THE ALPINE MARMOT,

AN interesting little animal, belongs to the order *Rodentia* and the genus *Arctomys*, and is the species with which we are best acquainted. It is classed among rats by Linnæus, and in its appearance is compared by some writers to a diminutive bear or badger; but the disposition of its teeth, and its internal conformation, evince its closer affinity to the squirrel family.

The animal, when full grown, attains the size of a rabbit, measures about fifteen inches from the nose to the root of the tail, and two feet including the tail—and generally weighs about nine pounds. The characteristics of the genus to which it belongs are thus stated:—There are two incisors in each jaw, and ten grinders in the upper, and eight in the lower jaw; four toes, with a tubercle in place of a thumb on the fore-feet, and five toes on the hinder. The genus possesses no cheek pouches, like some others belonging to the same family; and the individual species we are considering has a thick and short body, short legs and very short round ears; the tail differs materially from that of the squirrel, being much shorter in proportion, and straight. The head is large and thick—flattened at the top; the nose blunt and thick, and is often carried erect when the animal sits. The muzzle is furnished with whiskers, and there are long hairs also above and below each eye. The upper part of the body may be generally described as of a rather light gray color, and the lower part of a light fawn color. The gray darkens towards the head and tail, and the latter becomes nearly black towards the extremity. The ears of a lighter gray than the surrounding parts. The toes of the hind-feet are whitish, and those of the fore-feet black. The circuit of the muzzle is white. The fur of the animal is generally long and soft. The hairs of the tail are thicker and coarser than those of other parts, while below the tail, and inside the limbs, the hair is very short, leaving those parts almost naked.

These marmots inhabit the higher parts of the Alps and Pyrenees, just below the regions of perpetual snow, and are also found in some parts of Asia. They avoid moist places, and prefer small and narrow valleys, exposed to the south, south-east or south-west. In such places they construct their domicils under the earth, each family living in its distinct habitation. The entrance is usually placed under some stony mass. In forming their dwellings they scoop out the earth with great dexterity and expedition. By throwing away a small part, and beating the remainder close, they form a very compact and solid passage. Their excavations may be compared to the letter Y, the proper dwelling-place or room being at the point where the limbs branch off. The extreme length of the entire excavation is about twenty feet when the branches are formed, and seldom less than eight feet when they are not. The first passage, which is barely wide enough to admit the animal, is about six feet in length; and the cell in which it terminates is round or oval, arched at top, and in its form may be compared to an oven. It is from three to seven feet in diameter, being

larger or smaller according to the number of the family, and very comfortably lined with hay and moss, of which a good stock is laid in during the summer The use of the passages which branch off from this chamber, is rather a matter of conjecture.

In these burrows the marmot spends one half of the year in sleep. It retreats to them at a period which varies from the middle of September to the middle of October, according to the early or late approach of the winter. It remains shut up until March or April, and then removes the cement with which it had blocked up the entrance, by pulling it inward, and comes forth. At first they go down to the lower part of the mountains, where the season is more advanced, and on the approach of summer return to the neighborhood of their proper homes.

The marmot—organized for digging, destined for an obscure underground life, requiring for its nourishment only the herbs and roots which grow in the neighborhood of its habitation, and finding in its subterranean retreat the means of escape from most of its enemies—does not possess the power of many other animals of the order to which it belongs. It cannot leap like the rat, or climb like the squirrel. It walks but slowly, and raises itself to a short distance with effort; though it mounts with more facility than it descends. It rarely climbs, however, unless in the clefts of rocks, which it then does by the alternate use of its back and legs, in the same manner that chimneys are ascended by climbing-boys. Notwithstanding this want of agility, it does not appear that the marmots are often taken above ground, though they are usually out in sunshiny weather, in which they seem to have great enjoyment. Early in the morning the old marmots come out of their holes, and, when the sun is higher, bring out their young ones. The latter scamper about on all sides, chase one another and when disposed for more quiet enjoyment, seat themselves on their hind feet, and remain in that posture facing the sun, with an air expressive of great satisfaction. While these parties are thus amusing themselves, or busied in collecting food or materials with which to line their winter habitations, they are not unmindful of their personal safety. One of their number is posted as a sentinel upon a rock, or some other commanding spot, and if he perceives an enemy, or any unusual object that disquiets him, he sends forth a piercing cry, upon which the others retreat in all haste to their burrows, or, if these are too distant, ensconce themselves under the rocks. As they have great quickness of sight, and can discern an enemy at a great distance, they are rarely surprised.

The marmots never assume an offensive attitude towards other animals, and when apprehensive for their safety, their first consideration is retreat. When afraid of any serious invasion, they forsake their habitations in entire families, and wander from mountain to mountain until they find a spot where they deem it eligible to construct new retreats. When, however, they are driven to the last extremity, and retreat is impracticable, they defend themselves with great spirit even against men and dogs; and with their teeth, with which they can inflict very terrible bites, and with their claws, they assail all who approach them.

The Alpine marmots breed in the summer, and the litter usually consists of three or four young ones, and sometimes as many as six. It has not yet been ascertained whether the young, which with the parents compose a family, are the produce of two years or of one year only. If the latter,

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the number of the young indicates that there must be several broods in one year.

When the marmots retreat to their cells for their winter sleep they are generally very fat, and continue so for nearly three months; but after that they gradually decline, and are very thin by the time they awake. In their torpid state they lie in the hay close to one another, and rolled up like hedge-hogs, without exhibiting any appearances of life; but they may be revived by a gradual and gentle heat. From fifteen to sixteen are usually found together, and sometimes, but not often, two families are found in the same burrow; and still more rarely is one marmot found alone. During their winter sleep they are taken in great numbers, partly for the sake of their skins, which are used as furs, and partly for their flesh, which is then considered by the mountaineers as an agreeable article of food, but which is not relished by persons of more delicate appetite. The fat of the marmot, which tastes like hog's-lard, is considered by the inhabitants of the Alps to possess medicinal virtues. By the Savoyards they are chiefly taken for the purpose of exhibiting them through various parts of Europe, after they have been tamed. A young one is easily domesticated; and may with little difficulty be taught to sit upright, or to walk on its hind feet. It is sometimes even taught to dance with a stick between its paws, and to perform a great variety of feats. In its tame state the marmot will eat almost everything except flesh. When drinking, it raises its head at almost every sip, like a fowl, looking round with watchfulness and apprehension. It, however, drinks very little. Its most marked partiality is for milk and butter; and its strongest aversion is towards dogs. Unless carefully watched it is very destructive to all kinds of provisions, clothes, linen, and furniture; and the power of its teeth is such, that no cage that is not well guarded with iron can retain it in bondage. Tame marmots, if kept sufficiently warm, are able to dispense with their winter's sleep.

THE MANIS.

ANIMALS of this genus present an appearance quite as extraordinary as that of the armadillo tribe; being covered on every part, except the belly, with exceedingly strong, large, and horny scales. These, when the animals roll themselves up, furnish a suit of armor by which they are defended much more effectually than even the armadillo is against the assaults of their enemies. This armor is a compensating circumstance in their structure, giving them the security which, from their want of teeth, their inability to grasp with their feet, and their perfectly harmless nature, they would otherwise want. The external covering, together with the unusual length of the body and tail, gives to these creatures an appearance so much resembling that of the lizard, that they have been called "scaly lizards." These animals have, however, no proper alliance with the lizard tribe; yet on a general view of the animal king

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dom, they may be admitted to be a link in the chain of beings which connects the proper quadrupeds with the reptile class.

With the exception of their scaly covering, the animals of this genus have much resemblance to the ant-eaters in their structure and general habits. Like them they live by thrusting their long tongue into the nests of ants and other insects, and then suddenly retracting it into their mouths and swallowing their prey. They are natives of India and the Indian isles. Our engraving represents the two species of the genus which are distinguished as long-tailed and short-tailed.

The long-tailed or four-toed manis is known in India by the name of the phatagen. It is of a very long and slender form. The head is small and the snout narrow. The whole body, except beneath, is covered with broad but sharp-pointed scales, which are striated, or divided by small channels like those of cockle-shells, throughout their whole length. The throat and belly are covered with hair. The tail is more than twice the length of the body and tapers gradually to the tip. The legs are very short: each foot is furnished with four claws, of which those of the fore-feet are stronger than those of the hind. Both the tail and the legs are scaled in the same manner as the body. The color of this animal is of an uniform deep brown, with a yellowish cast, and with a glossy polished surface. It grows to the average length of five feet, from the tip of the nose to the extremity of the tail.

The short-tailed or five-toed manis is generally called in India the pangolin, but in Bengal it is called, in the Sanscrit language, *vajracite*, or the thunderbolt reptile, on account of the excessive hardness of its scales, which are said to be capable of even striking fire like a flint. This species differs from the former in being of a much thicker and shorter form. The tail in particular is very differently proportioned, not being so long as the body; it is very thick at the base, and from thence tapering gradually, but terminating very obtusely. It has also five instead of four claws to each foot; of which those on the fore feet are of great strength, excepting the exterior one, which is much smaller than the rest. This species is scaled in the same manner as the preceding, but the scales differ in shape, and are much larger and wider in proportion to the body and tail. In the larger specimens of this species of pangolin the scales are smooth; but in those that are smaller they are slightly striated about half way from the base. In some specimens a few bristles are found between the scales; but in others this is not observed. The parts without scales are covered with hair. The animal is of a very pale yellow-brown color, with a surface as glossy as the preceding species. It is a native of India; and naturalists are disposed to consider that it is the same animal (the Quogelo of the negroes) which Des Marchais describes as a native of Guinea. He says, that it there grows to the length of eight feet, of which the tail is about four; that it lives in woods and marshy places, feeding on ants, which it takes by laying across their paths its long tongue which is covered with a viscid matter, so that the insects which attempt to pass it cannot extricate themselves. It walks very slowly with its claws bent under its feet, and would be the prey of every ravenous beast, had it not the power of rolling itself up, and opposing to its adversary a formidable defence of erected scales. The hungry leopard then vainly assails it with his powerful claws, and after much fruitless exertion is obliged to leave it in safety. The pan

golin endeavors to elude the vigilance of man by retiring into holes in the rocks, and into burrows of its own excavation, where the female produces and suckles her young. The negroes despatch the animal with blows of a stick, sell the skin to Europeans, and eat the flesh, which is white and savoury, and is highly relished by the natives.

It is stated in the Asiatic Researches that the Malabar name of this animal is *alungu*, and that the natives of Bahar call it *bajar-cit*, or the stone-vermin. In the stomach of the specimen examined by Mr. Burt, and described by him in the above work, about a teacupfull of small stones was found. There were indeed no traces of animal or vegetable substances in its stomach or intestines; and Mr. Burt inclines to the opinion that it is capable of digesting and deriving nourishment from mineral substances. It is more reasonable to conclude, however, that stones and gravel are merely swallowed by the pangolin to assist digestion. The tongue in the specimen (a small one) examined by Mr. Burt was about the thickness of the little finger at the root, tapering from thence to a point; and when dissected out, it was capable of being extended to a length more than equal to that of the animal exclusive of the tail.

BLACK AND GRAY SQUIRRELS.

SQUIRRELS, as might naturally be supposed, are exceedingly numerous in many of the aboriginal forests of North America, so that squirrel hunting is one of the favorite and more refined species of sporting amongst such as devote a day or two to "hunting frolics" on particular occasions; not solely for the sordid purposes of gain, but partly as a recreation from other and very different employments. Black and gray squirrels are the most commonly sought after; for, in addition to the fact of their being the most abundant, they are greatly esteemed as an article of food, and their skins are of more value than those of any of the other sorts. A party of six sportsmen will often kill 2000 or 3000 squirrels—of various sorts—in a two or three days' excursion; but your regular backwood's bear and wolf hunter rarely condescends to make war upon this species of small game. From all the experience I have had in the forests of North America, I am decidedly of the opinion that black squirrels are far more abundant than gray ones, but why this is the case I have never been able to arrive at any satisfactory conclusion; for in their general habits, and their partialities for those sections of the country that produce some peculiar and favorite food, there appears not the slightest difference; and since their size and strength are nearly equal, I can see no good reason for the great disparity in point of numbers. Both the black and gray squirrels are migratory and erratic in their habits; for at particular seasons of the year some sections of the forests will literally swarm with them, while at other times, in the same situations, but a few solitary stragglers may be seen, leaping from branch to branch in the tops of the tall forest trees.

The foresight (or by whatever name that instinctive peculiarity common to a large portion of the brute creation, may be designated) of the grey squirrel, is very remarkable; for although I have always been led to consider it more shy and timid than either the black or red ones which frequent the same localities, yet when a season of absolute famine has been approaching, I have observed that it would run greater risks in committing little depredations upon the granary or corn-crib than would either of the other species. In two or three seasons, when there was an entire failure of beechnuts, chestnuts, and the other sorts of food that these provident inhabitants of the wilderness chiefly subsist upon during the long winters, I had opportunities of becoming convinced of the fact as before stated. On the farm where I resided there stood a barn and granary within half a stone's cast of the bordering primeval forest, in which was stored a quantity of Indian corn, wheat, and other kinds of grain. Until the autumn was advancing, I had scarcely seen a gray squirrel in the neighboring woods; but in the month of October I observed a few of them paying occasional visits to my barn and granary; and, not wishing my grain to be stolen or destroyed with impunity, I shot two or three of the earliest intruders. On those occasions I invariably found them carrying off fifteen or twenty grains of Indian corn within the cavities of their cheeks; and being provided with comparatively small cheek-pouches wherein to stow away the pilfered property, it showed to what inconvenience they would subject themselves in order to procure a little stock as the means of sustaining life through a long and rigorous winter. Whether or not the few that had first visited my premises had communicated the intelligence to their tribe that my barn was stored with such food as they might subsist upon during the approaching famine, of course I have no means of knowing; however, by the early part of November there were several scores of them paying their daily respects to my corn crib and wheat bin. A few red ones, and occasionally a black one or two, would resort to the same scene of plunder; but I found that they were more intent upon making a meal on the spot, than upon carrying away a necessary supply for the approaching winter. At this time the gray ones were so numerous, and audacious too, that when I was not at leisure, or felt no inclination to make war upon them with my gun, I had to place a boy as a sentinel, to scare them back into the woods, which he sometimes found great difficulty in effecting. In the springs succeeding those seasons of famine, I found hardly any red or black squirrels in the adjoining woods—they had evidently perished through absolute want; while a number of the gray ones, which had been so fortunate as to escape my gun, and had succeeded in laying in a winter's supply at my expense, might be seen springing from branch to branch, as agile and shy as they had been before the approach of winter; and I could not help blaming myself for having denied a small and temporary pittance to so many of my graceful, sagacious, and provident neighbors.

Although apparently not well adapted for swimming, yet both gray and black squirrels, in their migratory excursions, will venture across lakes that are one or two miles wide, as well as the largest of the American rivers. In these adventurous exploits they generally take advantage of a favorable breeze, in which case the wind acts upon their elevated tails, thereby rendering the excursion both quicker and less laborious. In the latter part of the summer I have frequently witnessed black squirrels crossing the

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Niagara River in considerable numbers; and I always remarked that they swam across when the morning first began to dawn. On reaching the opposite shore they would appear greatly fatigued, and if unmolested would take a pretty long rest preparatory to their setting off for the neighboring woods, whither they were apparently led by the wonderful power of instinct.

THE BADGER.

NO very minute investigation is needed to satisfy us that the progress of cultivation in any country must have considerable influence on the habits of the various tribes of its indigenous animals. Some in time come to be exterminated, and others exist in greatly diminished numbers. The climate of England is just as suitable to them, but it is now several centuries since the wolf, and more recently the wild-cat, became extinct. Animals which are carnivorous and destructive to flocks and herds are hunted down, and those which can only find security in the recesses of vast woods fall easier and more frequent victims to their pursuers as the country becomes cleared up. Some are destroyed for the value of their skins, until the scarcity which ensues renders it necessary to resort to other countries for the supply. Thus war is made against animals which are perfectly harmless, as well as those which are really of destructive and noxious habits. In the course of time, the breed of animals whose existence is an object of anxiety to sportsmen and the lovers of the chase, can only be preserved in plantations, gorse-covers, or other sheltered and protected places, in which they are carefully guarded from indiscriminate pursuit. On the other hand, various animals multiply and spread themselves over the country in proportion as its richness and abundance are increased by an extended and improving agriculture. It is from this cause that the pheasant, which was scarcely known in Scotland at one period, is now found as frequently as in many parts of South Britain. The badger would perhaps have been long since extinct in England but for the solitary life which it leads and its nocturnal habits. Its skin is of considerable value, and its flesh, at least the ham, is palatable, and resembles bear's flesh, for which a relish has always been affected or felt by sportsmen-epicures. In China the badger may be seen in the meat-markets by dozens.

By Linnæus and the naturalists before his day, the badger was classed in the same genus as the bear. But the Linnæan arrangement has been broken into sections and secondary groups, in consequence of the discovery of many new species of animals within the last half-century. Comparative anatomy has been more generally and closely studied; and new and more scientific principles, deduced from this source, have been applied practically on a large scale by naturalists who have undertaken to investigate the general economy and habits of animals. The glutton, badger, and raccoon,

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formerly placed with the bear genus, have been formed into distinct genera, this classification depending upon certain peculiarities of habit or structure. The badger, however, belongs, like the bear, to the class of plantigrade animals, the formation of the extremities compelling it to rest upon the whole sole in standing or walking; but while this peculiarity in the badger points out its connection with the same family as the bear, yet it is separated from the bear by its dental formation. The influence of this part of the formation of an animal is so important as generally to affect its habits and modes of life. If the teeth are capable of cutting and tearing flesh, it must be endowed with activity, energy, or cunning, to enable it to obtain animal food. The dental system in the badger is adapted for masticating vegetable substances, and when in confinement it shows a marked preference to this kind of food. In its natural state it lives chiefly upon roots, fruits, insects, and frogs; and it is likewise destructive of the eggs and young of pheasants, partridges, and other birds which build their nests on the ground. Occasionally it attacks the nest of the wild bee, plundering the store of honey without dread of the sting of the bee, which cannot penetrate the thick skin of the badger, even if the long hair of the animal were not sufficient protection.

The badger is about the size of a middling dog, but its body being broader and flatter, and supported by short legs, it stands much lower than a dog. The external characteristics of the animal are — head long and pointed, ears almost concealed in the hair of the head, and the tail so short that it scarcely reaches to the middle of the hind legs; the hair trailing along the ground on each side as the animal moves; color, a sandy gray; yellow towards the roots, blueish brown in the middle, and of a deeper yellow at the tips, which mixture of deep brown and pale yellow combined gives a gray appearance to the color of the badger.

The feet of the badger are furnished with powerful claws, and the legs being short and muscular, it naturally makes a subterranean habitation. When attempted to be dug out it proceeds from one point to another with so much activity, forming behind it a sort of outwork of earth, that it is difficult to be dug out. The formation of the feet also equally well fits it for obtaining roots as food. The badger prefers a sandy or light gravelly soil in which to make his burrow, which has one external entrance, leading into different chambers, and terminating in a circular one at the extremity. This latter is lined comfortably with dry grass and hay, and here the animal spends the live-long day in repose, moving out only at night in search of food. The badger leads the most solitary and quiet life, not being found in company even with the females of his own species. Sleeping all day long, rolled up on its bed of warm hay, appears to agree singularly well with it, as it is always fat. Though invariably choosing the most secret recesses of the woods for its abode, where, if anywhere, it could remain in peace, the badger is a scarce animal. The number of its young is from three to five annually at one birth. They are suckled for five or six weeks, and then taught to shift for themselves. Their numbers are kept down by various means; moonlight nights, and when they leave their burrows for food, affording the best opportunities of pursuing and destroying them. Though harmless, the badger, when attacked, shows great resolution and courage, and is no mean antagonist, grappling with a dog of twice its own weight; and from the manner in which the under-jaw is joined to the skull,

keeping a firm hold with its teeth. The "sport" of badger-baiting was therefore one in which only the most brutal mind could find gratification. When the young are taken they may be easily tamed, and evince much docility and playfulness. No treatment, however kind, can change the character of the adult animal.

