native inflammable oil, which is so caustic that it will blister the skin. The kernel, contained in the second or inner shell, is of a very fine flavour, and used to give a pleasant taste to many products of cookery: it also greatly improves the flavour of chocolate.

The Juvia—*Bertholletia excelsa.*

This is one of the most extraordinary fruits of South America, which has been made familiar to us principally by the interesting description of Humboldt. It was first noticed in a geographical work published in 1633, by Laet, who says that the weight of this fruit is so enormous, that, at the period when it falls, the savages dare not enter the forests without covering their heads and shoulders with a strong buckler of wood. The natives of Esmerelda still describe the dangers which they run, when the fruit falls from the height of fifty or sixty feet. The triangular grains which the shell of the juvia incloses, are known in commerce under the name of Brazil nuts; and it has been erroneously thought that they grow upon the tree in the form in which they are imported.

The tree which produces the juvia is only about two or three feet in diameter, but it reaches a height of a hundred and twenty feet. The fruit is as large as a child's head. Humboldt justly observes that nothing can give a more forcible idea of the power of vegetable life in the equinoctial zone than these enormous ligneous pericarps. In fifty or sixty days a shell is formed half an inch in thickness, which it is difficult to open with the sharpest instrument.

The grains which this shell contains have two distinct envelopes. Four or five, and sometimes as many as eight, of these grains are attached to a central membrane. The Capuchin apes (*Simia chiropotes*) are exceedingly fond of the almonds of the juvia; and the noise of the falling fruit excites their appetites in the highest degree. The natives say that these animals unite their strength to break the pericarp with a stone, and thus to obtain the coveted nuts. Humboldt doubts this; but he thinks that some of the order of *Rodentia*, such as the *Cavia aguti*, are able to open the outer shell with their sharp teeth applied with unwearied pertinacity. When the triangular nuts are spread on the ground, all the animals of the forest surround them, and dispute their possession. The Indians, who collect these nuts, say "it is the feast of the animals, as well as of ourselves;" but they are angry with their rivalry. The gathering of the juvia is celebrated with rejoicings, like the vintage of Europe.

Chapter XI.

Fruits of India, China, and Japan.—Mango; Mangostan; Durion; Malay Apple; Jaca; Litchi; Longan; Jujube; Kaki; Loquat.

The Indian archipelago is said to produce the most rich and curious fruits of any part of the globe. The greater number of the fruits of the Indian islands grow wild; and very little cultivation is given to any. Nature appears to bestow her bounty peculiarly upon fruits; for some of the fine sorts are produced upon land unfit for raising grain.* The Indian continent bears, generally, the same fruits as the Indian islands; with some peculiar to itself. In China and Japan, the cultivated fruits, with a few exceptions, consist of the same natural orders as those of Europe; though, according to many travellers, far superior in size and flavour.

The Mango—*Mangifera indica.*

The mango, which grows abundantly in India, the south-eastern countries of Asia, Brazil, and some other places, is accounted one of the most delicious of the tropical fruits, and second only to the mangostan. The tree on which it is produced is large, with lancet-shaped leaves, bearing some resemblance to the walnut. The flowers are small and whitish, formed into pyramidal bunches; the fruit has some resemblance to a short, thick cucumber, and on the average of the varieties, of which there are many,

* Lindley on Tropical Fruits, Hort. Trans. vol. v.

The Mango—(Mangifera indica.)

about the size of a goose's egg. At first the fruit is of a fine green colour, and in some of the varieties it continues so, while others become partly or wholly orange. When ripe, the mango emits a smell, which, though faint, is very pleasant; and the flavour of it is then as delicious as can be imagined. Externally there is a thin skin; and upon removing that, a pulp, which has some appearance of consistency, but which melts in the mouth with a cooling sweetness, that can hardly be imagined by those who have not tasted that choicest of nature's delicacies. In the heart of the pulp there is a pretty large stone, resembling that of a peach, to which the pulp adheres firmly.