The skin of the badger is not without value in commerce. It makes excellent pistol-holsters, and the hair is used in painters' brushes, and as trimmings for articles of dress.

THE BEAVER.

MUCH that is false and exaggerated has found its way into the common descriptions of the habits of these animals; and the really extraordinary qualities which the species display, have been referred to an intelligence approaching that of the human race. The singular actions of the beaver are suggested by instinct alone—the same instinct which guides the ant and the bee. Each individual beaver is precisely the same in its faculties as another; they are all untaught—they are all incapable of teaching—they all remain the same in point of intelligence from generation to generation.

The exaggeration, which absurdly prevails with regard to the habits of the beaver, may be referred to unavoidable causes. The species are exceedingly timid and vigilant, and invariably labor in the night time. Thus, few persons, competent to observe them accurately, have had the opportunity of doing so. The greater part of our information is derived from the fur-traders and Indians; and these men are ignorant and credulous, deceiving themselves and deceiving others. The best account we have seen of the habits of the beaver is that by Dr. John Godman, Professor of Natural History in the Franklin Institute of Pennsylvania.

The general aspect of the beaver, at first view, would remind one of a very large rat, and seen at a little distance it might be readily mistaken for the common muskrat. But the greater size of the beaver, the thickness and breadth of its head, and its horizontally flattened, broad and scaly tail, render it impossible to mistake it, when closely examined, for any other creature.

In a state of captivity or insulation, the beaver is a quiet or rather stupid animal, evincing about as much intelligence as a tamed badger, or any other quadraped which can learn to distinguish its feeder, come when called, or grow familiar with the inmates of the house where it is kept. It is only in a state of nature that the beaver displays any of those singular modes of acting which have so long rendered the species celebrated. Their extraordinary instincts are applied to two principal objects: 1. To secure a sufficient depth of water to prevent it from being frozen to the bottom; 2. To construct huts, in which they pass the winter.

If beavers choose a spot for their residence where the water is not of sufficient depth, they set about obviating the inconvenience by building a dam. The materials used for the construction of their dams are trunks and branches of small birch, mulberry, willow, poplar, &c. They begin to cut down their timber for building early in the summer, but their edifices are not commenced until about the middle or latter part of August, and are not completed until the beginning of the cold season. The strength of their teeth and their perseverance in this work may be fairly estimated by the size of the trees they cut down. Dr. Best informs us that he has seen a mulberry-tree, eight inches in diameter, which had been gnawed down by the beaver. Dr. Godman saw, while on the banks of the Little Miami river, several stumps of trees, which had evidently been felled by these animals, of at least five or six inches in diameter. These are cut in such a manner as to fall into the water, and then floated towards the site of the dam or dwellings. Small shrubs, &c. cut at a distance from the water, are dragged with their teeth to the stream, and then launched and towed to the place of deposit. At a short distance above a beaver-dam the number of trees which have been cut down appears truly surprising, and the regularity of the stumps which are left, might lead persons unacquainted with the habits of the animal to believe that the clearing was the result of human industry.

The figure of the dam varies according to circumstances. Should the current be very gentle, the dam is carried nearly straight across; but when the stream is swiftly flowing, it is uniformly made with a considerable curve, having the convex part opposed to the current. Along with the trunks and branches of trees they intermingle mud and stones, to give greater security; and when dams have been long undisturbed and frequently repaired, they acquire great solidity, and their power of resisting the pressure of water and ice is greatly increased by the willow, birch, and other cuttings occasionally taking root, and eventually growing up into something of a regular hedge. The materials used in constructing the dams are secured solely by the resting of the branches, &c., against the bottom, and the subsequent accumulation of mud and stones, by the deposit of the stream or by the industry of the beavers.

The dwellings of the beaver are formed of the same materials as their dams, and are very rude, though strong, and adapted in size to the number of their inhabitants. These are seldom more than four old and six or eight young ones.

When building their houses, they place most of the wood crosswise and nearly horizontally, observing no other order than that of leaving a cavity in the middle. Branches which project inward are cut off with their teeth and thrown among the rest. The houses are by no means built of sticks first and then plastered, but all the materials, sticks, mud, and stones, if the latter can be procured, are mixed up together, and this composition is employed from the foundation to the summit. The mud is obtained from the adjacent banks or bottom of the stream or pond near the door of the hut. The beaver always carries mud and stones by holding them between his fore-paws and throat.

Their work is all performed at night, and with much expedition. When straw or grass is mingled with the mud used by them in building, it is an accidental circumstance, owing to the nature of the spot whence the mud

was taken. As soon as any part of the material is placed where it is intended to remain, they turn round and give it a smart blow with the tail. The same sort of blow is struck by them upon the surface of the water when they are in the act of diving.

The outside of the hut is covered or plastered with mud late in the autumn, and after frost has begun to appear. By freezing it soon becomes almost as hard as stone, effectually excluding their great enemy, the wolverene, during the winter. Their habit of walking over the work frequently during its progress, has led to the absurd idea of their using the tail as a trowel. The habit of flapping with the tail is retained by them in a state of captivity, and, unless it be in the acts already mentioned appears designed to effect no particular purpose. The houses, when they have stood for some time, and been kept in repair, become so firm from the consolidation of all the materials, as to require great exertion and the use of the ice chisel, or other iron instruments, to be broken open. The laborious nature of such an undertaking may be easily conceived, when it is known that the tops of the houses are generally from four to six feet thick at the apex of the cone. Hearne relates having seen one instance in which the crown or roof of the hut was more than eight feet in thickness.

The door or hole leading into the beaver-hut is always on the side farthest from the land, and is near the foundation of the house, or at a considerable depth under water. This is the only opening into the hut, which is not divided into chambers.

All the beavers of a community do not coöperate in the fabrication of houses for the common use of the whole. Those who are to live together in the same hut, labor together in its construction, and the only affair in which all seem to have a joint interest, and upon which they labor in concert, is the dam, as this is designed to keep a sufficient depth of water around all the habitations.

In situations where the beaver is frequently disturbed and pursued, all its singular habits are relinquished, and its mode of living changed to suit the nature of circumstances, and this occurs even in different parts of the same rivers. Instead of building dams and houses, its only residence is then in the banks of the stream, where it is now forced to make a more extensive excavation, and be content to adopt the manners of a muskrat. More sagacity is displayed by the beaver in thus accommodating itself to circumstances, than in any other action it performs. Such is the caution which it exercises to guard against detection, that were it not for the removal of small trees, the stumps of which indicate the sort of animal by which they have been cut down, the presence of the beaver would not be suspected in the vicinity. All excursions for the sake of procuring food are made late at night, and if it pass from one hole to another during the day-time, it swims so far under water as not to excite the least suspicion of the presence of such a voyager. On many parts of the Mississippi and Missouri, where the beaver formerly built houses according to the mode above described, no such works are at present to be found, although beavers are still to be trapped in those localities.

These animals also have excavations in the adjacent banks, at regular distances from each other, which have been called *washes*. These excavations are so enlarged within, that the beaver can raise his head above water, in order to breathe, without being seen, and when they are dis

turbed at their huts, they immediately make their way under water to these washes.

The beaver feeds principally upon the bark of the aspen, willow, birch, poplar, and occasionally the alder, but it rarely resorts to the pine tribe, unless from severe necessity. They provide a stock of wood from the trees mentioned, during the summer season, and place it in the water opposite the entrance to their houses. They also depend, in a great degree, upon the large roots (of the *nuphar luteum*) which grow at the bottom of the lakes, ponds, and rivers, and may be procured at all seasons.

The number of young produced by the beaver at a litter is from two to five. The young beavers whine in such a manner as closely to imitate the cry of a child. Like the young of most other animals they are very playful, and their movements are peculiarly interesting, as may be seen by the following anecdote, related in the narrative of Capt. Franklin's perilous journey to the shores of the Arctic Sea:—"One day, a gentleman, long resident in the Hudson's Bay country, espied five young beavers sporting in the water, leaping upon the trunk of a tree, pushing one another off, and playing a thousand interesting tricks. He approached softly under cover of the bushes, and prepared to fire on the unsuspecting creatures, but a nearer approach discovered to him such a similitude betwixt their gestures and the infantile caresses of his own children, that he threw aside his gun and left them unmolested."

The beaver swims to considerable distances under water, but cannot remain for a long time without coming to the surface for air. They are therefore caught with greater ease, as they must either take refuge in their vaults or washes in the bank, or seek their huts again for the purpose of getting breath. They usually, when disturbed, fly from the huts to these vaults, which, although not so exposed to observation as their houses, are yet discovered with sufficient ease, and allow the occupant to be more readily captured than if he had remained in the ordinary habitation.

To capture beavers residing on a small river or creek, the Indians find it necessary to stake the stream across to prevent the animals from escaping, and then they try to ascertain where the vaults or washes in the banks are situated. This can only be done by those who are very experienced in such explorations. The hunt takes place in winter, because the animal's fur is then in the best order. The hunter is furnished with an ice chisel lashed to a handle four or five feet in length; with this instrument he strikes against the ice as he goes along the edge of the banks. The sound produced by the blow informs him when he is opposite to one of these vaults. When one is discovered, a hole is cut through the ice of sufficient size to admit a full-grown beaver, and the search is continued until as many of the places of retreat are discovered as possible. During the time the most expert hunters are thus occupied, the others with the women are busy in breaking into the beaver's houses, which, as may be supposed from what has been already stated, is a task of some difficulty. The beavers, alarmed at the invasion of their dwelling, take to the water and swim with surprising swiftness to their retreats in the banks, but their entrance is betrayed to the hunters watching the holes in the ice, by the motion and discoloration of the water. The entrance is instantly closed with stakes of wood, and the beaver, instead of finding shelter in his cave, is made prisoner and destroyed. The hunter then pulls the animal out, if within reach, by the

introduction of his hand and arm, or by a hook designed for this use, fastened to a long handle. Beaver-houses found in lakes or other standing waters offer an easier prey to the hunters, as there is no occasion for staking the water across.

The number of beavers killed in the northern parts of America is exceedingly great, even at the present time, after the fur trade has been carried on for so many years, and the most indiscriminate warfare waged uninterruptedly against the species. In the year 1820, sixty thousand beaver skins were sold by the Hudson's Bay Company alone.

It is a subject of regret that an animal so valuable and prolific should be hunted in a manner tending so evidently to the extermination of the species, when a little care and management on the part of those interested might prevent unnecessary destruction, and increase the sources of their revenue.

In a few years, comparatively speaking, the beaver has been exterminated in all the Atlantic and in the western States, as far as the middle and upper waters of the Missouri; while in the Hudson's Bay possessions they are becoming annually more scarce, and the race will eventually be extinguished throughout the whole continent.

The Indians inhabiting the countries watered by the tributaries of the Missouri and Mississippi, take the beavers principally by trapping, and are generally supplied with steel traps by the traders, who do not sell, but lend or hire them, in order to keep the Indians dependent upon themselves, and also to lay claim to the furs which they may procure. The business of trapping requires great experience and caution, as the senses of the beaver are very keen, and enable him to detect the recent presence of the hunter by the slightest traces. It is necessary that the hands should be washed clean before the trap is handled and baited, and that every precaution should be employed to elude the vigilance of the animal. The bait which is used to entice the beavers is prepared from the substance called castor (*castoreum*), obtained from the glandulous pouches of the male animal, which contain sometimes from two to three ounces.

During the winter season the beaver becomes very fat, and its flesh is esteemed by the hunters to be excellent food. But those occasionally caught in the summer are thin, and unfit for the table. They lead so wandering a life at this season, and are so much exhausted by the collection of materials for building, or the winter's stock of provisions, as well as by suckling their young, as to be generally at that time in very poor condition.

THE SABLE.

THIS animal, which is so much valued for its fur, belongs to the same genus with the common marten, which it greatly resembles in form, and it is nearly of the same size. They are of that class of animals which are called *vermiform*, on account of the great length of their bodies and shortness of their legs, which enables them to pass through very small

THE SABLE.

apertures. The head of the sable is small and oval, with short, round ears and long whiskers. The feet are large, each having five toes, furnished with white claws, which are short, hooked, and very hard pointed. This animal is distinguished from others of the same genus, by having the fur extended to the extremities of the toes, and even under them. The tail is somewhat bushy; it is five inches long, but with the hair it measures eight inches. The body is nearly of equal diameter throughout; and in proper season is thickly covered with hair, the color of which is black at top and cinerous at the bottom; the throat is cinerous, sometimes white, yellow, or spotted, and the edges of the ears are yellowish. Sometimes the hair has a tawny cast, for in spring, after shedding the coat, the color varies. The length of the animal is about eighteen inches, exclusive of the tail.

The chief residence of the sable is in Asia, beginning at the Uralian chain, and becoming more and more plentiful in the progress eastward, and more valuable in the advance to the north. None are found to the north-east of the Anadir, nor in any parts destitute of trees. They prefer vast forests, especially those of fir, in which the furs of the greatest beauty are found. They are frequent in Kamtschatka, and are met with in the Kurile Isles. Their proper limit extends from 50° to 58° north latitude.

The sable lives in holes in the earth, or beneath the roots of trees; sometimes, like the marten, forming nests in the trees, and skipping with great agility from one to another. It is very lively, and much in motion during the night, but generally sleeps in the day. It goes abroad to seek its prey during the night, if the weather be clear and fine; but if otherwise it retires to sleep. It is very courageous and will attack and destroy animals of a larger size than itself. Weasels, squirrels, and hares, form its usual prey in summer; in winter it is said to feed on birds, particularly partridges; it will also eat fruit, especially that of the service-tree, and it is, indeed, stated that fruit and berries form the principal part of its subsistence in autumn. During this season the furs are at the worst, their vegetable diet causing their skins to itch, when they rub off their fur against the trees. When very unsuccessful in its own researches for food, and therefore pressed by hunger, the sable follows bears, gluttons, and wolves, as the jackal does the lion, to partake of the overplus of their meals.

The females, towards the end of March or the beginning of April, produce from three to five young, which they suckle about four or five weeks. It seems that the sable is capable of being rendered very docile. Steller relates an instance of one that was domesticated in the palace of the Archbishop of Tobolsk, which used to wander about the city and visit the neighbors.

It necessarily results from the costliness of the fur, that men have not been deterred by any ordinary difficulties in the pursuit of the animal which affords it. Indeed, there is no article of luxury to obtain which more distress is endured or more peril incurred, than in the chase of this animal, which is carried on in the depth of winter—among mountains covered with ice, and in the deepest snows—in the coldest and most desolate regions to which man has yet penetrated. The hunters are often overcome by the combined operation of fatigue, cold, and hunger, and perish in those remote solitudes. Formerly, in the Russian Empire, the hunting of the sables was a task imposed upon the exiles who were banished to Siberia. As that country became more populous, the animals retired into the remote forests

and mountains; and it was the further pursuit of them which led to the discovery of Eastern Siberia. We suppose that an account of the manner in which the hunting of the sable is at present conducted in that country will not be without interest to our readers.

The sable-hunters form themselves into parties of from five to forty each. The last subdivides into smaller parties, each of which has a leader; but there is one person who directs and controls the whole. Each party is furnished with a small covered boat, laden with provisions; they are also furnished with a vessel to bake their bread in, and there is a dog and a net to every two men. Each party is provided with an interpreter for the country which it intends to penetrate. Every party then sets out in the direction prescribed by the leader. They go against the stream of the rivers, drawing their boats up until they arrive in the hunting country. There they stop, build themselves huts, and remain until the rivers are frozen and the season commences. Before they begin the chase their leader assembles them together, when they join in prayer to God for success and safety, and afterwards separate. The first sable each party takes is called "God's sable," and is dedicated to the church.

The small parties then penetrate into the woods, and mark the trees as they advance, that they may know their way back; and when arrived in the hunting quarters, they form huts of trees and bank up the snow around them. Near these they lay their traps; then they advance farther and lay more traps; still building new huts in every quarter, and returning successively to every old one, to visit the traps, and take out the game, and skin it, which none but the chief of the party must do. The traps are a sort of pit-fall, with a loose board placed over it, baited with fish or flesh. When the sables become scarce, the hunters trace them in the new-fallen snow to their retreats, placing their nets at the entrance, and sometimes have to remain waiting two or three days on the watch for the appearance of the animal. Another way of taking the sable is by placing a piece of timber from tree to tree horizontally; near one end of this a bait is placed. Over this piece of wood another is suspended obliquely, one end slightly resting on a post, and a rod extending from it to a noose to which the bait is fastened. As soon as the sable seizes the meat, the upper timber falls and kills him.

During this time the hunters are supplied with provisions by persons who are employed to bring it on sledges from places on the route where they are obliged to form magazines. The hunters are sometimes reduced to dreadful extremities from the failure of their provisions, and sometimes they perish. The following passage from the "Travels of Bell of Antermony," published in 1763, besides describing another mode of taking the sable, mentions a curious process resorted to for suppressing the cravings of appetite. "The sables are not caught in the same manner as other animals. The fur is so tender that the least mark of an arrow, or ruffling of the hair, spoils the sale of the skin. When the hunter finds the track of a sable in the snow, he follows it perhaps for two or three days, till the poor animal, quite tired, takes refuge in some small tree—for it can climb like a cat; the hunter then spreads his net around the tree, and makes a fire; the sable, unable to endure the smoke, immediately descends and is caught in the net. I have been told by some of these hunters that, when pinched with hunger in some of these long chases, they take two thin

boards, one of which they apply to the pit of the stomach, and the other to the back opposite to it; the extremities of these boards are tied with cords, which are drawn tighter by degrees, and prevent their feeling the cravings of hunger."

When the season is concluded, the hunters reässemble—report to their leader the number of sables each has taken—make complaints of offenders against their regulations—punish delinquents, and divide the spoil. They then continue at head-quarters until the rivers are clear of ice, when they return home and deliver to every church the dedicated furs.

What is commonly called the American sable is now known to be a distinct species. It is a larger animal than the true sable of Siberia; it is of a glossy, silver, black color, which is paler towards the fore-quarters, and slightly red about the nose; the tail and legs are velvet black, the hair silky and the fur very beautiful. The hunters call it the fisher, but improperly, as it by no means frequents the water, but its habits are almost entirely similar to those of the animal to which our attention is more particularly limited. As the skins of these animals are not so valuable as those of the true sable, the American hunter, as represented in our engraving, does not hesitate to shoot them.

THE OTTER.

ALL anglers, with Izaak Walton at their head, have an inveterate hostility against the otter, inasmuch as it may be regarded as their rival in the destruction of the finny race, but not a fair rival, since it is ever upon the spot, incessant in its exertions, voracious in the extreme, and works like a poacher during the night, nefariously thinning the river of the finest fish, and thereby depriving the angler of his anticipated enjoyment. The complaint that "the otter devours much fish, and kills and spoils much more than he eats," is very true; for where his prey is abundant, he only devours the fish from the head downward to the vent, leaving the tail as a witness against him.

Like the fox and wild-cat, the otter is in fact a nocturnal beast of prey, remaining quiet in its retreat till the night has set in, when it begins its depredations, and continues them till the first beams of sunrise warn it to retire. The ease and celerity of its aquatic evolutions during the chase of its victims are astonishing: rapid as the trout is in its motions, arrow-like as is its speed, the otter hunts it down, for his perseverance is equal to his celerity; he follows the fish in every turn and double, and maintains the pursuit with a pertinacity which generally insures success.

Fishes seem to have an instinctive dread of the otter, for it has been seen to collect into a shoal a vast number of trouts in the river, and drive them before it until the greater part have thrown themselves on shore.

The otter usually avails himself of any convenient excavation in the bank overhanging the water, especially if covered and concealed by the twisted

roots of a tree, or overarched by intertangled shrubs or bushes. Buffon says that the otter will even take up its abode among piles of floating wood. Sometimes, however, its retreat is at a considerable distance from its usual fishing haunt. In the month of March, or early in April, the female brings forth her young, from three to five in number, upon a bed of sticks or grass, in the excavation she has chosen for their concealment, and she attends them with great solicitude. The strength of the instinctive attachment for her young is thus noticed by Steller. "Often," says he, "I have spared the lives of the female otters, whose young ones I took away. They expressed their sorrow by crying like human beings, and followed me as I was carrying off their young, which called to them for aid in a tone of voice very much resembling the crying of children. When I sat down in the snow they came quite close to me, and attempted to carry off their young. On one occasion when I had deprived an otter of her progeny, I returned to the place eight days afterward, and found the female sitting by the river, listless and desponding, who suffered me to kill her on the spot, without making any attempt at escape. On skinning her, I found she was quite wasted away with sorrow for the loss of her young. Another time I saw at some distance from me an old otter, sleeping by the side of a young one about a year old. As soon as the mother perceived me, she awakened the young one, and enticed him to betake himself to the river; but as he did not take the hint, and seemed inclined to prolong his sleep, she took him up in her fore paws, and plunged into the water." It is during the spring and summer months, while the young of the otter are dependent upon the mother's care, that the destruction she makes among the fish is most considerable; she has not only her own wants, but those of her offspring to provide for, and her exertions during the silent hours of night are unremitting.

The sport of otter-hunting, formerly maintained by country gentlemen for the sake of the diversion, may be regarded as having been brought to a close in England, with the termination of the last century, and is now only practised for the sake of extirpating a noxious animal. At the present day, few or no packs of otter-hounds are kept.

SEAL HUNTING.

CRANTZ, in his "History of Greenland," has fully detailed the modes of taking this animal, in use among the Greenlanders.

The seal is of far more importance to the Greenlanders than the sheep is to us, or the cocoanut tree to the Indian. Therefore, among the Greenlanders, a man who cannot catch seals is held in very light esteem. It is the ultimate end kept in view in all the training of children. It is the only art to which they are trained from infancy, and it is by the exercise of it that men maintain themselves, make themselves agreeable to others, and become useful members of the community.

The Greenlanders have three ways of taking seals: either singly with the bladder, or in company by the *clapper hunt*, or in the winter on the ice; to which peculiar methods that of shooting may now be added.

THE OTTER.

OTTER HUNTING.

When the Greenlander, properly equipped for hunting, observes the harp seal, he endeavors to surprise it unawares, and approaches with the wind and sun in his back, that he may not be seen or heard by it. When he comes within four, five, or six fathoms of the animal, all his implements being in previous readiness, he transfers the oar to his left hand, and taking the harpoon (to which an inflated bladder is attached by a long string) in his right, launches it with all his force against the seal. The moment the animal is pierced, the man throws the bladder, tied to the end of the string, into the water, on the same side that the seal runs and dives, which it instantly does like a dart. The seal often drags the bladder under water; but from its size, it is so great an impediment that the animal soon tires, and must come up again in about a quarter of an hour, to take breath. The man hastens to the spot where he sees the bladder ascend, and as soon as the seal appears, throws an unbarbed lance against it. This lance always comes out of the wound it has inflicted, and the man continues to employ it until the seal is quite exhausted, when he runs a smaller lance into it, and kills it outright; but he immediately after closes the wound in order to preserve the blood.

Of the several species of seal found in Greenland, only one, the harp seal, called by the natives *attarsoak*, which is the most stupid and careless, can be caught in this manner. Some other species, more careful or timid, are taken by several men in company, in what Crantz calls the "clapper hunt." In this process the men cut off their retreat, and frighten them under water by clapping, shouting, and throwing stones; but as the seals must come to the surface at frequent intervals to draw breath, the men again persecute them, until at last the animals are obliged to remain so long under water, that when they do come up they stay so long at the surface as to afford the men an easy opportunity of effecting their destruction.

The third method of killing seals (upon the ice) is mostly practised in Disko, where the bays are frozen over in the winter. Several methods of proceeding are adopted. The seals themselves sometimes make holes in the ice, at which they come to breathe. Near such a hole the Greenlander seats himself upon a stool, resting his feet on one that is lower, to keep them from the cold: he thus sits watching; and when the animal comes and puts its nose to the hole, he pierces it instantly with his harpoon; and then, breaking the hole larger, he draws it out and kills it quite. Another method is, for a man to lie along upon his belly on a kind of sledge, near other holes from which the seals come out occasionally upon the ice to bask themselves in the sun. Near this great opening another small one is made, at which another man is stationed, who holds, inserted through it, a harpoon with an unusually long shaft or pole. The man who lies upon the ice looks into the large hole until he perceives a seal under the harpoon; he then makes a signal to the other man, who instantly thrusts down the weapon with all his strength, to run the animal through.

If a Greenlander happens to see a seal near its hole upon the ice, he slides along upon his belly towards it, wagging his head and imitating the grunting of a seal, so that the poor animal, concluding it to be one of its own harmless companions, allows the man to come near enough to pierce it with his long dart.

When the current wears a large opening in the ice in spring, the Green-

THE SEAL.

landers station themselves all around it, waiting till the seals come in large droves thither to take breath, when they kill them with their harpoons. Many also are killed on the ice while they lie sleeping and snoring in the sun.

An interesting account of the habits of the seal, as observed in the Orkney and Shetland Islands, is given in the 'Fauna Orcadensis' of the Rev. George Low, minister of Birsa and Haray, from which we extract the following particulars:

Seals are very numerous in these parts, especially in the desert isles or sea rocks that are separated from the land: there they lie in droves when the sea is low, and in season bring forth their young.

The seal swims with great rapidity, and, before a gale of wind, is full of frolic, jumping and tumbling about, sometimes throwing itself entirely out of the water, and performing many awkward gambols, at last retiring to its wonted rock or cavern, and there remaining till the storm is over. Seals seem to have much curiosity. If people are passing in boats they often come up very close, stare at them, and follow them a considerable time. If the people are speaking loud, they seem to pay much attention, and to exhibit some surprise. The church of Hoy, in Orkney, is situated near a small sandy bay, which is much frequented by these animals; and Mr. Low used to observe that when the bell rung for divine service, all the seals within hearing would swim directly for the shore, and would remain while the bells continued ringing, looking about with much appearance of wonder, but without alarm.

Numbers of seals are yearly caught upon the northern coasts, both with nets and shot, for the sake chiefly of the skins and oil. Mr. Low was credibly informed that in North Ronaldsha they were taken also for eating, and that very good hams were made from them. He had seen large numbers of seals cut up, and had no doubt that the young ones might eat tolerably well; but the flesh of the old ones is coarse grained and black, and must be very indifferent food. We are not so much surprised as Mr. Low, that the people of Ronaldsha should eat seals. He was probably aware, from Pennant, that seals formerly found a place at the tables of the great even in England, as appears from the bill of fare of the famous feast given by Archbishop Neville in the reign of Edward IV., which states that several were provided on that occasion.

Mr. Low also informs us that in his time (he died in 1795) a ship went annually from Pomona (as we understand him) to Soliskerry, and seldom returned without 200 or 300 seals. She was manned with between thirty and forty men, who, as soon as they came up with the rock, landed—except a few who remained on board to receive what the others killed—and immediately surrounded the seals which were then on it. One party, armed with clubs, commenced knocking them on the head, and another employed itself in *jacking;* that is, cutting off the skin with the blubber on it, while another party put the produce on board. They continued this as long as any seals remained; and when their task was accomplished, they hastened on board and set sail, as they were in danger from the weather while they remained, as, if it blew up, it was impossible for them to get to their boats. When they returned home, the "jacks" were divided, and sold by public auction, producing five or six shillings each; and each man generally got about thirty shillings for his share, after allowing a third for the vessel, and

something more than a common share for the master. When the "jacks" were sold, the blubber was cut from the skin and boiled down into oil, which sold well. The skins were fastened to the walls of the houses till dry, and were then sold to the trunk makers and others for eight pence or a shilling apiece, small and great. Mr. Low adds that the local tanners dressed the seal skin both for shoes and breeches, but they did not answer very well for the former, being soft and spongy, but, when properly managed, they did well for breeches. They were also dressed, with the hair on, for saddle covers; and very beautiful skins are sometimes made into waistcoats.

We recur to Pennant for further information concerning the treatment of seals in Scotland. He informs us that on the coast of Caithness there are immense caverns opening into the sea, and running some hundred yards beneath the land. These are the resort of seals in the breeding time, where they continue till their young are old enough to go to sea, which is in about six or seven weeks. The first of these caves is near the Ord, the last near Thrumster; their entrance is so narrow as only to admit a boat, but within they are very spacious and lofty. In the month of October, or beginning of November, the seal hunters enter the mouth of the caverns about midnight, and rowing up as far as they can, they land. Each man is provided with a bludgeon, and when properly stationed, they light their torches and make a great noise, which brings down the seals from the further end of the cavern in a confused body, with fearful cries and shrieks. At first the men are obliged to give way, for fear of being overborne; but when the throng has passed, they kill those that straggle behind, which are chiefly the young, by striking them on the nose, where a very slight blow destroys them, though they are otherwise exceedingly tenacious of life. When the work is over, the seals are dragged to the boat, which two men had been left to guard. This process is attended with great hazard, for should the torches go out, or the wind blow from the sea while the men remain in the cave, their lives are lost.

Those who pursue the seal rather for sport than profit, adopt another method, of which the following description has been furnished:

"One fine October morning I accompanied a military friend in quest of the seals. We embarked in a boat from Mull. The major's body servant carried two double barreled rifles, and had brought an oblong wooden box, fitted with a square piece of glass at one end, to be employed in searching below the surface of the water for any dead seals that might be lost. The boat was manned by four stout highlanders, who rowed us among certain small rocky islands, with which the sea in that part is studded; numerous goats and sheep pick up a living on these barren rocks, the verdure being particularly scanty, though the short grass, I was told, is very nourishing. In a nook of one of these islands we put the boat, and leaving the crew with an injunction to remain perfectly still, ascended the craggy side of the land; behind a fragment of rock the keen sportsman crouched with rifle cocked, his eye ranging over the expanse, his whole figure and expression of countenance denoting eagerness, mingled with caution. There was a long silence of expectation, and the whole scene, as I lay watching the surface of the water, struck me as one of the wildest and most interesting that I ever witnessed. The sea was calm as a lake, the sun shining full upon it; lofty ridges of heather-covered hills now glowing with warm light,

and then subdued by passing shadows, formed a romantic background. The shores were lined by steep cliffs and reefs of jagged rocks jutting out far into the sea, and the islands before mentioned, on one of which I was seated, varied the scene still more with color and picturesque forms. The seal in such a calm scene ventures from the ocean depths to inhale the air, and seeing no object to alarm, sports above the wave, or swims to and fro like a dog, occasionally landing on pieces of rock, and basking at his ease. Several of these singular animals soon showed their heads above the water, the sportsman waiting until they approached within shot. It is very difficult to hit them in this way, but I have seen experienced marksmen kill them from the boat at the extreme limit of a rifle's power. At one hundred yards they are frequently killed."

FISHERIES.

THE surface of nearly three-fourths of the globe is covered with water, and this vast space is peopled as thickly with animated beings as the land; but the difficulties which arise when an investigation into their nature and habits is attempted, renders this field of observation comparatively unknown. Concerning even some which are most familiar to us our knowledge is limited, and the difficulty of accumulating facts renders the progress of information slow. Still, the perseverance and industry of some active minds have done much to render the study of ichthyology full of interest. Many difficulties and obscurites have been removed, and sufficient is known to excite a desire to know more.

It may be convenient in this place to give the most approved arrangement of fishes. They are placed by Cuvier in the fourth class of organized beings, after beasts, birds and reptiles. This class is divided into two subclasses —viz., cartilaginous fishes and osseous fishes. In the former the bones are gristly, and in the latter firm, though less so than those of land animals, the matter of which they are composed being differently proportioned.

The cartilaginous fishes are divided into three orders: —1. Cyclostomi, having the jaws fixed and the gills adhering, with numerous openings—*e. g.*, the lamprey. 2. Selachii, having teeth instead of jaws, and the gills toothed like a comb —the ray. 3. Sturiones, having the gills free—the sturgeon.

The osseous fishes are divided into six orders; —1. the Plectognathi have fibrous bones and fixed jaws—*e. g.*, the sun fish. 2. the Lopobranchii have gills in the form of small round tufts—the hippocampus. 3. The Malacopterygii Abdominales have the rays of the fins generally soft, and the ventral fins placed far behind—the salmon. 4. The Malacopterygii Subbrachiati have gills resembling the tooth of a comb, and the ventral fins are placed either before the pectoral fins, between them or a little behind them—the whiting. 5. The Malacopterygii Apodes are footless, or without ventral fins—the eel. 6. In the Acanthopterygii the first rays

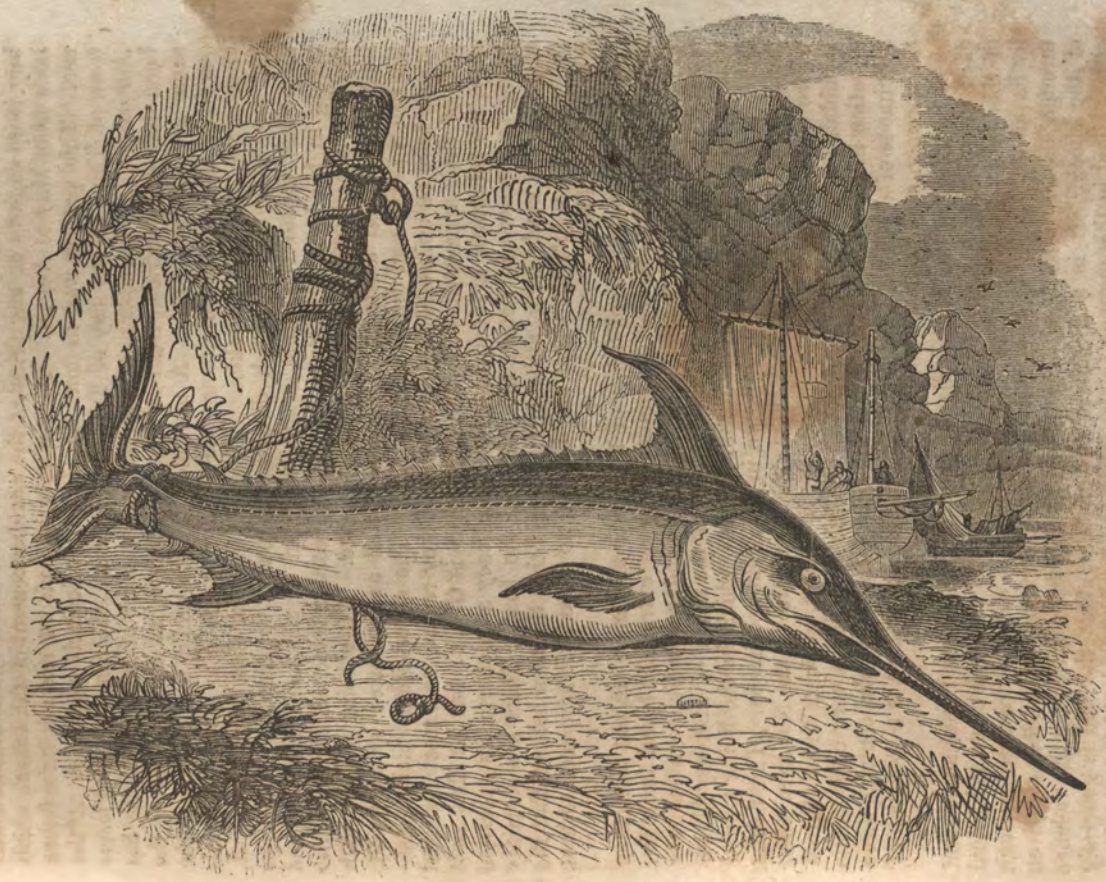
FISHERMEN.

of the fins are supported by a spinous process, and pointed like a thorn—the sword-fish.

The fins exercise considerable influence on the habits of fishes, and are the substitutes for limbs. The pectoral or breast-fin assists in supporting the upper part of the body, and gives a direction to its motion; the dorsal or back-fin steadies it; the ventral or belly-fin acts as an oar, and impels it along; the vent or hind-fin, with the pectoral fin, keeps the fish in a horizontal position; and the tail or caudal-fin is the great organ of progressive motion, acting like a scull. It has been found that if the pectoral and vent-fins are cut off, fishes lose the power of controlling the direction of their movements.

SWORD-FISH.

THE prolonged bony snout of the sword-fish, bearing some resemblance to a sword in its form and employment, has in all nations procured for the fish a name expressive of this analogy. The generic character common to the species is, that the head with the upper jaw terminates in a sword-shaped snout, that the mouth is without teeth, that the gill-membrane has eight rays, and that the body is roundish and without scales. The two principal species are the common sword-fish, and the broad-finned sword-fish. The common sword-fish is considered as properly a native of the Mediterranean, though it sometimes strays into the Atlantic, and has been found along the coast of Europe as far as the Baltic, and along that of Africa as far as the Cape of Good Hope. It has a long and round body, and gradually tapering towards the tail. The head is rather flat, and the mouth wide, both jaws ending in a point, but the upper extending to a much greater length than the lower. This prolonged part is what is usually called the sword: it is of a bony substance between three and four inches wide at the base, according to the proportions of the individual to which it belongs, and tapering to a sharp point. It is covered by a strong epidermis or scarf-skin, rough to the touch like sand paper. A deeply impressed line or furrow runs down the middle of the upper part, and three similar furrows on the lower surface. It has only one fin on the back, which runs along the whole length of it. It is very high at the commencement, and sinking suddenly, becomes very shallow, and is continued to within a short distance of the tail, terminating in an elevated point. The vent-fin, which is placed nearly opposite this part beneath, is moderately small, and much wider at each extremity than in the middle. The gill-fins are rather small, and of a lanceolate shape. The tail is large and crescent-shaped, and on each side of the body, immediately before it, is a strong finny appendage. The general color of the fish is brown, accompanied by a deep steel-blue cast on the head and upper parts, and inclining to silvery white on the sides and abdomen. It sometimes grows to a very large size, and as much as twenty feet in length. Pennant mentions one cast on



THE SWORD-FISH.

shore near Laugharne, Caermarthenshire, the head of which alone weighed seventy-five pounds, and was furnished with a snout three feet long.

The sword-fish is very active in its movements and voracions in its appetite. It feeds on the smaller kinds of fish, which it kills by piercing them with its sword. It is said to be in particular a very great enemy to the tunny, which is described by Belon to be as much alarmed by its appearance as a sheep is at the sight of a wolf.

This fish is highly esteemed as an article of food by the Sicilians, who buy it up eagerly at any price at the commencement of the season, which lasts from May to August. They cut it into pieces, and salt it for future use. This process was in ancient times particularly performed at the town of Thuri in the bay of Tarentum, whence the fish was called *tomus Thurianus*. A description of the ancient manner of taking this fish has been left us by Strabo, from which it appears that the process was the same as that now in use. A man mounts upon a cliff that overhangs the sea; and as soon as he discovers the fish, gives notice to a boat in attendance of the course it has taken. A man in the boat then mounts the mast, and on seeing the sword-fish directs the rowers towards it. As soon as they think themselves within reach, the man on the mast descends, and taking in his hand a harpoon, to which a cord is attached, strikes it into the fish, sometimes at a considerable distance. After being wearied with its agitations and attempts to escape, as well as exhausted by its wound, the fish is seized and drawn into the boat. The superstitious Sicilian fishermen have an unintelligible chant, which they regard as a most essential part of their apparatus. Brydone thinks it is Greek: but be that as it may, the fishermen are convinced of its efficacy as a charm, its operation being to attract and detain the fish near the boat. There are certainly some Italian words in it, although it is said that the men believe that the fish would dive into the water and be seen no more if it happened to hear a word of Italian.