The mangos of Asia are said to be superior both in size and flavour to those of America; and so highly are some of the finer trees prized in India, that guards are placed over them during the fruit season. The mangos of Mazagong, which are thus carefully watched, are thought to be superior to any

other. The varieties of a fruit so much esteemed must be numerous,—accordingly it is reckoned that there are upwards of forty in the island of Java alone, while those of some of the islands farther to the east, such as Amboyna and Banda, are said to be still finer. The *Mango dodol* is the largest variety, the fruit weighing upwards of two pounds,—generally about the size of a middling shaddock. Some of the others, which make up the five principal heads into which Rumphius (*Herbarium Amboinense*) arranges the whole, are of superior size and flavour: but the fruit, taken altogether, is one of the chief dainties of the vegetable world.

The mango is never brought from India to this country in any other state than the green fruit pickled, from which no idea of the flavour can be formed. The ripe fruit is very perishable; and when it begins to decay it is offensive, and tastes strongly like turpentine. It is not easy even to secure the vegetative power of the nut or kernel during the voyage from India, unless it be inclosed in wax; and the plants are with difficulty preserved as objects of curiosity.

In the Transactions of the Horticultural Society for 1826, there is an account of some mangos, raised by Earl Powis, at Walcot Hall, in Shropshire. "The mango," says Mr. Sabine, the secretary to the society, in his very able paper upon the subject, "is well known to all travellers who have visited the tropical parts of the world, as being by far the best fruit that is generally produced in those regions, and as that which is the most uniformly grateful to an European palate. In such climates, it is cultivated wherever the arts of civilization have penetrated; and it may there be said to hold the same station, among other fruits, as the apple possesses among those of northern regions. Like the apple, the number of varieties

raised from the seed of the mango is also very great; and of these, while some possess the highest excellence, there are others in which the flesh of the fruit is so fibrous and ill flavoured, as to resemble, as is commonly said, nothing so much as a mixture of 'tow and turpentine.'"

THE MANGOSTAN—*Garcinia mangostana.*

The Mangostan, or Mangustin, is one of the most delicious fruits that grows; and the tree (*Garcinia mangostana*) on which it is produced, is one of the most graceful and beautiful anywhere to be met with. It is a native of Sumatra, and also of the Molucca, or Spice islands, from which it has been transplanted to Java, and some other parts of the eastern Archipelago. The stem, which is of a variegated brownish-red colour, rises to the height of about twenty feet; the branches come out in regular order, and give the head of the tree the form of a parabola; and the leaves are entire, about eight inches long, and four broad at the middle, of a beautiful green on the upper side, and a fine olive on the under. The flower resembles that of a single rose, with some dark red petals. The fruit is round, about the size of an ordi-

nary orange ; and has a little cap on the extremity, under which it is plaited into rays. The shell of the fruit, which is at first green, but changes to brown marked with yellow spots, has some resemblance to that of a pomegranate, but is thicker and softer, and the contents are more juicy. The pulp is divided internally by thin septa, like those in an orange, and the seeds are lodged in the divisions. The flavour of the pulp is said to be that of the finest grape and strawberry united ; but those who have tasted the fruit in perfection, and attempted to convey to others some idea of the impression that it had made on them, are not agreed as to what it resembles. Abel says that " he and his companions were anxious to carry with them some precise expression of its flavour ; but after satisfying themselves that it partook of the compound nature of the pine-aple and the peach, they were obliged to confess that it had many other equally good but utterly inexpressible flavours."

There are two other species of this tree. These are the Celebes mangostan (*Garcinia celebica*), and the horny mangostan (*Garcinia cornea*). The first is found wild in the woods of Celebes, near Macassar, whence it has been transplanted to Amboyna, Java, and other places ; but the fruit, which is rather larger than that of the true mangostan, does not always ripen. The corneous species is found in the high remote mountains of Amboyna : it is a lofty tree, though not of very great diameter. The fruit is so excellent as nearly to equal the true mangostan. The wood is very hard, heavy, and tough, and of the colour of horn, from which latter circumstance the specific name is given to it.