The broad-finned sword-fish is of a thinner and more elegant form than the preceding, and is also distinguished by an extremely broad back fin, and by very long sharp-pointed thoracic appendages, which are entirely wanting in the other. The general color of the fish is of a silvery-bluish white, except in the back, head, tail, and fins, which in the living animal are of a deep blue, fading into brown in the dried specimens. This fish is found in the Brazilian and East Indian seas, and also in the Northern seas, where and elsewhere it is a great enemy to whales, piercing them with its formidable weapon. A specimen of this fish occupies a very conspicuous situation in the British Museum in a distinct case, which also contains three specimens of detached swords. In the same room there is a specimen of the common sword-fish.

The captain of an East Indiaman sent to Sir Joseph Banks an account of an astonishing but not singular instance of the strength of an individual of this broad-finned species; the bottom of his ship was pierced through by its sword in such a manner that it was completely imbedded, or driven through almost to its base—the animal having been killed by the violence of the shock. It is a fortunate circumstance that the fish is generally either killed in this manner or else perishes from being unable to withdraw its weapon, for could it effect this object, the vessel must inevitably founder in consequence of the leak; and, indeed, instances are recorded in which

some vessels, probably old or of slight description, have been greatly endangered, or even lost, in consequence of having been struck by a sword-fish. In the present instance, the wood, with the sword imbedded in it, was sawed out, and is now in the British Museum, where it forms one of the detached swords just mentioned.

Pliny mentions the power of the sword-fish to transfix vessels; and this was for a long time regarded as one of the exaggerated statements which are so common in the works of the ancient naturalists. Dr. Shaw thinks that Pliny, not being acquainted with the distinction of species, must have attributed to the common sword-fish what is true only of this species; but Dr. Shaw must have been in error, as the operation seems to be as often performed by the common fish as by that with the broad fin—a fact which does not appear to have been ascertained when he wrote. Dr. Jerome V. C. Smith, in his Natural History of the Fishes of Massachusetts, 1833, describes the common sword-fish as frequent off that coast, contrary to the ordinary opinion, which restricts it to the Mediterranean, and to the Atlantic coasts of Africa and Europe. That he means the common and not the broad-finned species is however evident, as he gives a figure and a detailed description. He then proceeds to relate instances of transfixion performed by this fish such as Dr. Shaw would restrict to the broad-finned species. Dr. Smith seems to have seen specimens of the fish which he describes, but he mentions that his practical information is derived from Mr. Dagget, an aged person, who has pursued the business of a pilot for half a century. Upon the whole, it seems evident that his information, the substance of which we proceed to give, applies to the common sword-fish, although it is to be regretted that he could not acquire distinct information concerning the smaller sword-fish of which he had heard mariners speak, and which he at first supposed might be the *makaira*, but which in the end he concluded must be the young of the common fish. There is no doubt, however, that, although, on the authority of Dr. Smith and *his* authorities, we are bound to consider the ensuing facts as applying to the common species, the whole is equally true of the broad-finned one. There is in fact little, if any, known difference in their habits.

Our author observes, that the fish "is evidently possessed of a highly irritable disposition, and therefore appears to be constantly involved in perilous and fearful difficulties. It is voracious, and yet without teeth; and though it seems to be the knight-errant of the deep, by meddling with the affairs of others, in which it has no personal interest, it also appears, at other times, to be at open war with whatever moves in the liquid element. Whales of prodigious magnitude, though truly peaceably disposed, if by chance they get within the sphere of its vision, are butchered without mercy. Whenever the sword-fish fails of accomplishing the death of this great animal, it is oftener because the sword is not long enough to penetrate through the thick sheet of blubber to the vitals than from any want of exertion on the part of the warlike assailant."

Notwithstanding this view of its character, it seems to us that the sword-fish aims its formidable thrusts at vessels, not so much from a disposition to attack everything that falls in its way, as under the impression that the said vessels are whales, or other great fish; and may not the fact, that vessels are rarely if ever so attacked in the Mediterranean, be in a great degree owing to this—that there are not in that sea any fish so large that

a sword-fish of ordinary penetration could mistake a ship for them. We are liable to great misapprehension in estimating the character of an animal without a careful reference to local circumstances.

Dr. Smith mentions the sword imbedded in wood at the British Museum, and gives some additional instances, which we quote:—

"On a calm sunny day during the last summer, as a pilot was leisurely rowing his little skiff over the glossy bosom of the gently swelling waves, he was suddenly roused from his seat by the plunge of a sword fish, thrusting his long spear more than three feet up through the bottom of his slender bark, when the pilot, with that presence of mind for which the whole fraternity are distinguished, broke it off on a level with the floor, by the butt of an oar, before the submarine assassin had time to withdraw his fearfully offensive weapon.

"Within five or six years, a Boston ship, on a return from a long voyage being overhauled for repairs, presented the stump of a sword-fish's blade, the point of which was driven a considerable way into the hard oak. In repairing his Britannic Majesty's ship Leopard, in 1725, on her return from the coast of Guinea, a sword of this fish was found to have gone through the sheathing one inch, next through a three-inch plank, and beyond that four inches and a half into the firm timber. It was the opinion of mechanics that it would require nine strokes of a hammer, weighing twenty five pounds, to drive an iron bolt of similar size and form to the same depth in the same hull; yet this was accomplished by a single thrust."

That the vessel came from the coast of Guinea is certainly one circumstance in favor of the claim of the common fish to the credit of this feat.

"The Hon. Josiah Robbins," proceeds Dr. Smith, "of Plymouth, Mass., related to us the following extraordinary fact. On the return of the ship Fortune, of Plymouth, from a whaling voyage in the Pacific, some time in the year 1826 or 1827, he does not recollect which, the stump of a sword-blade was discovered on the outside of the hull, which, on examination, was found to have penetrated through the copper sheathing, an inch board sheathing, a three inch plank of hard wood, the solid white oak timber of the ship, twelve inches thick, through another two and a half inch hard oak ceiling plank, and lastly perforated the head of an oil cask, where it still remained immovably fixed, so that not a single drop of oil had escaped."

Dr. Smith says that the American ship carpenters do not view the circumstance of finding points and portions of the swords in the hulls of vessels as a rare occurrence, particularly in those that come from South America. "We have," he continues, "many specimens of the swords from various parts of the world, but only two possess the skeleton of the head, which renders them quite valuable to a cabinet. Seamen who bring them from foreign countries as curiosities, are very apt to ruin them in two ways; first, by sawing them off too far from the jaw, and secondly, by scraping the blades smooth with knives and glass by way of improving upon nature; hence a majority of the specimens in museums are nearly ruined."

THE WHALE, AND WHALE-CATCHING.

IN giving a description of the whale, we must necessarily repeat much that has been written by others; but one who has seen them, in their native element, and has often met them in all their terrors, can at least strip his description of the exaggeration in which most writers have indulged.

The whale may be properly divided into two genera: the bone whale and the sperm whale. I prefer this description to the scientific one usually given, as it will more definitely mark the difference of these animals than classic words, to which we attach little meaning. The bone whales are of several species, all agreeing in general habits and character, but each having some distinct characteristic. The first and most important is the black whale, or, as the Americans call him, the *right* whale. This animal is usually about fifty-six feet in length, the largest may reach to sixty feet. Their color is black on the back, and white on the centre of the belly. Occasionally he is spotted with white. The head of this creature is about one third of his whole length. The eyes are placed on the sides of the head, near the body, and from its great size, it is consequently unable to see either directly forward or behind it, so that it may be approached very near, without being alarmed. But the most singular part of the animal is its mouth, and its adaptation for collecting the food upon which it lives. The upper jaw opens at least fifteen feet in length, and is provided with over five hundred laminæ, or slabs of thin black bone, which are hairy on the inner side, and when seen without, have the appearance of a Venetian blind, placed perpendicularly. The under jaw is broad, and when closed receives the ends of this bone upon its soft gums. It is also provided with two immense lips, one on each side, which are large enough to close the whole mouth and cover the bone. Some idea of these lips may be formed, when we know that the longest bone is fourteen feet in length, and the largest lip will make three barrels of oil. The body is from forty to fifty feet in circumference, and has two fins just behind the head, in which whalemen, owing to the peculiar situation of the bones, trace a fanciful resemblance to the human hand and fingers. The use of the fins appears to be to direct their course, and not to assist them in swimming. The body is thick for the greater part of its length, but it tapers near the end, and finishes in the tail, or as it is usually called, in flukes. These flukes are from twelve to fifteen feet in breadth, and in them is placed the animal's means of offence and defence. With its flukes it strikes blows which may be heard at the distance of miles, and from their force, one would suppose that nothing could sustain them, but we find that, in their contests with each other, they seldom or never produce death.

This whale feeds upon the animalculæ of the ocean, more particularly upon a very minute species of the shrimp, by the whalemen called britt, which is found without the tropics, both in the northern and southern oceans.

This is obtained by swimming with its mouth partly opened, until a sufficient quantity is collected and retained by the hairy bone of the upper jaw, when the lips are closed, and by means of its tongue this small food is collected and swallowed. Its manner of feeding would remind you of the grazing of the ox—the same disproportion between the size of its food and the animal to be supported. But when we reflect upon the fact that the ocean is teeming with life, and remember the immense net-like mouth of the whale, we shall at once see that the end is not disproportioned to the means. Like the ox too, this animal feeds industriously for a few hours, and then either rises above the surface and sleeps, or exercises itself in awkward gambols. If playful it beats the water with its flukes, or sinks to the depths of the ocean, and ascends with such velocity that it throws its whole body out of the water. It can not remain long under the water at one time, but must ascend for respiration. Its usual time of breathing is once in fifteen minutes. It has two orifices on the top of the head which answer for nostrils, and when it throws out its breath it is detected by the spray or steam which it throws up; owing to this, it becomes the prey of the whalemen. This animal is sought for its oil and bone.

The other species of bone whale are the humpbacked whale, the finback, and a species called the sulphur-bottom. The humpback is killed for his oil, but his bone is small and of no value; he differs from the black whale in having a large hump on the back, and in his fins which are at least fifteen feet in length, with which he strikes severe blows, and will readily destroy a boat. The finback whale is ninety feet in length, being much longer than either of the others; is distinguished from them by throwing his spout much higher, and by having a fin on the top of his back, and never lifting his flukes out of the water. He is also much fleeter than the black or humpbacked whales. For while they usually move but three or four miles an hour, and when excited can only for a short time accelerate their motion to ten or twelve miles, and must then stop and rest, the finback can readily move at the rate of twenty miles an hour (at the least,) and will continue that rate for a length of time, that render all attempts to take him unavailing. The last and largest of the whale species, is the sulphur-bottom or razor-back whale. They have been met with at the estimated length of one hundred and thirty feet, they differ little in appearance from the finback, except that the back fin is nearer the tail, and their motion is much slower, seldom exceeding five miles an hour. They feed in the same manner as the black whale, and like them are killed for their oil. All the species of bone whale are alike in their habits, being all timid and cowardly, trusting to flight when attacked, and never, if they can avoid it, defending themselves by injuring others.

The bone whales have but one known enemy except man. This is a fish called by whalemen "the killer," about twenty feet long, rather large in the body, and armed with strong teeth, which attacks the bone whale for the sake of his tongue. He first fastens upon the blow-holes or nostrils of the whale until he is forced to open his mouth to breathe, which then entering, he fastens upon the tongue and devours it, thus killing this immense animal, which would appear from its bulk to be safe from the attack of all minor creatures.

The sperm whale differs from the bone whale in its feeding. The food of the sperm whale is a species of animated vegetable, called squid, usually

found in deep water. As this substance has much consistency, the whale is provided with thirty-six large teeth on the under jaw, with which it rends its food from the rocks to which it is attached. The head of the sperm whale is square at the end, and seems unfit for rapid motion, but it is so hard that it is unaffected by collision with hard substances, and one means of offence with this animal is to strike with the head. Its head is not only one third the length of the body, but contains one third of the oily matter of the whole creature; its upper jaw is frequently fourteen feet in thickness. Its upper surface of about six or eight feet in thickness (in a very large whale) is called junk, being formed of hard muscular fibres filled up with very fat oily matter. Beneath this is a cavity called the case, in which is contained a semi-liquid matter, which is spermaceti mixed with a little oil. This whale is not so timid as the bone whale, and has more means of offence. It can attack with its square head, its jaw, or its flukes, and either of them are usually fatal to its opponent. It is the monarch of the ocean, and perhaps the leviathan of Job. It is not usually dangerous or malicious, but when aroused and aware of its enemy, its ferocity is terrible; it is not satisfied with beating him off, but pursues him to his destruction. He pursues the boat of the whalemen until he has dashed it in pieces; but they who man it are too contemptible an enemy for this terror of the deep: when the apparent enemy is destroyed, the men are left to their fate, and are safely picked up by another boat.

The sperm, like the bone whale, breathes air, but is capable of remaining longer under water. It is usually supposed that the sperm whale remains as long under the water as he does on the surface; and the largest have been known to be one hour and a quarter on the surface, breathing, and the same time below. This whale has but one nostril or spout-hole, and in breathing blows the spray forward and low. He moves slowly through the water when not excited, but when attacked is capable of moving seven or eight miles an hour, and continuing at that rate for a great length of time. The male of the sperm whale is much larger than the female; the largest male whales having produced from one hundred and fifty to two hundred barrels of oil, while the largest female never yields more than forty barrels. Of the same genus as the sperm whale are the porpoise and black fish. Their habits are similar, and their oil of the same kind. All whales produce their young alive, one every year, and the young are suckled like the calf until they are capable of providing for their own sustenance.

Having given a short account of the habits of whales, and the character of the different species, I shall now describe the manner of taking them and saving the oil.

A whale-ship is usually fitted with three or four boats, according to her size. Each boat is manned with six people—one mate, one harpooner, or boat-steerer, and four sailors. Besides the boats' crews she has six or eight men to keep the ship when the boats are in pursuit of whales; having in all from twenty-five to thirty-three men on board. Each boat is provided with a tub containing thirteen hundred and fifty feet of tow-line, which, when used, is made fast to two harpoons. She also has several lances, which are sharp weapons five feet in length and made fast to a pole, and used to dispatch the whale after the boat is made fast to him by the barb-harpoon. There are also several minor articles attached to the boat, which conduce to the safety of the men in case of accident. The ship is also

WHALE FISHERY.

provided with two or three large iron pots, capable of containing from one hundred and sixty to two hundred and twenty gallons each, for the purpose of boiling out the oil. Thus provided the ship takes her departure in search of the monsters of the deep. At this time commences the toil and excitement of the whalemen, which I shall now attempt to describe, using the language of the whalemen where it is intelligible to landsmen.

The ship goes on her course with an officer at her mainmast head, and a sailor at her fore. All is industry on deck. When the look-out aloft cries, "There she blows," instantly he is answered from the officer of the deck, with the shrill cry, "Where away?" He answers, giving the direction in which the fish is from the ship. Now, all is bustle, but all is order. The captain with his telescope, ascends the mast, and observes the spout, and directs the ship to steer for the expected prey. The mates and boat-steerers prepare their weapons for the conflict. The men are all on the look-out to catch the first view of the whale from the deck. The old and seasoned whaleman looks forward to the strife with hope and excitement, and perhaps amuses himself by frightening the landsmen with the dangers they are about to encounter. At last comes the order, "Haul aback the mainyard, lower away the boats." In breathless haste the orders are obeyed, the boats are gone, the ship lies like a log on the waters, and all is silence and expectation. The boats speed toward their object, the old sailors recklessly indifferent to the danger, and highly excited with the hope of gain, and the pride of contest, the landsmen doubting, but usually firm, and too proud to yield when others will lead.

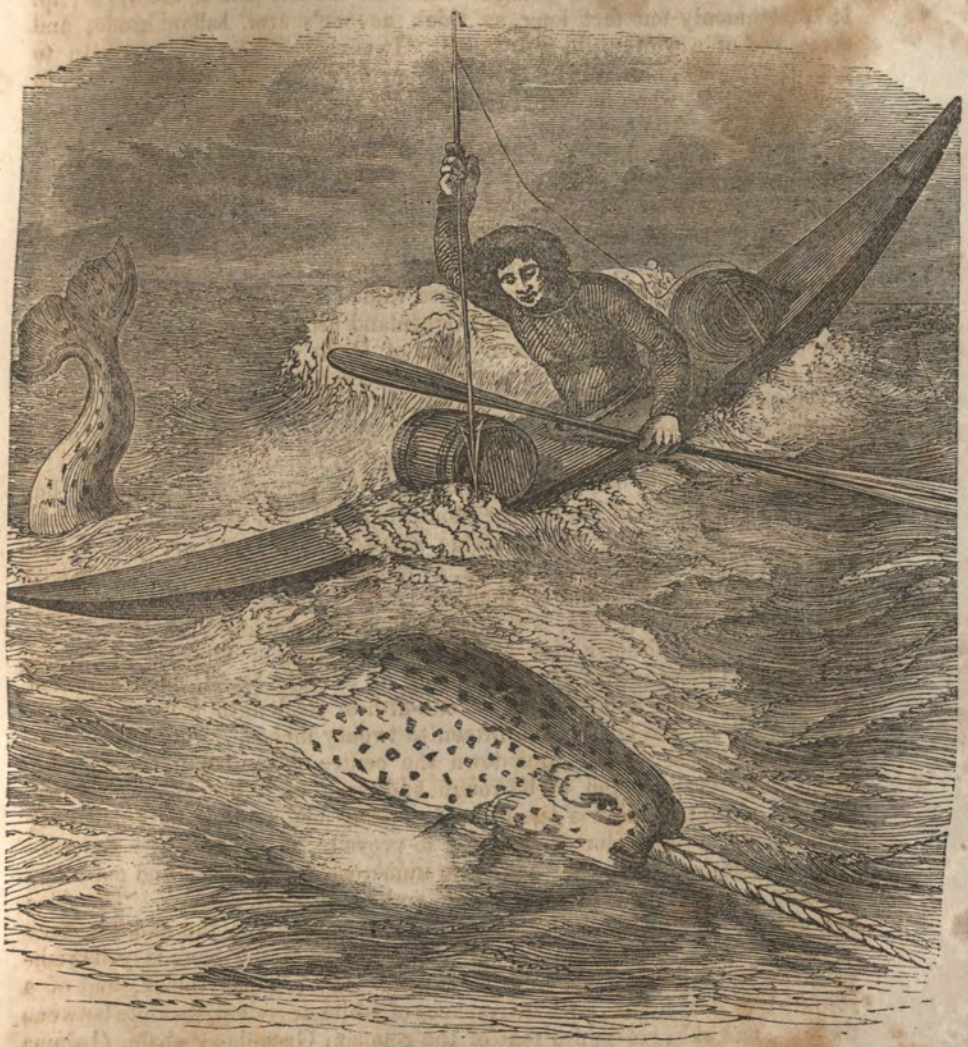
Unaware of his danger, the leviathan of the deep lies idly on the water. His foe is upon him. All is silence and exertion; now comes the stern order to the harpooner, "Stand up—dart," and the barbed iron is buried deep in his vitals. Then is heard the shout, "Stern all," (to escape the danger of the agonized exertions of the wounded monster), and the reckless exultation of the daring whalemen; then writhing with pain, he lashes the waters with his tail, and in the words of the Hebrew poet, "he maketh the sea to boil like a pot; one would think the deep to be hoary." But this soon passes away, his strength is exhausted, and he lies trembling on the waters, or he seeks safety in flight. Now the boat by its tow-line is brought near to him, and the mate, with his lance, strikes him to the heart; he throws blood from his nostrils; his breathing is choked; in his agony he lashes the water; the ocean resounds with his bellowing; his strength can endure no more; he rolls a lifeless mass on the waters, the prize and scorn of his puny enemy. Yet in all this there is but little danger to the bold and experienced whaleman. He watches the motions of his timid foe, he avoids the agonized blows of his tail, and suffers him to exhaust his great strength in futile exertions.