THE DURION—*Durio zibethinus.*

The durion, which is pretty generally diffused over the south-east of Asia, is accounted next to the mangostan ; and, in the opinion of some, is superior to it. However excellent the taste may be, the durion is revolting to those unaccustomed to it ; for it has a strong smell, which is said to arise from sulphuretted hydrogen. Yet this quality is soon forgotten, after the palate becomes familiar with it. Though of the most nutritious quality, and the most dainty taste, the durion never palls upon the appetite or injures the digestion: its effects are directly opposite.

The tree which produces the durion is about the size, and something in the form, of a pear-tree ; but the leaves are in shape like those of the cherry, only they are entire and smooth at the edges. The flowers are large, and of a yellowish white. The fruit is large,—in some of the species as large as a man's head ; and, externally, it is not unlike the bread-fruit.

It has a hard rind, covered with warts and tubercles. When ripe, it becomes of a brownish yellow, and opens at the top. It must then be eaten fresh from the tree, as it putrifies in less than twenty-four hours.

Internally, the fruit contains five large longitudinal cells, in each of which are the seeds, about the size of pigeon's eggs, and from one to four in each cell. The remainder of the cells is filled with the pulp, which is the delicious part of the fruit. It is of the consistence of thick cream, of a milk-white colour, highly nutritious, and blending the flavour and qualities of a delicate animal substance with the cool acidity of a vegetable. This compound flavour is peculiarly its own, and cannot be imitated by any process of cookery. The Spanish *Mangia blanco*, pullets' flesh distilled with vinegar, is said to come the nearest to it.

The durion is a particular favourite with the natives of the Eastern archipelago; and there are many varieties of it. They all, however, belong to three principal ones:—The *Borneo* durion is found in the island after which it is named. It grows to so great a size, that one fruit is a load for a man. The *Cassomba*, which has a smoother rind, is more orange in the colour, more elongated in the shape, and contains fewer seeds and more pulp. The *Babi* is a small, but very delicious sort. The kernels or seeds of the durion, when roasted, have nearly the same taste as chesnuts. It has not been found in a wild state; but in the countries where it will grow and ripen at all, it is easily cultivated. So highly is it esteemed, that it is the most costly fruit in the archipelago—a single durion being worth more than a dozen of the choicest pine-apples.

The *Lanseh*, and the *Jamlee*, fruits of Sumatra,

are esteemed most highly by the natives—the former next to the durion.

THE MALAY APPLE—*Eugenia malaccensis.*

This, though an inferior fruit to the durion, is attractive by its fragrance—its smell being that of a rose. The Malay apple belongs to a numerous genus of plants, there being a great number of species very generally diffused over the tropical countries. The fruit of all the species is a fleshy rind, inclosing one or two large seeds. The Malay apple varies in size from about an inch in diameter to the bigness of a man's fist. The skin is yellowish, thin, and shining; the nut large, and without any hard shell; and the pulp very wholesome and agreeable. The tree that produces it has a brown stem, about twenty feet high, very full of branches at the top; the young leaves are bright purple, and the old ones green.

THE JACA—*Artocarpus integrifolia.*

The *Jaca*, or *Jack*, grows to the same, or even to a larger size, than the bread-fruit of the Society islands; but it is neither so palatable nor so nutritious. Though its specific name implies that it is entire-leafed, the leaves of it are sometimes found lobed, like those of the other. The fruit often weighs more than thirty pounds, and contains two hundred or three hundred seeds, each of them four times as large as an almond. December is the time when the fruit ripens: it is then eaten, though not much relished; and the seeds or nuts also are eaten, after being roasted. There are many varieties of the jaca-tree, some of which can hardly be distinguished from the seedling variety of the true bread-fruit. The fruit, and also the part of the tree on which it is produced, varies with the age. When the tree is young, the fruit grows from the twigs; in middle age, it grows from the trunk; and when the tree gets old, it grows from the roots. The sort called the *Champadak* is more esteemed than the common *Jack*, or *Nangka*.

Longan.

LITCHI—*Dimocarpus litchi.*—LONGAN—*Dimocarpus longan.*

These fruits are natives of the south of China, where they are held in the highest estimation. They have thence been introduced into many parts of the East Indies, and to the gardens of the curious in some places of Europe. John Knight, Esq., of Lee Castle, near Kidderminster, presented the Horticultural Society with some of the fruit that had ripened in his hot-house in 1816, and it was found to be as good as that which is produced in China. The litchi was introduced into this country by the celebrated Warren Hastings, Esq., in 1786: the longan had been introduced before.

The trees on which these fruits are produced have a considerable resemblance to each other,—are, in fact, so much alike, that they are distinguished only by the flowers of the litchi being without petals, while

those of the longan have eight; and the fruit of the litchi being larger, and generally of a red colour, while that of the longan is always brown. They are moderately sized trees, with brown bark which is very bright in the twigs. The leaves are large, have some resemblance to those of the laurel, are placed alternate, and hang very gracefully. The fruit is produced in bunches, which are pendent from the extremities of the twigs; and there is a considerable number of fruit in the bunches, not close together, like grapes, but on stalks, the principal ones from six inches to a foot in length; while those of the individual fruit are from one inch to two.

Of both species there are many varieties in China, which differ in the time of ripening, and the form and qualities of the fruit. In general, the litchi is about an inch and a half, or from that to two inches, in diameter, and the longan about an inch and a quarter; and both are covered with small scaly processes, which are most prominent in the longan. Both fruits are covered by tough, thin, leathery coats, within which is the pulp, and in the inside of that a single brown seed. The pulp is colourless, semi-transparent, slightly sweet, and very grateful to the taste. The Chinese prefer the longan, to which they ascribe medicinal qualities; but Europeans give the preference to the litchi, probably on account of its larger size, and the greater beauty of its colour. The litchi is often brought to this country in a dried state, in which, though the pulp be much diminished in size, it retains a very considerable portion of its original flavour. From the beauty and flavour of these fruits, and the perfection to which they have been brought in this country, in all cases where they have had a fair trial, it is by no means unlikely that they may become common as hot-house fruit.

The *Jujube* (*Zizyphus jujuba*) belongs to the very numerous genus of the buckthorns (*Rhamni*). It is found in the south of Europe; but nowhere is it brought to so much perfection as in China, where there are upwards of sixty kinds, all of them highly esteemed. In the opinion of Mr. Lindley, (Trans. Hor. Soc., v. 123,) the Chinese jujube might be fruited in greenhouses in England, with a very moderate degree of artificial heat.

The *Kaki* or *Chinese Date-plum* (*Diospyrus kaki*), is a tree of middle size, bearing a fruit about the size of an apple, of a reddish orange colour, and with a very luscious, brownish, semi-transparent pulp. The fruit of one species is dried with sugar, like figs.

The *Loquat*, or *Japanese medlar* (*Eriobotrya japonica*), is a large tree, producing a fine fruit, having much the flavour of an apple. The fruit grows in clusters, is of an oblong shape, and about the size of a small plum. The tree is very handsome, and bears the open air in this country, if the winter be not too severe. It was first introduced from Japan in 1787. It has produced fruit in England.

Chapter XII.

Fruits of the Society Islands. Bread-fruit; Hog-plum.—New fruits of Australia.—Conclusion.