When the whale is dead commences the labor of saving the oil. The animal is brought along side of the ship, and secured by a chain around the small part of the body where it joins the flukes. Large tackles, (or pulley-blocks with ropes rove through them), are made fast at the mainmast head, one end of the fall or rope is passed around the windlass forward; and to the lower block is attached a large hook. A hole is now cut in the blubber or outer coat of the whale, and the hook is placed in it; the men at the windlass then heave up the hook, a strip of about four feet in width of the blubber is cut by the officers of the ship, and the fat or

blubber is peeled off as the bark is peeled from a tree. When a piece extending from the animal to the head of the mainmast is hove up, a new hole is cut, and another tackle is made fast below, and the part above is cut off and lowered into the hold. The other tackle is hove up with another piece, rolling the whale over and over, until the whole of the blubber is taken into the ship. When everything valuable is secured, preparation is made to boil out the oil. Two men commence cutting the blubber into small oblong pieces. It is then passed to two others, who with large knives mince it thin, when it is placed in the large pots and heated until the oil flows from it, and all the water is expelled. The oil is then bailed into a large copper vessel from which it runs through a strainer into a large pot, and is thence put into casks and rolled away to cool. The scraps or solid matter of the blubber are used for fuel, so that every part is useful; and if it were not for the scraps, no ship could carry wood enough to boil out its oil. When the oil is cooled it is sent below into casks in the hold, by means of leather hose, and is there done with until the ship arrives at home. The description of a whale ship boiling at night, may amuse, and would convey no bad idea of the fancied infernal regions of former days. If the observer were placed near enough to see the general movements, and yet not so contiguous as to let dull reality dispel the illusion of appearance, and could fancy the heaving ocean glaring in the fitful light to be liquid sulphur, he would have the material hell of our precise ancestors before him. The men feeding their huge fires, and now stirring them into fierce action, the bright blaze flaring wide over the ocean, and throwing in bold relief, visages blackened by smoke, unshorn and shaggy, their bright steel forks and pikes now flashing in the light, and now indistinct as the flickering blaze fades away, and again seen as the master-demon throws boiling oil into the blaze, (to give light to his operations), the hasty movements of the men passing suddenly before the fires, and then lost in darkness, or their forms thrown at length before the blaze, in the moments of relaxation —a morbid fancy might easily make it an image of terror, or a lighter mood might laugh at the ridiculous pageant as it passed before him.

THE NARWAL.

AMONG the cetacea that inhabit the Polar ocean, the narwal, if not the largest, is nevertheless one of the most remarkable. Its general form resembles that of the porpoise; it has, however, no teeth, properly so called, but two tusks, or spears, implanted in the intermaxillary bone, but of which the right remains usually rudimentary and concealed during life. The left tusk, on the contrary, attains to from five to seven or eight, and sometimes ten feet in length, and projects from the snout in a right line with the body, tapering gradually to a point, with a spiral twist (rope-like) throughout its whole extent. In structure and growth, this tusk resembles that of the elephant, being hollow at its base, or root, and solid at its extremity.



THE NARWALL.

The tusk or spear of the narwal constitutes a powerful weapon, which it is reported to use with terrible effect. It is, however, its only weapon, for it has neither the formidable teeth of the grampus nor of the cachalot. Crantz thus describes the narwal: "This species is commonly twenty feet long, and has a smooth black skin, sharp head, and little mouth. A round double-twisted horn runs straight out from the left side of the upper lip. It is commonly ten feet long, as thick as one's arm, hollow inside, and composed of a white solid substance. It is probable he uses this horn to get at the sea grass, which is his proper food, and also to bore a hole in the ice with it, when he wants fresh air; possibly also as a weapon against his enemies. Another little horn, a span long, lies concealed in the right side of his nose, which probably is reserved for a fresh supply, if some accident should deprive him of the long one; and they say that as a ship was once sailing at sea, it felt a violent shock, as if it had struck upon a rock, and afterward one of these horns was found fastened in it. Formerly these horns, or tusks, were looked upon to be the horns of the fabulous land unicorn, and therefore they were valued as an inestimable curiosity, and sold excessively dear, till the Greenland fishery was set on foot, when they found them in the northern parts of Davis' straits in greater plenty than anywhere; yet for some time they carried on the cheat."

Captain Scoresby found the remains of cuttle fish in the stomachs of several which were opened by him, and similar remains were also found in the stomach of one driven ashore near Boston, Lincolnshire, England.

In general form, the narwal resembles the porpoise, or grampus, but the head is small and blunt; the mouth is small, and not capable of much extension. The under lip is wedge shaped. The eyes are placed in a line with the opening of the mouth, at the distance of thirteen or fourteen inches from the snout, and of small size, being about an inch in diameter. The spiracle, or blow hole, is a single orifice of a semicircular form, on the top of the head directly over the eyes. The fins, or flippers, are about fourteen or fifteen inches long, and from six to eight broad, their situation on the sides of the animal being at one-fifth of its length from the snout. The breadth of the tail is from fifteen to twenty inches. There is no dorsal fin, but a sharp ridge runs down the centre of the back, the edge of which is generally found to be rough and worn, as if by rubbing against the ice. Crantz describes the narwal as being black; it is only in young specimens that this color can be said to prevail; at an early age the narwal is blackish-gray on the back, with numerous darker spots and markings running into each other, forming a general dusky-black surface. The sides are almost white, with dusky and more open markings; the under surface is white. In adult specimens, the ground color of the back is yellowish-white, with markings varying from dark gray to dusky-black, and of a roundish or oval figure, with interspaces of white or yellowish-white between them. The skin resembles that of the common Greenland whale, (balæna mysticetus,) but is thinner. The female narwal produces a single young one at a birth, which she nourishes with milk for several months; the teats are situated near the origin of the tail.

The narwal is gregarious, associating in troops of from six or eight to twenty or more; and numbers are often seen clustered together, both in the open sea and in bays and inlets free from the ice, forming a compact phalanx, moving gently and slowly along. Under such circumstances the

independent movements of each individual are necessarily embarrassed, so that a considerable slaughter may be easily effected among them. When attacked at such a time, the hind ranks, instead of turning against their assailants, press upon those before, sliding their long weapons over the glossy backs of their leaders, and all becomes disorder and confusion. Opportunities of this kind are welcome to the Greenlanders, to whom the narwal is an important animal.

The origin of the word narwhale, narwhal, or narwal, is said to be from the Teutonic nar, or ner, which signifies a beak or projecting snout; and wal, wale, or whale, an indiscriminate word, in the same great family of languages, for any of the cetacea.

NEW ZEALAND.

NEW ZEALAND, filling a large space in the south Pacific, extending from 34° to 47° south latitude, and from 167° to 179° east longitude, was discovered by Tasman, a Dutch navigator, in 1642. The vast southern Pacific was then an almost unexplored region, and though nearly two centuries had elapsed since European navigators discovered the passage to India by the Cape of Good Hope, the mine of enterprise which was then opened still continued to attract their chief attention, and to satisfy their maritime ardor. The reputed existence of a fifth continent, placed in the southern hemisphere, and vague rumors of its supposed rich productions, inflamed the imaginations of geographers, and proved a wholesome stimulus to the progress of discovery. Tasman was despatched by Anthony Van Diemen, governor of the Dutch East Indies, and sailed on the 14th of August, 1642, from the Port of Batavia, in company with another vessel under his command. He first discovered the island now known as Van Diemen's Land; and pursuing his voyage towards the east, again saw land on the 13th of September, and following the line of coast anchored next day within a large bay. Here for the first time he had an opportunity of seeing the natives, who came out in two canoes, and hailed the strangers in a strong rough voice, but they did not approach very near to the ship. On the following day, a canoe with thirteen men came within a stone's throw, but no temptations could induce them to come on board the ship. Tasman describes them as of the common stature and strong-boned; their complexion between brown and yellow, and their black hair tied up in the Javanese fashion, on the crown of the head, with the addition of a large feather stuck therein. Seven other canoes in the meantime put off from the shore, and Tasman, doubtful of their intentions, hoisted out one of his boats, which being manned by a quartermaster and six seaman, was on its way to the other ship to put her commander on his guard, when the canoes ran violently in upon the boat and nearly upset it, at the same time making a desperate attack upon the boat's crew. Three of the men were killed and one mortally wounded. The savages then hastily retreated, carrying with

EUSTON SQUARE STATION.

them one of the dead bodies. Tasman immediately weighed anchor, and gave the place the name of the Bay of Murderers. Thus inauspiciously did the first interview of the New-Zealanders with Europeans terminate. Tasman had not been able to bring his guns to bear upon the retreating islanders, and the savages could not as yet appreciate the hostile power which they had aroused. When the ship had got under sail, twenty-two canoes followed her, and advancing within range of the guns, were fired upon, and one man being killed, and the shot striking the canoes, they turned toward the shore. The man who was killed bore a white flag in his hand. Tasman's course precluded him from ascertaining that what he took for a large bay was the strait separating the northern from the southern island, which unitedly are known under the name of New Zealand. He therefore naturally looked upon the other island as a continuation of the same land, and that in fact he was upon the shores of the new continent, believed to exist in this part of the southern ocean. "It is," he says, "a very fine country, and we hope it is a part of the unknown south continent." One of his countrymen had made a similar mistake about a quarter of a century before, having come in sight of land which he conceived to be part of a continent, and to which he gave the name of Staten land, or State's land. Just at this time, or a few months afterward, the supposed continent was discovered to be an island of no great extent; but Tasman believed that he had also fallen in with a portion of Staten land or the southern continent. When it was ascertained that the country called Staten land was only an island, Tasman's discovery received the name of New Zealand. On the 4th of January he passed the north-western extremity of New Zealand, which he named Cape Maria Van Dieman, in honor of a lady to whom it is said he was attached, the daughter of the governor under whose auspices the expedition was projected.

It was about a century after Tasman's voyage, before New Zealand was again visited by Europeans; but on the 6th of October, 1769, Captain Cook, then making his first voyage of circumnavigation in the Endeavor, came in sight of the island.

Captain Cook approached New Zealand from the west, on his passage from the Society islands, while Tasman had reached it from the east. The general opinion on board the Endeavor was that they also had found the "Terra Australis Incognita." On the 8th Cook anchored, and soon after went on shore accompanied by Mr. (afterwards Sir Joseph) Banks and Dr. Solander, and were unhappily attacked by the natives, on whom they were compelled to fire in self-defence. An attempt at friendly intercourse was made the day following, but though aided by the persuasions of a native of Otaheite on board the Endeavor, it proved unsuccessful. The Endeavor did not leave this part of the coast without an unfortunate collision with the natives, who fought in the most obstinate manner against an unequal force, the contest ending in four of the savages being killed. Two youths, one aged 19, and the other 11, were taken on board the ship, where they expected instant death, but being kindly treated, soon recovered their spirits. Being unable to procure provisions at this place, to which Cook gave the name of Poverty Bay, the anchor was weighed, and the Endeavor, pursuing the line of coast, came to the supposed bay in which Tasman had anchored, and which Cook found to be a strait separating the islands: in the maps it bears the name of Cook's straits.

The next epoch in the intercourse with New Zealand, arose out of the proximity of the English settlements in New South Wales, founded at the close of the last century, the distance from them being about 1,200 miles; while New Zealand is not more than two or three days' sail from Norfolk island, where a settlement was commenced in 1793. The natives of New Zealand have frequently visited Sydney, Port Jackson, and other Australian ports. At a somewhat later period, the ships engaged in the South sea whale fishery, began to frequent New Zealand; and the government at New South Wales availed themselves of this medium to send presents of cattle, grain, and such other articles as were calculated to promote the social improvement of the natives.

A third stage in the intercourse of New Zealand with civilized nations is marked by the arrival of Christian missionaries in 1814, after they had remained several years in New South Wales. The Church Missionary Society commenced this work, in which other societies were engaged, and their operations during the last twenty-five years, have had some important influence on the New Zealand character. The island has also become an active scene of commercial enterprise, and as the Australian colonies increase in wealth and population, New Zealand will be brought into still closer connexion with the habits and wants of civilization.

THE DODO.

THE engraving represents a bird, of the existence of whose species a little more than two centuries ago there appears to be no doubt, but which is now supposed to be entirely extinct. It must be obvious that such a fact offers some of the most interesting and important considerations; and the subject, therefore, has claimed the particular attention of several distinguished naturalists.

In Herbert's Travels, published in 1634, is a description of this bird, which is very quaint and curious:—

"The Dodo comes first to our description, here, and in Daygarrois; (and no where else, that ever I could see or heare of, is generated the Dodo.) (A Portuguize name it is and has reference to her simplenes,) a bird which for shape and rareness might be called a Phœnix (wer't in Arabia;) her body is round and extreame fat, her slow place begets that corpulencie; few of them weigh lesse than fifty pound: better to the eye than the stomack: greasie appetites might perhaps commend them, but to the indifferently curious nourishment, but prove offensive. Let's take her picture: her visage darts forth melancholy, as sensible of nature's injurie in framing so great and massie a body to be directed by such small and complementall wings, as are unable to hoise her from the ground, serving only to prove her a bird; which otherwise might be doubted of: her head is variously drest, the one halfe hooded with downy blackish feathers; the

other, perfectly naked; of a whitish hue, as if a transparent lawne had covered it: her bill is very howked and bends downwards, the thrill or breathing place is in the midst of it; from which part to the end, the colour is a light greene mixed with a pale yellow; her eyes be round and small, and bright as diamonds; her cloathing is of finest downe, such as you see in goslins: her trayne is (like a China beard) of three or four short feathers; her legs thick, and black, and strong: her tallons or pounces sharp, her stomack fiery hot, so as stones and iron are easily digested in it; in that and shape, not a little resembling the Africk Oestriches: but so much, as for their more certain differance I dare to give thee (with two others) her representation."

In this description there are several details that are no doubt inaccurate; such as the iron-digesting stomach; but the more important particulars agree with other evidence.

In a paper "on the natural affinities that connect the orders and families of birds," published in the Transactions of the Linnean Society, the following observations occur on the Dodo:—

"Considerable doubts have arisen as to the present existence of the Linnean *Didus* (Dodo;) and they have been increased by the consideration of the numberless opportunities that have lately occurred of ascertaining the existence of these birds in those situations, the Isles of Mauritius and Bourbon, where they were originally alleged to have been found. That they once existed I believe cannot be questioned. Besides the descriptions given by voyagers of undoubted authority, the relics of a specimen preserved in the public repository of this country bear decisive record of the fact. The most probable supposition that we can form on this subject is, that the race has become extinct in the before-mentioned islands, in consequence of the value of the bird as an article of food to the earlier settlers, and its incapability of escaping from pursuit."

THE HORNED PHEASANTS OF INDIA.

PHEASANTS form one of the most interesting groups of the feathered race, whatever be the point of view in which we contemplate them. Their beauty of form and the splendor of their hues have attracted universal admiration. Many dazzle by the metallic lustre of their plumage, which gleams with green, and blue, and gold. Such, for example, is the case with that gorgeous bird the Impeyan pheasant of the Himalayan Mountains, which it has several times been attempted to bring alive into this country, but hitherto without success. Others, as the golden pheasant of China, delight us with the richness and multiplicity of their tints, which contrast admirably with each other. The common pheasant, now naturalized over the greater portion of Europe, is exceedingly beautiful, but it is far surpassed by many of its congeners, of which we may mention that elegant Chinese

THE HORNED PHEASANT.

species, the *Phasianus Reeresii*. It is to be observed, however, that this beauty of plumage is confined to the males: the females are universally attired in a sober dress of brown, often, indeed, exquisitely penciled with spots and zigzag lines, but totally destitute of the brilliant hues which glisten in their mates. Independently, however, of the beauty of the pheasant tribe, there is another point of interest which cannot be overlooked—we allude to their value as it respects the table. The flesh of all the gallinaceous birds affords to man a wholesome and nutritious food, and that of the pheasants is deservedly in high estimation.

The pheasants are all natives of Asia. The common pheasant was originally brought from the river Phasis by the Greeks in some of their earlier expeditions; that of the Argonauts under Jason has the popular credit of having introduced it. However this may be, the name given to the bird by the Greeks, of which all our modern European names for it are merely corruptions, points to the banks of the Phasis as the place from which it was derived; and to the present day the pheasants of Mingrelia (the Colchis of the ancients) are celebrated for their beauty and size. Extreme brilliancy of plumage is in general the characteristic of birds dwelling in torrid regions beneath a glowing sky; such is not the case as it regards the most gorgeous and beautiful of the pheasant tribe. On the contrary, the high mountains of the Himalaya, bordering upon the limits of perpetual snow, are tenanted by the most splendid of this family. The Impeyan pheasant is an example in point: adapted for regions where the temperature is at the most only moderate, and often at a low degree, this noble bird soon dies when taken from its alpine home into the burning lowlands of India; and hence arises one of the difficulties in the way of our obtaining living specimens here. But besides the Impeyan pheasant, the Himalaya chain of mountains presents us with a group or genus of this family, containing a very limited number of species remarkable both for their great beauty and their characters, which indicate an affinity to the turkeys, between which group and that of the genuine pheasants, they constitute an intermediate link. The genus to which we allude is that termed *Tragopan* (Cuvier), of which three species only are known. They are easily distinguishable from all the rest by the presence of large throat-wattles, or naked carunculated flaps of skin, (resembling those of the turkey,) which extend from the naked cheeks, spread over the throat, and proceed down each side of the neck, while from behind each eye rises a soft fleshy horn. The whole of these appendages are capable of being contracted and dilated at pleasure, or at least in accordance with the emotions of anger, fear, &c., as we see in the male turkey: the tints of the horns and wattles are rich purple, mingled with scarlet, and are most probably changeable from one hue to another. The tail is broad and rounded, and the plumage is dotted with round spots of white on a brown or red ground, the effect of which is very pleasing.

THE MOCKING-BIRD,

WHICH, in extent and variety of vocal powers, stands unrivaled by the whole feathered songsters of America or perhaps any other country, is peculiar to the New World; and inhabits a very considerable extent of both North and South America, having been traced from the States of New England to Brazil, and also among many of the adjacent islands. They are, however, much more numerous in those States south than those north of the river Delaware; being generally migratory in the latter, and resident (at least many of them) in the former. A warm climate, and low country not far from the sea, seems most congenial to their nature; the species are accordingly found to be less numerous to the west than east of the great Alleghany range, in the same parallels of latitude. In these regions the berries of the red cedar, myrtle, holly, many species of smilax, together with gum berries, gall berries, and a profuse variety of others, abound, and furnish them with a perpetual feast. Winged insects also, of which they are very fond and very expert in catching, are there plentiful even in the winter season.

The precise time at which the mocking-bird begins to build his nest varies according to the latitude in which he resides, from the beginning of April to the middle of May. There are particular situations to which he gives the preference. A solitary thorn-bush, an almost impenetrable thicket, an orange-tree, cedar or holly-bush, are favorite spots, and frequently selected. It is no great objection to the bird that a farm or mansion-house happens to be near; always ready to defend, but never over-anxious to conceal, his nest, he very often builds within a small distance of the house, and not unfrequently in a pear or apple-tree, rarely at a greater height than six or seven feet from the ground. The nest varies a little according to the conveniency of collecting suitable materials. Generally it is composed of, first, a quantity of dry twigs and sticks, then withered tops of weeds of the preceding year, intermixed with fine straw, hay, pieces of wool and tow; and, lastly, a thick layer of fine fibrous roots, of a light brown color, lines the whole. The female sits fourteen days, and generally produces two broods in the season, unless robbed of her eggs, in which case she will even build and lay the third time. She is, however, very jealous of her nest, and very apt to forsake it if much disturbed.

During the period of incubation, neither cat, dog, animal nor man can approach the nest without being attacked. The cats, in particular, are persecuted whenever they make their appearance, till obliged to retreat. But his whole vengeance is more particularly directed against that mortal enemy of his eggs and young, the black snake. Whenever the insidious approaches of this reptile are discovered, the male darts upon it with the rapidity of an arrow, dexterously eluding its bite and striking it violently and incessantly about the head, where it is very vulnerable. The snake soon becomes sensible of its danger, and seeks to escape; but the intrepid defender of his young redoubles his exertions, and, unless his antagonist be

of great magnitude, often succeeds in destroying him. All his pretended powers of fascination avail nothing against the vengeance of this noble bird. As the snake's strength begins to flag, the mocking-bird seizes and lifts it up partly from the ground, beating it with its wings, and when the business is completed, he returns to the nest of his young, mounts the summit of the bush, and pours forth a torrent of song in token of victory.

The mocking-bird is nine inches and a half long and thirteen across when its wings are spread. Some individuals are, however, larger and some smaller, those of the first hatch being uniformly the largest. The upper parts of the head, neck, and back are a dark brownish ash, and when new moulted, a fine light gray; the wings and tail are nearly black, the first and second rows of coverts tipped with white; the primary, in some males, are wholly white, in others tinged with brown. The first three primaries are white from their roots as far as their coverts; the white on the next six extends from an inch to one and three-fourths farther down, descending equally on each side the feather; the tail is cuneiform; the two exterior feathers wholly white, the rest, except the middle ones, tipped with white; the chin is white; sides of the neck, breast, belly, and vent, a brownish white, much purer in wild birds than in those that have been domesticated; iris of the eye, yellowish cream colored, inclining to golden; bill black; the base of the lower mandible whitish; legs and feet black and strong. The female much resembles the male, and is only distinguishable by the white of her wings being less pure and broad, and her black feathers having a more rusty hue.

It will be seen from this description, that though the plumage of the mocking-bird is none of the homeliest, it has nothing gaudy or brilliant in it; and, had he nothing else to recommend him, would scarcely entitle him to notice. But his figure is well proportioned and even handsome. The ease, elegance, and rapidity of his movements, the animation of his eye, and the intelligence he displays in listening and laying up lessons, from almost every species of the feathered creation within his hearing, are really surprising, and mark the peculiarity of his genius. To these qualities may be added that of a voice full, strong, and musical, and capable of almost every modulation, from the clear, mellow tones of the wood-thrush to the savage scream of the bald eagle. In measure and accent he faithfully follows his originals; in force and sweetness of expression he greatly improves upon them. In his native groves, mounted on the top of a tall bush or half-grown tree, in the dawn of the morning, while the woods are already vocal with a multitude of warblers, his admirable song rises preëminent over every competitor. The ear can listen to his music alone, to which that of all the others seems a mere accompaniment. Neither is his strain altogether imitative. His own native notes are bold and full, and varied seemingly beyond all limits. They consist of short expressions of two, three, or, at the most, five or six syllables, generally interspersed with imitations, and all of them uttered with great emphasis and rapidity, and continued with undiminished ardor for half an hour or an hour at a time. His expanded wings and tail, glistening with white, and the buoyant gaiety of his action, arresting the eye as his song most irresistibly does the ear, he sweeps round with enthusiastic ecstacy, and mounts and descends as his song swells or dies away. While thus exerting himself, a bystander, destitute of sight, would suppose that the whole feathered tribes had assembled

together on a trial of skill, each striving to produce his utmost effect. He often deceives the sportsman, and sends him in search of birds that are not, perhaps, within miles of him, but whose notes he exactly imitates: even birds themselves are frequently imposed upon by this admirable mimic, and are decoyed by the fancied calls of their mates, or dive with precipitation into the depth of thickets at the scream of what they suppose to be the sparrow-hawk.

The mocking-bird loses little of the power and energy of his song by confinement. In his domesticated state, when he commences his career of song, it is impossible to stand by uninterested. He whistles for the dog; Cæsar starts up, wags his tail, and runs to meet his master. He squeaks like a hurt chicken, and the hen hurries about with hanging wings and bristled feathers, chuckling to protect its injured brood. The barking of the dog, the mewing of the cat, the creaking of a passing wheelbarrow, follow with great truth and rapidity. He repeats the tune taught him by his master, though of considerable length, fully and faithfully; he runs over the quaverings of the canary, and the clear whistlings of the Virginia nightingale, or red-bird, with such superior execution and effect that the mortified songsters feel their own inferiority, and become altogether silent, while he seems to triumph in their defeat by redoubling his exertions.

This excessive fondness for variety, however, in the opinion of some, injures his song. His elevated imitations of the brown thrush are frequently interrupted by the crowing of cocks; and the warblings of the blue-bird, which he exquisitely manages, are mingled with the screaming of swallows or the cackling of hens. Amidst the simple melody of the robin one is suddenly surprised by the shrill reiterations of the whippoorwill, while the notes of the kildeer, blue-jay, martin, baltimore, and twenty others, succeed, with such imposing reality, that the auditors look round for the originals, and with astonishment discover that the sole performer in this singular concert is the admirable bird now before us. During this exhibition of his powers, he spreads his wings, expands his tail, and throws himself around the cage in all the ecstacy of enthusiasm, seeming not only to sing but to dance, keeping time to the measure of his own music. Both in his native and domesticated state, during the stillness of the night, as soon as the moon rises, he begins his delightful solo, making the whole neighborhood resound with his inimitable medley.

The mocking-bird is frequently taken in trap-cages, and, by proper management, may be made sufficiently tame to sing. The usual price of a singing-bird is from seven to fifteen, and even twenty dollars. Fifty dollars have been paid for a remarkably fine singer; and in one instance a hundred dollars were refused for a still more extraordinary one. Attempts have been made to induce these charming birds to pair, and rear their young in a state of confinement, and the result has been such as to prove it, by proper management, perfectly practicable.

THE PASSENGER PIGEON.

THIS remarkable bird inhabits a wide and extensive region of North America, spreading over the whole of Canada, and extending to the Gulf of Mexico southward, while the Stony Mountains appear to limit its westward range. In the United States it occasionally visits and breeds in almost every quarter.

The passenger-pigeon is sixteen inches long, and twenty-four in extent, and it is in this circumstance of size, and that of plumage, that we are chiefly to look for the distinguishing external difference between this and other species of the pigeon. A light slate color predominates in the head and upper part of the neck, and a darker slate in the back, wings, and rump coverts. The throat, breast, and sides, as far as the thighs, are of a reddish hazel; the lower part of the breast and the thighs, fade into a brownish red; and the belly and the vent are white. The lower part of the neck and sides are of a resplendent gold, green, and purplish crimson, the latter most predominant. The tail is long, and all the feathers taper towards the point; the two middle ones are plain, deep black; the other five on each side hoary white, lightest at the tips, and deepening into bluish near the basis. The bastard wing is black; the legs and feet are bare seamed with white. The female is about half an inch shorter than the male, and an inch less in extent; she resembles the male generally in color, but less vivid and more tinged with brown.

The most remarkable characteristic of these birds is their associating together, both in their migrations and during the period of incubation, in such prodigious numbers as almost to surpass belief, and which has no parallel among any other feathered tribes on the face of the earth with which naturalists are acquainted.

These migrations appear to be undertaken rather in quest of food than merely to avoid the cold of the climate. The passenger pigeons are found lingering in the northern regions about Hudson's Bay so late as December; and their appearance is casual and irregular. As the beech-nut constitutes the chief food of this wild pigeon, in seasons when it is particularly abundant, corresponding multitudes of pigeons may be confidently expected. It sometimes happens that when they have consumed the whole produce of the beech-trees in one extensive district, they discover another at the distance of perhaps sixty or eighty miles, to which they regularly repair every morning, and return as regularly in the course of the day, or in the evening, to their place of general rendezvous, or, as it is usually called, the *roosting-place*. These roosting-places are always in the woods, and sometimes occupy a large extent of forest. When they have frequented one of these places for some time, the appearance it exhibits is surprising. The ground is covered to the depth of several inches, with their dung—all the tender grass and underwood destroyed—the surface strewed with large limbs of trees, broken down by the weight of the birds clustering one above another—and the trees themselves for thousands of acres, killed as com

THE PASSENGER PIGEON.

pletely as if girdled with an axe. The marks of this desolation remain for many years on the spot; and numerous places could be pointed out where for several years after, scarce a single vegetable made its appearance. When their roosting places are first discovered, the inhabitants from considerable distances visit them in the night with guns, long poles, clubs, pots of sulphur, and various other instruments of destruction, and in a few hours fill many sacks and load their horses with them.

The breeding-place differs from the roosting-place in its greater extent. In the western countries these are generally in beech-woods, and often extend in nearly a straight line, across the country, for a very great way. One is mentioned in the State of Kentucky which stretched through the woods in nearly a north and south direction, was several miles in breadth, and said to be nearly forty in length. In this tract almost every tree was furnished with nests wherever the branches could accommodate them, a single tree frequently containing more than a hundred. At this place the pigeons made their first appearance about the tenth of April and left it altogether, with their young, before the 25th of May.

The nest of the wild pigeon is formed of a few dried, slender twigs, carelessly put together, and with so little concavity, that the young, when only half grown, can be easily seen from below. All accounts agree in stating that each nest contains only one young squab; but it is asserted that the pigeon breeds three or four times in the course of the same season. The young are so exceedingly fat, that the Indians, and many of the whites, are accustomed to melt down the fat for domestic purposes as a substitute for butter and lard.

As soon as the young are fully grown, and before they leave their nests, numerous parties of the inhabitants of the neighboring country often come with wagons, axes, beds, cooking utensils, many of them accompanied by the greater part of their families, and encamp for several days in these immense nurseries. It is said that the noise in the wood is so great as to terrify the horses; and when a person speaks he finds it difficult to make himself heard without bawling in the ears of those whom he addresses. The ground is strewed with broken branches, eggs, and young squab pigeons which have been precipitated from above, and on which herds of hogs fatten themselves. Great numbers of hawks, buzzards, and sometimes the bald eagle himself, hover about and seize the old or the young from the nests amidst the rising multitudes, and with the most daring effrontery. From twenty feet upwards to the tops of the trees the view through the woods presents a perpetual tumult of crowding and fluttering multitudes of pigeons. The noise of their wings is mingled with the frequent crash of falling timber; for the axe-men cut down those trees which seem to be most crowded with nests, and contrive to fell them in such a manner that in the descent they may bring down several others. The falling of one large tree sometimes produces 200 squabs little inferior in size to the old ones, and almost one mass of fat.

From the account given of the flight of vast flocks of the passenger-pigeon, it would appear as if they were hardly exceeded in extent or number by those of the locusts in the East. Mr. Wilson, the ornithologist, mentions some of these flights that he himself saw. On one occasion he was on his way to Frankfort, in Kentucky, where, about one o'clock, he saw a flock of pigeons, more immense in its numbers than any he had ever

witnessed, which flew in a compact body of several strata deep, at a height beyond gun-shot, with great rapidity and steadiness. The breadth of this vast possession extended from right to left so far as the eye could reach, and seemed greatly crowded in all its parts. Curious to determine how long this appearance would continue, Mr. Wilson took out his watch to note the time, and sat down to observe them. He waited more than an hour, but perceiving that this prodigious procession seemed rather to increase than diminish in numbers and rapidity, and being anxious to reach his destination before night, he went on. When he reached Frankfort, about four hours after he first saw the flock, the living torrent over his head seemed as numerous and extensive as ever. On a subsequent occasion Mr. Wilson reverts to this flock, and makes the following curious calculation. If we suppose the column to have been one mile in breadth, (and he believes it to have been much more,) and that it moved at the rate of one mile in a minute; four hours, the time it continued passing, would make the whole length 240 miles. Again, supposing that each square yard of this moving body comprehended three pigeons, the square yards in the whole space multiplied by three, would give 2,230,272,000 pigeons!

In the Atlantic States, though they never appear in such unparalleled multitudes, they are sometimes very numerous, and great havoc is made among them with the gun, the clap net, and various other implements of destruction. As soon as it is ascertained in a town that the pigeons are flying numerously in the neighborhood, the gunners rise *en masse;* the clap nets are spread out in suitable situations, and some live pigeons being made to flutter on a stick as birds just alighted, numbers of the passing flock are induced to descend and feed on the corn, buckwheat, &c., which they find strewed about; and, while thus engaged, the pulling of a cord covers them with the net—sometimes ten, twenty, or thirty dozen are taken at one sweep. Meantime the air is darkened with large bodies of them moving in various directions; the woods also swarm with them in search of acorns; and the thundering of the musketry is perpetual on all sides from morning till night. Wagon loads of them are poured into the market, where they sell from fifty to twenty-five, and even twelve cents per dozen; and pigeons are universally found at breakfast, dinner, and supper, until the very name becomes sickening. When they have been kept alive and fed for some time on corn and buckwheat, their flesh acquires great superiority; but in their common state they are far inferior to the full grown young ones or squabs.

THE WILD TURKEY.

FROM the north-western territory of the United States to the isthmus of Panama constitutes the native country of the wild turkey; south of the isthmus it is not to be found. In Canada, and the now densely peopled parts of the United States, this bird was formerly very abundant; but the progress and aggressions of man have compelled them to seek refuge in the remote interior. It is not probable that the range of the wild

turkey extends to or beyond the Rocky Mountains. The Mandan Indians, who a few years ago visited the city of Washington, considered it one of the greatest curiosities they had seen, and prepared a skin of one to carry home for exhibition.

It is not necessary to be particular in describing the appearance of a bird so well known in its tame state. The difference consists chiefly in the superior size and beauty of plumage in the wild turkey; for, under the care of man, this bird has greatly degenerated, not only in Europe and Asia, but in its native country. When full grown, the male wild turkey is nearly four feet in length and nearly five in extent, from wing to wing, and presents, in its plumage, a rich assortment of colors, brown predominating, which might be vainly sought in the domesticated bird. Altogether, his appearance is such as, with other considerations, disposed Dr. Franklin to regret that he, rather than the bald eagle, had not been selected as the national emblem of the United States. But since the choleric temper and the vanity of the tame turkey have become proverbial in various languages, the authors of "American Ornithology" are well pleased that its effigy was not placed on the North American escutcheon.

The wild turkeys do not confine themselves to any particular food; they eat maize, all sorts of berries, fruits, grasses, beetles; and even tadpoles, young frogs, and lizards are occasionally found in their crops; but where the pecan nut is plenty, they prefer that fruit to any other nourishment. Their more general predilection, however, is for the acorn, on which they rapidly fatten. When an unusually profuse crop of acorns is produced in a particular section of country, great numbers of turkeys are enticed from their ordinary haunts in the surrounding districts. About the beginning of October, while the mast still remains on the trees, they assemble in flocks and direct their course to the rich bottom lands. At this season they are observed in great numbers on the Ohio and Mississippi. The time of this irruption is known to the Indians by the name of the *Turkey month.*

The males, usually termed *gobblers*, associate in parties numbering from ten to one hundred, and seek their food apart from the females; whilst the latter either move about singly with their young, then nearly two-thirds grown, or—in company with other females and their families—form troops, sometimes consisting of seventy or eighty individuals. They are all intent on avoiding the old males, who, whenever opportunity offers, attack and destroy the young, by repeated blows on the skull. All parties, however, travel in the same direction, and on foot, unless they are compelled to seek their individual safety by flying from the dog of the hunter, or their progress is impeded by a large river. When about to cross a river, they select the highest eminences, that their flight may be the more certain; and here they sometimes remain for a day or more, as if for the purpose of consultation, or to be duly prepared for so hazardous a voyage. During this time the males gobble obstreperously, and strut with extraordinary importance, as if they would animate their companions, and inspire them with hardihood. The females and young also assume much of the pompous air of the males, the former spreading their tails and moving silently around. At length the assembled multitude mount to the tops of the highest trees, whence, at a signal note from a leader, the whole together wing their way towards the opposite shore. Immediately after these birds have succeeded in crossing a river, they for some time ramble about without any apparent

THE WILD TURKEY.

unanimity of purpose, and a great many are destroyed by the hunters, though they are then least valuable.

When the turkeys have arrived in their land of abundance, they disperse in small flocks, composed of individuals of all ages and sexes intermingled, who devour all the mast as they advance; this occurs about the middle of November. It has been observed that, after these long journeys, the turkeys become so familiar as to venture on the plantations, and even approach so near the farm houses as to enter the stables and corn cribs in search of food. In this way they pass the autumn and part of the winter. During this season great numbers are killed by the inhabitants, who preserve them in a frozen state, in order to transport them to a distant market.

Early in March they begin to pair. The sexes roost apart, but at no great distance, so that when the female utters a call, every male within hearing responds, rolling note for note, in the most rapid succession; not as when spreading the tail and strutting near the hen, but in a voice resembling that of the tame turkey, when he hears any unusual or frequently repeated noise. Where the turkeys are numerous, the woods, from one end to the other, sometimes for hundreds of miles, resound with this remarkable noise, uttered responsively from their roosting places. This is continued for about an hour; and, on the rising of the sun, they silently descend from their perches, and the males begin to strut, as if to win the admiration of their mates. Their process of approach to the females is remarkably pompous and ceremonious; and, in its course, the males often encounter one another, and desperate battles ensue, when the conflict is only terminated by the flight or death of the vanquished. With the hen whose favor is thus obtained the male is mated for the season, though he does not hesitate to bestow his attentions on several females whenever an opportunity offers. One or more females, thus associated, follow their favorite and rest in his immediate neighborhood, if not on the same tree, until they begin to lay, when they shun their mates, in order to save their eggs, which the male uniformly breaks if in his power. At this period the sexes separate, and the males, being much emaciated, retire and conceal themselves by prostrate trees, in secluded parts of a forest, or in the almost impenetrable privacy of a canebrake. By thus retiring, using very little exercise, and feeding on peculiar grasses, they recover their flesh and strength, and, when this object is attained, again congregate and re-commence their rambles.

About the middle of April, when the weather is dry, the female selects a proper place in which to deposit her eggs, secured from the encroachment of water, and as far as possible concealed from the watchful eye of the crow. The nest is placed on the ground, either on a dry ridge, in the fallen top of a dead leafy tree, under a thicket of sumach or briars, or by the side of a log; it is of a very simple structure, being composed of a few dry leaves. In this receptacle the eggs are deposited, sometimes to the number of twenty, but more usually from nine to fifteen; they are like those of the domestic bird.

The female uses great caution in the concealment of her nest; she seldom approaches it twice by the same route; and on leaving her charge, she is very careful to cover the whole with dried leaves in such a manner as to make it difficult, even for one who has watched her motions, to indicate the

exact spot. Nor is she easily driven from her post by the approach of apparent danger; but if an enemy appears, she crouches as low as possible and suffers it to pass. They seldom abandon their nests on account of being discovered by man; but should a snake or other animal suck one of the eggs, the parent leaves them altogether. If the eggs be removed she again seeks the male and re-commences laying, though otherwise she lays but one set of eggs during the season. Several turkey hens sometimes associate, perhaps for mutual safety, deposit their eggs in the same nest, and rear their broods together. Mr. Audubon once found three females sitting on forty-two eggs. In such cases the nest is commonly guarded by one of the parties, so that no crow, raven, or even polecat dares approach it. The mother will not forsake her eggs, when near hatching, while life remains; she will suffer an enclosure to be made around and imprison her rather than abandon her charge.