The Bread-Fruit—*Artocarpus incisa.*

The bread-fruit, originally found in the south-eastern parts of Asia and the islands of the Pacific, though now introduced into the tropical parts of the western continent, and the West India islands, is one of the most interesting, as well as singular productions of the vegetable kingdom. There are two species of it: the bread-fruit, properly so called (*Artocarpus incisa*), with the leaves deeply gashed or divided at the sides, which grows chiefly in the islands; and the Jack fruit, or Jaca tree (*Artocarpus integrifolia*,) with the leaves entire, which grows chiefly on the main land of Asia. The latter has been already noticed.

The bread-fruit is a beautiful as well as a useful tree:

the trunk rises to the height of about forty feet, and, in a full grown tree, is from a foot to fifteen inches in diameter; the bark is ash-coloured, full of little chinks, and covered by small knobs; the inner bark is fibrous, and used in the manufacture of a sort of cloth; and the wood is smooth, soft, and of a yellow colour. The branches come out in a horizontal manner, the lowest ones about ten or twelve feet from the ground; and they become shorter and shorter as they are nearer the top: the leaves are divided into seven or nine lobes, about eighteen inches or two feet long, and are of a lively green. The tree bears male and female flowers, the males among the upper leaves, and the females at the extremities of the twigs. When full grown, the fruit is about nine inches long, heart-shaped, of a greenish colour, and marked with hexagonal warts, formed into facets. The pulp is white, partly farinaceous and partly fibrous; but, when quite ripe, it becomes yellow and juicy. The whole tree, when in a green state, abounds with a viscid milky juice, of so tenacious a nature as to be drawn out in threads.

In the island of Otaheite and other places, where the bread-fruit forms the chief support of the people, there are, as is the case with cultivated vegetables in all countries, many varieties; only two, however, are very different from each other—that which contains seeds in the fruit, and that which contains none. The variety with seeds is much inferior to the other, being more fibrous, containing less farina, and not so pleasant to the taste; it is, therefore, not cultivated, though, in cases of need, it is roasted and eaten. Whether the seedless sort has been produced wholly by cultivation it is not easy, and would not be of much importance, to ascertain: it is the one cultivated in the South Sea islands; it was originally found only there; and the tree was not in much repute till these islands were discovered.

The bread-fruit continues productive for about eight months of the year: such is its abundance, that two or three trees will suffice for a man's yearly supply, a store being made into a sour paste, called *mahe* in the islands, which is eaten during the unproductive season. The planting of the seedless variety is now saved, as the creeping roots send up suckers which soon grow to trees. When the fruit is roasted till the outside is charred, the pulp has a consistency not very unlike that of wheaten bread; and the taste is intermediate between that of bread and roasted chesnuts. It is said to be very nourishing, and is prepared in various ways.

The timber of the bread-fruit, though soft, is found useful in the construction of houses and boats; the male flowers, dried, serve for tinder; the juice answers for bird-lime and glue; the leaves for packing and for towels; and the inner bark, beaten together, makes one species of the South Sea cloth.

The earliest account of the bread-fruit is by Captain Dampier, in 1688. "The bread-fruit," says this navigator, "grows on a large tree, as big and high as our largest apple trees; it hath a spreading head, full of branches, and dark leaves. The fruit grows on the boughs like apples; it is as big as a penny loaf, when wheat is at five shillings the bushel; it is of a round shape, and hath a thick tough rind. When the fruit is ripe, it is yellow and soft, and the taste is sweet and pleasant. The natives of Guam use it for bread. They gather it when full grown, while it is green and hard; then they bake it in an oven which scorcheth the rind, and maketh it black; but they scrape off the outside black crust, and there remains a tender thin crust; and the inside is soft, tender, and white, like the crumb of a penny loaf. There is *neither seed nor stone* in the inside, but all of a pure substance, like bread. It must be eaten new, for, if it be kept above twenty-four hours, it

grows harsh and choky, but it is very pleasant before it is too stale. This fruit lasts in season *eight months* in the year, during which the natives eat no other sort of bread kind. I did never see of this fruit any where but here. The natives told us, that there is plenty of this fruit growing on the rest of the Ladrone Islands; and I did never hear of it anywhere else."

The scientific men who accompanied Captain Cook in his voyages, came home with the most enthusiastic ideas of the bread-fruit. Dr. Solander calls it "the most useful vegetabtle in the world," and urges that no expense should be spared in its cultivation. The mere idea of bread, the most valuable food of man, growing spontaneously, was doubtless calculated to excite attention—almost, perhaps, as strongly as the subsequent description of the poet:—

"The bread-tree, which, without the ploughshare, yields
The unreap'd harvest of unfurrow'd fields,
And bakes its unadulterated loaves
Without a furnace in unpurchased groves,
And flings off famine from its fertile breast,
A priceless market for the gathering guest."*

A tree, of the value and easy culture of which so very encouraging accounts were given, could not but attract the notice of the public generally, and more especially of those colonists of Great Britain who lived in a climate warm enough for its cultivation. An application to be furnished with plants of the bread-fruit tree was accordingly made to his late Majesty by the planters and others interested in the West Indies, and it met with a favourable reception. The Bounty, a vessel of about two hundred and fifteen tons burthen, was fitted up for a voyage to Otaheite. Lieutenant (afterwards Admiral) Bligh, who had accompanied Cook on his last voyage, and shewn himself an officer of great talents, enterprise,

* Byron.

and bravery, was appointed to the command. In addition to the crew of the vessel, two men were appointed at the recommendation of Sir Joseph Banks, to take immediate charge of the procuring, shipping, and tending of the plants.

The Bounty was skilfully fitted up for her intended purpose. A large cabin between decks, in midships, was prepared for the reception of the plants. This had two large skylights on the top for light; three scuttles on each side for ventilation of air, and a double bottom; an upper one of timber on which to place the pots and tubs containing the plants, which was drilled full of holes to allow escape to the superfluous water which might have injured them by stagnation—and a leaden one upon the lower deck, in which the water that ran through the other was collected, and from which it was conducted by a leaden pipe at each corner, into casks below for future use.

Thus prepared, the vessel put to sea about the middle of November 1787, but was beat about and baffled by contrary winds, so that the voyage was not commenced till the 23d of December. The instructions given to Lieutenant Bligh were full and explicit. He was to resort to those places in the Society Isles where Captain Cook had stated that the bread-fruit tree was to be found in the greatest luxuriance, and there procure as many plants as the vessel could carry; after which he was to proceed with them to the West Indies with all possible expedition.

The commander sailed first for Teneriffe, and thence for the South of America, intending to enter the Pacific by the passage of Cape Horn. But the storms of that inhospitable region beat him back; and he was forced to bear away for the Cape of Good Hope, and reach the Society Islands on the side or New Holland. This voyage, which had occupied

ten months, terminated on the 25th of October, by the arrival of the Bounty at Otaheite.

No time was lost in putting the instructions into execution. The young shoots that sprung from the lateral roots of the bread-fruit trees were taken up, with balls of earth, where the soil was moist; and this operation was continued till they were in possession of one thousand and fifteen live plants, secured in seven hundred and seventy-four pots, thirty-nine tubs, and twenty-four boxes. To complete this cargo took them till the 3d of April, 1789; and Bligh sailed on the fourth, passing from Otaheite through the group of islands, and bidding adieu to the natives, with whom he and his crew had been on the most friendly terms during their stay.

Hitherto there had been no perils to contend with but those of the sea; but when four and twenty days had elapsed, and they were of course, far from any land, a new scene took place, which frustrated for a time the bounty of the government and the skill of the commander. Under the cloak of fidelity, a mutiny had been forming of a very determined and extensive nature; and so well had the mutineers disguised their intentions, that not one but those who were in the plot had the slightest suspicion of it.