As the hatching generally occurs in the afternoon and proceeds but slowly, the first night is commonly spent in the nest; but afterwards the mother leads them to elevated dry places, as if aware that humidity, during the first few days of their life, would be dangerous to them, they having then no other protection than a delicate, soft, hairy down. In rainy seasons wild turkeys are scarce, because when completely wetted the young rarely survive. At the expiration of about two weeks the young follow their mother to some low, large branch of a tree, where they nestle under her broadly curved wings. The time then approaches when they seek the open ground or prairie land during the day, in search of berries and grasshoppers, thus securing a plentiful supply of food and enjoying the genial influence of the sun. The young turkeys now grow rapidly, and in the month of August, when several broods flock together and are led by their mothers into the forest, they are stout, and able to secure themselves from the unexpected attacks of their enemies, by rising quickly from the ground, and reaching with ease the upper limbs of the tallest tree.

It is rather surprising that, though the introduction of this bird into Europe is comparatively modern, its origin has been so much lost sight of, that eminent naturalists of the last century expressed themselves with great uncertainty concerning its native country. Thus Belon, Aldrovand, Gessner, Ray, and others, thought that it came originally from Africa and the East Indies, and endeavored to recognize it in some of the domestic birds of the ancients. But its American origin is now clearly ascertained. This bird was sent from Mexico to Spain early in the 16th century, and from Spain it was introduced into England in 1524. Since that period they have been bred with so much care, that in England, as we read in ancient chronicles, their rapid increase rendered them attainable at country feasts, where they were a much esteemed dish, so early as 1585.

THE CASTOR-OIL PLANT

BELONGS to an order whose affinities have not yet been accurately limited by botanists; but it is supposed to comprise at least 1500 species, distributed in each quarter of the globe from the equator to latitudes as high as Great Britain; "sometimes," as Professor Lindley

remarks, "in the form of large trees, frequently of bushes, still more usually of diminutive weeds, and occasionally of deformed, leafless, succulent plants, resembling the cacti in their port." The *ricinus communis* becomes an annual in our climate, and its stem and branches are said to lose their ligneous nature, and afterwards, on being placed in a hot-house, to reässume their former characteristics. At Villefranche, near Nice, there were, in 1818, specimens in the open air above thirty feet high, which it was believed were the only instances in Europe of the species growing in an arborescent form. The tropical latitudes of Asia, Africa, and America, are the regions in which it is indigenous, and of course most flourishing.

The properties of the order of plants to which the *ricinus communis* belongs are remarkably varied, and highly valuable on account of their medical uses. Both Jussieu and Lindley have enumerated them in their respective systems of botany. The peculiar virtues of the plant reside principally in a milky secretion which it produces, the strength and efficacy of which are determined by the secretion being more or less copious. Some of the species exhale an aromatic odor, others a disagreeable and pungent one. The flowers of some may be used in preparing a decoction possessing useful tonic properties; in others, the leaves are sudorific; and again, the juice and root of some of the species may be taken as an emetic. The properties of the plant range from gentle and beneficial stimulants to rank poison; the nature of the poison, however, frequently being so volatile as to be deprived of its baneful effects by the action of fire; so that the roots of some species which would be destructive of life if eaten in their natural state, become, after cooking, a nutritious food for sustaining and invigorating it. The preparation called turnsol is obtained from one of the plants of this order, so named from its turning its flowers to the sun; and caoutchouc is supplied by others of this widely diversified genus.

The *ricinus communis*, or castor-oil plant, is highly valuable for the excellent medical virtues of the oil which it furnishes: its root is said to be diuretic. The positions of the flowers are shown in the accompanying cut; but it is from the seeds that the oil is extracted, three of which, of an oblong, flattish form, are inclosed in each receptacle. The oil is prepared chiefly in the East Indies, and in the West India Islands, the United States, and also in the south of Europe.

In America, the seeds being stripped of their covering, are boiled about six hours in a considerable quantity of water, and the oil, as it rises to the surface in a white and frothy state, is carefully skimmed off. Successive boilings and straining in a canvass bag, bring it to the necessary degree of fineness and purity.

The oil which has been what is called "cold drawn," is generally held in the highest estimation. This method consists in the seeds being bruised in a mortar, in order to express the oil, the whole being afterwards tied up in linen bags, and strained until the oil separates from the bruised seeds.

A French chemist has proposed a third method of extracting the oil, founded on the circumstance of its remaining insoluble in alcohol.

The best castor-oil is of a pale straw color, and the more limpid it is the better are its qualities. The use of castor-oil in medicine is not of very old date; but not only are its excellencies generally acknowledged, but in some respects its properties are to be found in no other medicine. It was

THE CASTOR OIL PLANT.

formerly believed that the mode adopted for obtaining the oil by bruising the seeds was the means of rendering it harsh and acrid; but some French chemists, who made experiments both on the seed and its rind, found that the quality of the oil was not injured from the cause which had been supposed, but that some mismanagement attending the preparation, and which might occur under either system, occasioned the decomposition of a small portion of the essential properties of the oil.

THE JACA-TREE.

ONE of the most interesting as well as singular productions of the vegetable kingdom, is the bread-fruit tree, originally found in the southeastern 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. There are two species of it:—the bread-fruit, properly so called, with the leaves deeply gashed, or divided at the sides, which grows chiefly in the islands;—and the jack-fruit, or Jaca-tree, which grows chiefly in the main land of Asia.

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-colored, 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 color. 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 color, 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.

The bread-fruit tree continues productive for about eight months in 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. When the fruit is roasted until the outside is charred, the pulp has a consistency not unlike that of wheaten bread, and the taste is intermediate between that of bread and roasted chestnuts. It is said to be very nourishing, and is prepared in various ways.

The timber of the bread-fruit tree, though soft, is found useful in the construction of houses and boats; the male flower, dried, serves for tinder, and the juice answers for bird-lime and glue; the leaves for packing and

THE JACA TREE.

for towels; and the inner bark, beaten together, makes one species of the South-sea cloth.

The Jaca or Jack, which is represented in our engraving, 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-leaved, 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 in 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 DATE-PALM.

IN the countries that are congenial to its growth, the date is one of those plants which 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 more 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 Atlantic to the confines of Persia, an extent of nearly four thousand miles. The shores, the banks of the rivers, and every part of the region in which there is humidity, are exceedingly fertile; and even with unskillful 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 on which man can subsist. Over the lowly vegetables, of a saline and succulent description, which appear on this soil, 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 anything 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; and upon the last plain, as the desert is approached, and 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. 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 traveler may in general be sure that he shall find a fountain ready to afford him its cooling water.

Although there are some palms more majestic, the date-palm is still a beautiful tree. Its stem 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 length. 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 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 ten 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 towards 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.

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 diæcious 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 having stamens in their centres, have the rudiments of 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. Wild dates impregnate themselves; but the cultivated ones do not without the assistance of art. In every plantation of cultivated dates, one of the labors 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, although the male and female trees are

growing in the same plantation, the crops 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 neighborhood of Cairo did not yield a crop in 1800. The French and Turkish troops having been fighting all over the country in the spring, field-labor of every kind was suspended, and, among the rest, the fecundation of the date. The female date-trees put forth their bunches 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 insure fructification, an almost universal failure was the consequence. Michaux relates an instance in which the male date-trees of a whole province were wantonly destroyed by an invading army; but the inhabitants, who were apprehensive of such a result, having previously taken the precaution of collecting and preserving the pollen in close vessels, were enabled to impregnate the female flowers with it after the country was cleared from the destroying army. It is said that the pollen had thus preserved its powers during nineteen years.

Four or five months after the operation of fecundation has been performed, the dates begin to swell; and when they have attained to nearly their full size, they are carefully tied to the base of the leaves, to prevent them from being bruised or beaten 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 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 travelers in the desert often carry with them a little bag of dried dates, as their only or their chief sustenance during journeys of many hundred miles. In some parts of the East, the dates that fall from the cultivated trees are left upon the ground for the refreshment of the wayfaring man.

In the Hedjaz, as Burckhardt informs us, (and the observation applies very generally to other date countries,) 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 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 as 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 fit 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 Mohammedan countries, and answers the same purpose of false excitement as the various kinds of fermented liquors and distilled spirits used by other nations. Palm-wine is also made from the date, and is also without the statute of the prophet. It is the sap of the tree, and can only be obtained by its destruction, so that such trees only as as are unproductive are selected for the purpose of obtaining it. The time chosen for the 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 completely dry by the operation, is cut down for firewood, or for some 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; and, 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 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 chestnut; but, like the palm-juice, it is obtained only by the destruction of the tree, and therefore it is not taken except from those trees that 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 its fibrous nature makes it easily split lengthwise into threads. The medullary part is much more abundant and soft towards the centre of the tree than towards the circumference, and therefore 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 tree is partly farinaceous, and soluble in water; and a nutricious substance may be obtained from it, resembling in consistency the sago which is obtained from another kind of palm. In the proper date-tree the quantity of this is small, and the quality not good; and is, in both respects, much exceeded by a smaller species of palm, a native of the East Indies.

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, bags, fans, brooms, panniers and mats. The stem of the leaf, which forms a long and tapering rod or staff, serves many useful purposes. At Bagdad it is a trade to work them up into all sorts of domestic articles, such as bedsteads, couches, cages, and even tables and stools. When an even and solid surface is desired, the sticks are laid side by side, and then the surface planed to something of a level. The circular boats of the Tigris and

Euphrates are so entirely made from the leafstem and leaflets of the date-tree. The former serves for ribs, which are interwoven with the leaflets, the whole being afterwards coated with bitumen. 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 Gulf of Genoa.

The cutivation of the date-tree is an object of the highest importance in the countries of the east. In the interior of Barbary,—in a 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.

A pleasant anecdote was related to Sir John Malcolm, which will serve to illustrate the indispensable character of this tree in the eyes of the Arabs, to whom indeed it seems to occupy much the same place in the vegetable kingdom as the camel does in the animal; and to be in an equal, perhaps a superior degree, a beautiful provision of nature for their wants and the peculiar physical circumstances of the country they inhabit. The story runs thus:—"Some time since an Arab woman, a native of Abusheher, went to England with the children of a Mr. Beauman. She remained in your country four years. When she returned, all gathered round her to gratify their curiosity about England. "What did you find there? Is it a fine country? Are the people rich? Are they happy?" She answered, "The country was like a garden; the people were rich, had fine clothes, fine houses, fine horses, fine carriages, and were said to be very wise and happy." The audience were filled with envy of the English, and a gloom spread over them which showed discontent at their own condition. They were departing with this sentiment when the woman happened to say, "England certainly wants one thing?"—"What is that?" said the Arabs eagerly. "There is not a single date-tree in the whole country!" Are you sure?" was the general exclamation. "Positive!" said the old nurse; "I looked for nothing else all the time I was there, but I looked in vain." This information produced an instantaneous change of feeling among the Arabs; it was pity, not envy, that now filled their breasts, and they went away wondering how men could live in a country where there were no date-trees."

Our engraving represents a wild date-palm, found by MM. Leon and Laborde in the Sinai mountains. It exhibits none of the elegance of form under which the palm-tree is usually represented, and which is commonly supposed its proper characteristic, although actually caused by art,—the simple art of cutting away year by year the lower branches, or rather leaves, as the tree ascends in its growth. This not being attended to, a rampart is formed with the decayed branches, and the tree continues to grow from the midst of its own *debris*. Neglected by the desert Arab, who considers all culture as below his dignity, the palm-trees sometimes form impenetrable forests; but more frequently insolated near some spring, as in the engraving, it stands a most cheering beacon to the traveler, promising on the one hand water whereby his thirst may be appeased, and on the other grateful shade under which he may repose.

GIGANTIC CHESTNUT TREE.

ONE of the most celebrated trees in the world, is the great chestnut tree of Mount Ætna, of which the accompanying engraving is a representation, as it existed in 1784; it is known by the name of the *Castagno de cento cavalli*, (the chestnut tree of a hundred horses.) A tradition says that Jane, Queen of Arragon, on her voyage from Spain to Naples, landed in Sicily, for the purpose of visiting Mount Ætna; and that being overtaken by a storm, she and her hundred attendants on horseback found shelter within the enormous trunk of this celebrated tree. At any rate the name which it bears, whether the story be true or not, is expressive enough of its prodigous size.

It appears to consist of five large and two smaller trees, which, from the circumstance of the bark and boughs being all outside, are considered to have been one trunk originally. The largest trunk is thirty-eight feet in circumference, and the circuit of the whole five, measured just above the ground, is one hundred and sixty-three feet; it still bears rich foliage, and much small fruit, though the heart of the trunk is decayed, and a public road leads through it wide enough for two coaches to drive abreast. In the middle cavity a hut is built for the accommodation of those who collect and preserve the chestnuts.

This is said, by the natives, to be "the oldest of trees." From the state of decay, it is impossible to have recourse to the usual mode of estimating the age of trees by counting the concentric rings of annual growth, and therefore no exact numerical expression can be assigned to the antiquity of this individual. That it may be some thousand years old, is by no means improbable. Adanson examined in this manner a Baobab tree in Senegal, and inferred that it had attained the age of five thousand one hundred and fifty years; and De Candolle considers it not improbable that the celebrated Taxodium of Chapultepec, in Mexico, which is one hundred and seventeen feet in circumference, may be still more aged.

It is evident that if the great chestnut tree were in reality a collection of trees, as it appears to be, the wonder of its size would at once be at an end. Brydone, who visited it in 1770, says:

"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 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 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 was indeed an appearance as if these five trees had really been once united in one. The opening in the middle is at present prodigous; 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

THE GREAT CHESTNUT TREE.

of any of the stumps, nor on the sides that are opposite to one another. 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 de cento cavalli*, and he assures me, upon his honor, that he found all these stems united below ground in one root."

THE CITY OF YORK.

YORK was certainly a Roman, and, in all probability, was previously a British town, if so we may call one of those collections of huts occupying a cleared-out spot in the midst of the woods, which were the only towns the island had to boast of when in the possession of its first proprietors. The station or settlement, it is most likely, derived its name from the river on the banks of which it was placed, now the Ouse or Ose, but anciently the Oure or Oore, a sound which seems evidently to be present in Eb-*or*-acum, the Latinized form used by the Romans. The *orac* of Eboracum again is no doubt the origin of the modern York.

The Ouse flows through the city of York, the principal part of which, however, stands on the left or east bank of the river, immediately above its junction with the smaller stream called the Fors. Vessels of ninety tons burden can still ascend the Ouse as far as York; but in former times that city used to be accounted one of the chief marts of foreign commerce in the kingdom. From the foundation, however, of the port of Hull by Edward I. towards the close of the thirteenth century, the trade and commercial importance of York began rapidly to decline.

The latter place, nevertheless, retained for a long time after not merely the nominal rank, but the real consequence, of one of the principal towns in the kingdom. York is still the only city in England, except London, whose mayor enjoys the title of lord, for which, among other reasons, it claims to stand next in dignity to the metropolis, and to be accounted the second city in the realm. In the Roman times, however, it may be said to have been, more than London, the capital of the island. The Roman emperors who visited this country for the most part took up their residence at York. Here the emperor Severus died in the year 211, after making York his head-quarters during the three or four preceding years which he spent in the island. Three remarkable mounts, a little west from the city, still bear the name of the Hills of Severus: and many other remains that have been discovered in later ages attest the Roman domination. After the establishment of the Saxon Heptarchy, York became the capital of the kingdom of Northumberland. Although, on the arrival of the Normans, this district, like the rest of the kingdom, quietly submitted in the first instance to the invaders, it was the scene on which, soon afterwards, a struggle was made by a powerful confederacy of Saxon lords and their retainers to regain their independence. This insurrection, however, was

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soon crushed by the activity and energy of the conqueror, who, laying siege to York, starved it into a surrender in six months, and then, after his usual fashion, erected a fortress in the close neighborhood of the town, to keep it for the future in awe. This was the origin of the present castle, situated at the southern extremity of the city, in the angle formed by the confluence of the two rivers. At a little distance is a ruin called Clifford's Tower, which was the keep of the old castle, and took its name from the Cliffords, whom William appointed the first governors of that stronghold. In early times Parliaments were frequently held at York; and in 1299, Edward I. even removed the courts of law from London to this city, where they continued to sit for seven years.

The city of York stands in the midst of an extensive plain, the largest certainly in Great Britain, if not, as has been sometimes asserted, in Europe. Viewed from the immediate neighborhood, the peculiarity which most strikes the eye is the ancient wall by which it is encompassed—supposed to have been built by Edward I., about 1280, on the line of the old Roman fortification. This wall, which had fallen greatly into decay, never having recovered from the damage it sustained when the city was besieged by Sir Thomas Fairfax and General Lesley, in 1644, has been lately repaired, and a walk is now formed along the top of part of it, which is a favorite resort of the inhabitants.

Seen from a greater distance, York presents a crowd of pointed spires shooting up from the midst of the houses, the indications of those numerous parish churches of which it still retains twenty-three out of forty-two which it formerly possessed. Far above all these, however, rise the enormous bulk and lofty towers of the Minster, which stands in the north part of the city, and to the east of the river. In the opposite quarter is the Castle, a large building erected about the beginning of the last century, on the site of the Conqueror's Fortress, and serving as a prison for criminals and debtors. Beside the County Prison are the County Hall and the Courts of Assize. The other principal public buildings are the Mansion House, an elegant structure, erected in 1725; the Guildhall, which dates from the middle of the fifteenth century, and is one of the finest Gothic rooms in England, being ninety-six feet in length by forty-three in breadth and twenty-nine and a half in height; the Council Chamber, built in 1819; the Assembly Rooms, built in 1730; the Theatre, first opened in 1769, and thoroughly repaired in 1822; together with the County Lunatic Asylum, the establishment of the same kind belonging to the Society of Friends, called the Retreat, the County Hospital, the New City Jail, the New City House of Correction, &c. The Archbishop of York has no house in the city, the only residence attached to the see being the Palace at Bishopsthorpe, which stands on the west bank of the Ouse, about three miles farther down the river.

The entire circuit of the walls of York is about three miles and three-quarters, being somewhat less than that of the walls of the City of London. The space within, however, is much less densely occupied by streets and houses than it is in London. In 1831 the population was 25,359, having increased to that amount from 20,787 in the preceding ten years. The streets of York used formerly to be for the most part extremely narrow—many of the houses being built of wood, and, according to the common fashion of that style of architecture, often overhanging the road below with

their upper stories. Many of these ancient edifices, however, have been taken down of late years, and the principal streets widened and otherwise improved. Still the city, in almost every part, wears a look of other times; and could no more be mistaken for a modern town, notwithstanding the modern comforts and elegancies that are to be found here and there interspersed among the relics of the past, than an ancient lady could be mistaken for her grand-daughter because she may be attired in a gown or head-dress of the same fashion.

Among the most important of the recent alterations and repairs which have taken place in York, are to be reckoned those connected with the two rivers on the banks of which it stands. The Fors has been changed from little better than a stagnant ditch, into a clear and ornamental stream; and the navigation of the Ouse, which had been long neglected, has been greatly improved since the commencement of the present century. New bridges have likewise been thrown over both rivers; that over the Fors being a single arch, and that over the Ouse consisting of three elliptical arches, of which the center one is seventy-five, and each of the others sixty-five feet in span. The old bridge which crossed the Fors, was erected about the beginning of the fifteenth century; that of the Ouse is supposed to have been built at the expense of the Archbishop Walter Grey, about the year 1235. It consisted of five pointed arches, and the center arch was supposed to be the largest in Europe, with the exception of that of the Rialto, at Venice. A graveled walk was some years ago formed for about a mile along the left bank of the river, immediately to the south of the bridge, which, being now shaded with lofty elms, and having become a fashionable promenade, is one of the greatest ornaments of the city.

In a description of York, its ancient gates ought not to be forgotten. They are four in number, namely, Micklegate Bar to the south-west, over the entry from London; Walmgate Bar to the south-east, Monk Bar to the north-east, and Bootham Bar to the north-west, facing the great road from Scotland. All these structures are at least as old as the thirteenth century; and the inner arch of the Micklegate Bar, which is a portion of a circle, is supposed to be of the Roman times. Besides the four principal gates, there were formerly also five posterns, or smaller and more private entrances, but two of them, the Skeldergate and Castlegate posterns have, within these few years, been taken down.