The known bravery of Lieutenant Bligh made the mutineers afraid to attack him awake; and so, on the morning of the 28th of April, he was seized while asleep in his bed, by a band of armed traitors, and hurried upon deck in his shirt; and, on coming there, he found the master, the gunner, one of the master's mates, and Nelson the botanist, who had been with him under Cook, confined in the fore hatchway, and guarded by sentinels. The launch was hoisted; and such individuals as the mutineers did not like, were ordered to quit the ship, and forced if they refused or hesitated. Eighteen individuals out of the forty-

six remained true to the commander ; and one of them, Mr. Samuel, the clerk, contrived to save Mr. Bligh's commission and journals ; but he failed in attempting to procure Bligh's surveys, drawings, and remarks during fifteen years, which were exceedingly valuable, and the time-keeper. Four of the men, who kept their allegiance, were detained by the mutineers contrary to their wishes. The cause of this singular mutiny, for which none of the usual motives could very well account, could not with certainty be known ; but it was generally supposed that the instigator was Mr. Christian, one of the masters mates. Bligh himself says, in his most interesting account of this voyage and mutiny, "It will naturally be asked what could be the cause of this revolt ? In answer, I can only conjecture that the mutineers had flattered themselves with the hope of a happier life among the Otaheitans than they could possibly enjoy in England."

Thus, after they had made certain of the successful termination of an enterprise which was looked upon with a great deal of interest, both in a scientific and an economical point of view, Bligh was disappointed —and he and his faithful associates were sent adrift upon the wide ocean, in an open boat, with only an hundred and fifty pounds of bread, a few pieces of pork, a little wine and rum, a quadrant and compass, and a few other implements of navigation. But they were undaunted, and they were skilful ; and though they had hard weather to contend with, they reached Tofoa, one of the friendly Islands. But as the people there were as treacherous, though not quite so successful in their treachery, as their former shipmates, they again put to sea, and stood for New Holland, which they reached in safety ; rested for a little, and got a supply of provisions. From New Holland they again sailed in the direction of the Eastern Archipe-

lago ; and, after suffering the greatest fatigue, being exposed to the full action and vicissitudes of the elements, and forced for some time to bear famine, they reached the Dutch settlement of Coupang, in the island of Timor, without the loss of one individual by disease; though they had traversed at least five thousand miles of sea. Nay, so ardent was Bligh as a seaman, that, amid all those perils, he was occupied in making some very valuable observations.

The Dutch governor of Coupang shewed them every attention ; and, from the care that was taken of them, twelve were enabled to return to England. Though the adventure had failed, every body was disposed to bestow all praise on the adventurer ; and he was promoted to the rank of captain, and appointed to the command of his Majesty's ship Providence, in order to repeat the voyage.

The Providence, with the Assistant, a small ship in company, sailed on the 3d of August, 1791. His instructions were to procure the bread-fruit trees for the West Indies, and, on his return, to examine the passage between the north of New Holland and New Guinea—which, in his former voyage in the Bounty, he had been the first to navigate.

On the 9th of April, 1792, they reached Otaheite; and, by the 17th of July, they were ready to leave the island, having on board twelve hundred and eighty-one tubs and pots of plants, all in the finest condition. There was no mutiny on this voyage ; but the passage between New Holland and New Guinea was dangerous ; and it was the 2d of October before the captain reached his old friends at Coupang. He remained there for a week, replacing with plants from that island those that had died on the voyage ; and then he came to the Atlantic by the Cape of Good Hope, which he contrived to pass so closely as never to have a lower temperature than sixty-one degrees of Fahrenheit.

On the 17th of September, he anchored at St. Helena, collected there a number of trees, and among others the akee; and, leaving twenty-three bread-fruits, and some other valuable plants, he sailed, and reached St. Vincent on the 23d of January, 1793—where he left, with Dr. Anderson, the superintendent of the Botanical Garden, three hundred and thirty three bread-fruit trees, and two hundred and eleven fruit trees of other kinds, receiving at the same time nearly five hundred tropical plants for the Botanical Garden at Kew. From St. Vincent, Captain Bligh sailed for Jamaica, where he left three hundred and forty-seven bread-fruits, and two hundred and seventy-six others, which were a selection of all the finest fruits of the east. Some of the plants were also left on the island of Grand Cayman; and the ships finally came to the Downs on the 2d of August, 1793.

But, after all the peril, hardship, and expense thus incurred the bread-fruit tree has not, hitherto, at least, answered the expectations that were entertained. The banana is more easily and cheaply cultivated, comes into bearing much sooner after being planted, bears more abundantly, and is better relished by the negroes. The mode of propagating the bread-fruit is not, indeed, difficult; for the planter has only to lay bear one of the roots, and mound it with a spade, and in a short space a shoot comes up, which is soon fit for removal.

Europeans are much fonder of the bread-fruit than negroes. They consider it as a sort of dainty, and use it either as bread or in puddings. When roasted in the oven, the taste of it resembles that of a potatoe, but it is not so mealy as a good one.

The Otaheite Hog Plum—*Spondias cytherea.*

The tree which bears this fruit is large and graceful, rising to the height of fifty feet, spreading and shadowy. The fruit is oval, of considerable size, a

fine golden yellow when ripe, very smooth, disagreeable to the smell, but having a fleshy pulp, and a great stone covered with fibres, which penetrate the flesh. It is peculiarly grateful from its cooling, and, at the same time, aromatic qualities ; and its flavour

The Otaheite Hog Plum—(Spondias cytherea).

very much resembles that of the pine-apple. It is a very beautiful tree when in fruit. The leaves are of a dark clear green, among which the smooth fruit hangs in clusters, like burnished gold.

The fruits which have been yet discovered in Australia are neither remarkable nor numerous. Mr. Cunningham, who accompanied Captain King in his survey of the coast of that immense region, has, however, just sent home some curious specimens of fruit, which are thus described to us.

Limonia Australis.

The Australian lime is a small green fruit, having the form and flavour of the lime. The tree is very green ; the leaves lanceolate, with one or two slight notches in the edge. There is a long, stiff, and

pointed green spine at the insertion of each leaf. This was lately discovered at Moreton Bay; the flower has not been seen.

Lissanthe Sapida.

The Australian cranberry is a handsome bush, from six to nine feet high; it grows in forest lands near the Blue Mountains; the flowers are handsome; and the berries of a very delicate peach-bloom colour, having something of the consistency and taste of the Siberian crab.

Castanospermum Australe.

This singular fruit, which may not improperly be

called the *chesnut bean*, was lately found by Mr. Cunningham upon the banks of the Brisbane river, in Moreton Bay, New South Wales. It is the produce of a large and handsome tree, which belongs to a new and undescribed genus, though in some particulars it seems allied to *Robinia*. The leaves are pinnated, upon long footstalks; the leaflets entire, and there is a terminal one. The flowers, which are papilionaceous, are produced at the bases of the leaves in considerable numbers, not unlike those of the *Robinia hispida*. These flowers are succeeded by pods, very large, hard, and of a brownish, or cinnamon colour. These pods contain a variable number of roundish seeds or beans, compressed on the one side, and covered with a thin loose shell of a chesnut colour; when roasted, they have very much the flavour of chesnuts; and in a country where edible fruits of indigenous growth are few, they are at least a curiosity.

We have thus completed a rapid sketch of the various fruits of the world. As the commerce of mankind increases, the number of those valuable substances which we may secure to ourselves by cultivation will increase also; and, at the same time, we shall diffuse our own vegetable productions over the globe. In New South Wales the gardens of the settlers are filled with the plants which they cultivated in their native country. Colonization universally produces this good; and thus the intercourse of mankind may in time make the world one vast garden, in which all the blessings of a bounteous Providence shall be naturalized, as far as climate, or the science of man, can render those plants common to all, which were originally the property of a few.