THE MANGO TREE.

INDIA and the south-western countries of Asia, Brazil and the West Indies, produce the Mango tree in great abundance. It was introduced into Jamaica in the year 1782. It is a large tree, attaining the height of thirty or forty feet, with thick and wide-extended branches, and has been compared to the oak, in its manner of the growth. The leaves are scattered, stalked, simple, about a span long and an inch or two wide, wavy, entire tapering at each end, veiny, smooth, and shining.

THE MANGO TREE.

THE MAMMEE TREE.

The flowers are small and whitish, formed into pyramidal branches; the fruit has some resemblance to a short thick cucumber, and, on the average of the varieties, of which there are many, about the size of a goose egg. At first the fruit is of a green color, and in some of the varieties it continues so, while others become partly or wholly orange. When ripe, the mango emits a smell which is very pleasant, and the flavor of it then is exceedingly gratifying. 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 the peach, to which the pulp adheres firmly. In one variety of the mango, however, the stone does not exist.

The varieties of the mango are numerous. Upwards of eighty are cultivated, and the size of the trees and the quality of the fruits vary according to the countries where they grow, and the circumstances of their situation. While the fruit, as a whole, is one of the most delicious of vegetable products, in some varieties it is so deteriorated as to have been, rather disparagingly, perhaps, compared to a "mixture of tow and turpentine." The Mangos of Asia are said to be much superior in size and flavor 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 largest variety is the "mango dodol," the fruit of which weighs upwards of two pounds.

Travelers and residents in the East speak in warm terms of the mango, as by far the best fruit that is generally produced in those regions, and as that which is most uniformly grateful to an European palate. The fruit is variously used. Sometimes it is cut into slices and eaten with or without wine, or macerated in wine; it is also candied, in order to its preservation; and it is frequently opened with a knife, and the middle filled up with fresh ginger, garlick, mustard, and salt, with oil or vinegar, that it may be eaten with rice, or after the manner of pickled olives.

The several parts of the tree are all applied to some use by the Hindoos. The wood is consecrated to the service of the dead; some employ it to construct the funeral piles with which the bodies are consumed, and others the coffins in which they are inclosed for burial. The stalks supply the place of areca or cuanga in the chewing of betel. From the flour of the dried kernels various kinds of food are prepared. To the leaves, flowers, bark, &c., many medicinal virtues are attributed, which it is not necessary to enumerate here.

THE MAMMEE TREE.

THE mammee tree belongs to the family of the *guttiferæ*, the same with that of the *mœngostan*. It is a native of the West Indies, where it grows to a large tree—sixty or seventy feet in height. Browne states that it is one of the largest in Jamaica; that it affords excellent timber, and abounds with a resinous gum. 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, either in shape or size, one of the largest russet apples. The outer rind, which easily peels off, is thick and leathery; beneath this is a second very delicate coat, which adheres closely to the pulp, and should be carefully removed before eating the fruit, as it leaves a bitter taste in the mouth, which, though not very strong at first, it is said will continue for two or three days. 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 but very peculiar flavor. It is eaten either raw and alone, or cut into slices with wine or sugar, or preserved in syrup. To people with weak stomachs, it is said to be more delicious than healthful; but still it is highly prized, and abundant in the West India markets. A liquor called *San Creole* is also obtained from its flowers in Martinique by distilling them with spirits. The mammee was found by Don in the vicinity of Sierra Leone; but whether native there, or imported from America, cannot be ascertained.

STONEHENGE.

STONEHENGE is the most remarkable ancient monument now remaining in England; nor, indeed is there known anywhere to exist so stupendous an erection of the same character. Even in its present half-ruined state, the venerable pile retains a majesty that strikes, at the first glance, both the most refined and the rudest eye: and the admiration of the beholder grows and expands as a more distinct conception of the original plan of the structure gradually unfolds itself from amidst the irregular and confused mixture of the standing and the fallen portions, which for a short time perplexes the contemplation. It is then felt to be the produce, not only of great power and skill, but of a grand idea.

The situation is a highly commanding one. Stonehenge stands at a short distance north-west from the town of Amesbury, on the brow of one of those broad and gentle elevations which in many places slightly undulate the vast level of Salisbury Plain. The turnpike road from Amesbury to Shrewton, running in a north-west direction, passes close by it. It rises on the traveler's left as he proceeds from Amesbury, and is approached by a short avenue, marked by the traces of a ditch on each side. The direction of this avenue is from north-east to south-west, and it has been crossed obliquely by the turnpike road. It appears to have formed the only entrance to the enclosure in which the building stands, which is formed by a circular ditch, three hundred and sixty-nine yards in circumference, and having a slight rampart on the inner side. It has been supposed that, besides this, there were two other entrances; but both Dr. Stukeley and Sir Richard Colt Hoare, whose descriptions of Stonehenge are the fullest

and most careful that have been published, and between whom there is a perfect agreement in all material points, are decidedly of opinion that these breaks in the ditch have been made in modern times, probably to allow the passage of carts, by which so many of the stones have been carried away.

The building stands in the centre of this circular area. An outer circle of enormous upright blocks, having others placed upon them, as the lintel of a door is placed upon the side-posts, so as to form a kind of architrave, has enclosed a space of a hundred feet in diameter. The upright stones of this circle had been originally thirty in number, but only seventeen of them are now standing. The portion of the circle facing the north-east is still tolerably entire; and the doorway at the termination of the avenue may be said to be in perfect preservation. It consists of two upright stones, each thirteen feet in height, and between six and seven in breadth, with a third block placed over them, of about twelve feet in length, and two feet eight inches in depth. The space between the two posts is five feet, which is rather a wider interval than occurs between any two of the other pillars. Throughout the circle the broad side of the stone is placed in the line of the circumference, so that there must have been more of wall than of open space in the proportion of about six and a half to five. The imposts are fixed upon the uprights throughout by the contrivance called a tenon and mortise; the ends of the uprights being hewn into tenons or projections, and corresponding hollows being excavated in the imposts. They are oval or egg-shaped. Of course there are two tenons on each upright, and two mortices in each of the imposts, which are of the same number with the uprights. The principal workmanship must have been bestowed upon these fittings; for although the marks of the hewer's tool are visible upon the other parts of the stones, their surface has been left upon the whole, rude and irregular. They are made to taper a little towards the top; but even in this respect they are not uniform.

Within this great circle there is another, formed by stones not only much smaller, but also much ruder in their outline. Of these there had originally been forty, but only twenty of them can now be traced. This circle has never had any imposts; it is about eighty-four feet in diameter, and, consequently, the interval between it and the outer circle is eight feet.

The next enclosure has been formed of only ten stones, but they are of very majestic height, exceeding even that of those in the outer circle. They have been disposed in five pairs, and in the form of a half oval, or rather of a horseshoe; the upper part facing the north-east, or the great door. The two pairs at the terminations of the curve, which are distant from each other about forty feet, are each sixteen feet three inches high; but the height of the next two pairs is seventeen feet two inches; and that of the last pair, the station of which had been directly facing the opening, was twenty-one feet and a half. A striking effect must have been produced by this ascending elevation. A variety and lightness must also have been given to the structure by the arrangement of the stones here; not at equal distances, as in the two exterior rows, but in pairs, the interval between each two pairs being much greater than that between the two stones composing each pair. The uprights of this row have imposts over them, as in the outer circle. One of these imposts is sixteen feet three inches long. Of course the imposts here, not forming a continuous architrave, are only five in number. Of the five pairs, or rather *trilithons* (that is, com-

REMAINS OF STONEHENGE.

binations of three stones), although some of the shafts have been injured and mutilated, all are still in their places, except the fifth, or that which faced the entrance. This trilithon fell down on the 3d of January, 1797, and the stones now encumber a flat stone, of about fifteen feet in length, which lay at their base.

Lastly, there appears to have been a fourth enclosure, formed originally, as Stukely thinks, by nineteen stones, but only eleven now remain, entire or in fragments. These seem also to have been arranged in the shape of a half oval, with the open part, as in the case of the other, to the north-east. Although greatly inferior in height to those last described, they are still taller than those of the second circle. The most perfect, according to Sir R. C. Hoare, is seven and a half feet high, and twenty-three inches wide at the base, and twelve at the top. Like the second circle this row has never had any imposts.

Such is Stonehenge, as it still subsists; and in so far as the original design of the fabric can be traced from the portions of it which the waste of time has left, the appropriateness of the name, Stonehenge, which is Saxon, and signifies "the Hanging Stones," will be obvious enough from the account that has been given. But little doubt can be entertained that it is not a Saxon building. It is unquestionably the work of an age long preceding that in which the Saxons first obtained a footing in this island. Inigo Jones, in a posthumous work, has actually maintained the theory that it is a Roman erection—a temple of the god Cœlus, he conceives. A more absurd notion was never taken up. It would be much more rational to say that it was a work of nature; a piece of architecture which had grown up where it stands, like the Giant's Causeway, or the Cave at Staffa. Stonehenge certainly resembles these structures quite as much it does anything the Romans have left us. The old popular tradition, recorded by Giraldus Cambrensis and other chroniclers, was that the stones had been brought to the place where they now are, and elevated into the air as we see them, by the great magician Merlin, from the Curagh of Kildare in Ireland. It is not impossible that the design may have been taken from a similar building on that great plain, where Giraldus Cambrensis says, that an erection like Stonehenge was actually to be seen in his day. He calls Stonehenge, Chorea Gigantium, the Giant's Dance. Among modern speculators, some, also, have attributed it to the Danes; but, since the publication of Stukeley's book (1740), opinion has almost universally been made up in favor of his theory, that it is a Druidical temple of the ancient Britons. Of late, certain other hypotheses have been engrafted upon this general idea—as, for instance, that it had an astronomical as well as a religious aim; but these are to be considered as rather developments than refutations of Stukeley's view. Astronomy was the soul of the Druidical religion, and may very possibly have influenced the form of the temples as well as the worship. But there is little chance that we shall be able in the present day, to recover any correct knowledge of the principles of this astronomical architecture.

One difficulty in the subject of Stonehenge has given rise to much discussion—From whence were the stones brought? According to Sir R. C. Hoare, in his magnificent work entitled the "Ancient History of South-Wiltshire," (fol. Lon. 1812), the stones forming the outer circle and the fine trilithons of the grand oval are of the same kind with those which are

found in different parts of the surface of the Wiltshire Downs, and are there called Sarsen Stones, by which are meant stones taken from their native quarry in their rude state. They are a fine-grained species of silicious sandstone. Those forming the smaller circle, and the smaller oval again, are quite different. Some are an aggregate of quartz, feldspar chlorite, and hornblende; one is a silicious schist; others are hornstone, intermixed with small specks of feldspar and pyrites. What is called the altar, being the stone now covered by the central trilithon of the grand oval, is a micaceous fine-grained sandstone. From these circumstances, Mr. Cunnington first very ingeniously started the conjecture, that the original temple had probably consisted only of the great circle and the great oval, and that the two other rows were subsequent additions. In a late publication, entitled "Hermes Britannicus, (1828), the Rev. W. L. Bowles has taken up this idea, but has given it a new form, by supposing the lower stones to have formed the original temple, and the taller to have been afterwards added. He has connected this view with some very curious speculations as to the religion of the ancient inhabitants of Britain; for which, however, we must refer the reader to his work.

TILBURY FORT.

SITUATED on the Thames, about twenty-seven miles from London, and exactly opposite to Gravesend, is the small village of Tilbury. It appears to have been a place of some consequence in the early period of the Saxon dominion in England, having been an episcopal seat of Cedda, Bishop of the East Saxons, who, in the seventh century, propagated the Christian religion in this country, and built churches in several places, but especially, as Bede reports, "in the city which, in the language of the Saxons, is called Ythancestre; and also in that which is named Tillaburgh (the first of which places is on the banks of the river Pant, the other on the banks of the Thames,) where, gathering a flock of servants of Christ, he taught them to observe the discipline of a regular life, as far as those rude people were then capable." Tillaburgh is unquestionably the present Tilbury.

A medicinal spring was discovered here in 1727, considered very beneficial in cases of hemorrhage, scurvy, and some other disorders. In a chalk hill near this place there are several curious caverns called Danes' Holes. They are constructed of stone, narrow at the entrance, and very spacious at the depth of thirty feet. The neighborhood still affords some traces of the camp formed by Queen Elizabeth in 1588, when the kingdom was threatened by the Spanish Armada. But the most interesting object the place affords is the Fort, represented in our engraving. It was originally built as a kind of block-house by Henry VIII., but was enlarged into a regular fortification by Charles II., in the year 1667, after the Dutch fleet had sailed up the river and burned three men-of-war at Chat-

TILBURY FORT.

ham. It was planned by Sir Martin Beckman, engineer to Charles II., by whom the works at Sheerness were also designed. The esplanade is very large, and the bastions are the largest of any in England. They are faced with brick, and surrounded with a double ditch or moat, the innermost being 180 feet broad, and having a good counterscarp. On the land side, there are two small redoubts of brick; but the chief strength on this side consists in its being able to lay all the adjacent level under water. On the side next the river is a very strong curtain, having in the middle a strong gate called the water gate, and the ditch palisaded. At the place intended for the water bastion, which was never built, stands a high tower, erected by Queen Elizabeth, called the block-house. Various additions have been made to this fort since the time of Charles II.; and it is now mounted with several formidable batteries, and contains comfortable barracks and other accommodations for the garrison, which consists of a fort major and a detachment of invalids.

The four Roman proconsular ways crossed each other in this vicinity; and there was an ancient ferry over the Thames, said to be the place where Claudius passed in pursuit of the Britons.

PALMYRA.

UNRIVALED in extent and magnificence, the ruins of Palmyra rise in the midst of a vast ocean of sand, on which there is scarcely discernable a track of human footsteps. On the north-east the uninhabited waste extends to the Euphrates, the nearest point of which is 60 English miles distant. To the north and the west there is scarcely even a village of mud hovels within the same distance; and nothing, except two or three such miserable resting-places of the wild and roving Arabs, nearer than Aleppo, 180 miles to the north-west, or Damascus to the south-west, almost as far off. The nearest ports on the Mediterranean are Tripoli, Beirut, Sidon, and Tyre, all nearly due west, but none of them nearer than Aleppo. To the south again all is desert for many hundreds of miles.

The history of Palmyra is as singular and mysterious as its situation. We are told in the 9th chapter of the First Book of Kings, that "Solomon built Gezer, and Bethhoron the nether, and Baalath, and Tadmor in the wilderness." Tadmor is in all probability Palmyra. This is distinctly affirmed by Josephus. The two names also appear to be the same; for Tadmor is derived from a Hebrew root signifying a palm-tree, and Palmyra appears to have the same origin. We know that the city anciently stood in the midst of a grove of palms. But the strongest confirmation of the assertion of Josephus is found in the fact, that to this day Tadmor, or rather Thedmor, as they pronounce it, is the only name by which Palmyra is known among the Arabs. It is so called, and, as far as can be ascertained, has always been so called, by the tribe who claim possession of it, and who have taken up their abode among the ruins

ARCH AT PALMYRA.

RUINS—PALMYRA.

Solomon flourished a thousand years before the birth of Christ, and the foundations of Palmyra, therefore, if this supposition be correct, must have been laid more than 2800 years ago. Vestiges of the past still remain, which go to vindicate the claim of the city to this high antiquity. Besides the vast relics of an age of the most sumptuous architecture crowding the spot, there are in many places to be observed the ruins and rubbish of more ancient buildings, now for the most part forming merely ridges of shapeless hillocks covered with grass or sand. These are, perhaps, the foundations of the houses of old Tadmor, which a chronicler of the middle ages, probably on some authority which is now lost, affirms was sacked and overthrown by Nebuchadnezzar 400 years after it had been built by Solomon.

In course of time the city appears to have recovered from this disaster, and to have become again great and wealthy. It was probably built by Solomon to serve as an intermediate station for facilitating the intercourse between Judea and India; and, situated as it was, it no doubt owed its flourishing condition in after times to its Indian trade. Scarcely anything of its history, however, is known down to a comparatively recent period. It is first expressly mentioned as having, in the century before the birth of Christ, been plundered by Marc Antony, on the pretence that it had given aid to the Parthians, against whom he was then carrying on war. Its wealth, however, is stated to have been the real crime which drew upon it the observation of this needy, rapacious, and profligate soldier. But the booty he actually obtained was very trifling; for the inhabitants, having had timely notice of his intention, had contrived before his arrival to remove their treasures and most valuable effects beyond the Euphrates. From all this it would appear that although, from some inscriptions which remain, it may be conjectured that Palmyra had submitted to Alexander or his successors, it was now considered to be an independent city. Appian, who relates the transaction, expressly says that its inhabitants had acquired their riches by selling the merchandize of India and Arabia to the Romans.

After this we hear no more of Palmyra till towards the close of the third century of our era. It then makes a conspicuous figure for a few years during the reigns of the Roman emperors Gallienus and Aurelian. We must refer the reader to Gibbon's eleventh chapter for the story of its famous queen, Zenobia, who, after attempting to resist the arms of Rome, and assuming the title of Empress of Palmyra and the East, was attacked in her capital by Aurelian, taken captive, brought home by her conqueror to Italy, and forced to walk in his triumphal procession. This catastrophe extinguished for ever the glory of the City of the Desert. Although it had made an obstinate defence, it was, on its surrender, treated with lenity by Aurelian; but he had not long set out on his return home, when the inhabitants rose upon the garrison he had left in the city, and put them all to death. The emperor had already crossed the Hellespont when he received this intelligence. "Without a moment's deliberation," says Gibbon, "he once more turned his face towards Syria. Antioch was alarmed by his rapid approach, and the helpless city of Palmyra felt the irresistible weight of his resentment. We have a letter of Aurelian himself, in which he acknowledges that old men, women, children, and peasants, had been involved in that dreadful execution which should have been confined to armed rebellion; and although his principal concern seems directed to the reëstablishment of a Temple of the Sun, he discovers some pity for the

remnant of the Palmyreans, to whom he grants the permission of rebuilding and inhabiting their city. But it is easier to destroy than to restore. The seat of commerce, of arts, and of Zenobia, gradually sunk into an obscure town, a trifling fortress, and at length a miserable village." A few years afterwards, the emperor Diocletian appears to have erected some buildings at Palmyra, the ruins of one of which, bearing the only Latin inscription in the place, are still standing. Justinian, also, in the sixth century, after it had been for some time quite deserted, repaired its walls, and placed a garrison in it; but not regaining its ancient trade, its only means of existence, its temples and columned porticoes were probably soon after left once more to the winds and the beasts of prey.

For more than a thousand years after the time of Justinian, the history of Palmyra is again nearly an utter blank. A Jewish writer, called Benjamin Tudelensis, says that he was there in 1172, and that he found the place inhabited by about two thousand of his countrymen. The Arabian geographer Abulfeda also mentions it in 1321, under the name of Tedmor. But in Europe its existence would seem to have been quite forgotten, till, in the year 1678, some English merchants of the factory at Aleppo received from the natives of the country such an account of the ruins as determined them to attempt a visit to the spot. They set out accordingly, on the 18th of July that year; but although they reached Palmyra, they deemed it prudent, from the threatening attitude of the Arabs, to return almost immediately, taking time to copy only one inscription. No second attempt was made till 1691, when some English residents at Aleppo again set out for the place on the 30th of September, and reached it after what the Rev. William Halifax, who was one of the party, calls "six days' easy travel." They remained for four days, "having," says one of them, whose journal of the expedition has been printed, "tired ourselves with roving from ruin to ruin, and rummaging among old stones, from which little knowledge could be obtained." This writer gives no further account of what he saw, his whole narrative being occupied with the events of the journey; but fortunately, some of his companions did not hold "old stones," and the knowledge to be derived from them, in such contempt. In the Philosophical Transactions, No. 217, being the publication for October, 1695, is given a letter of twenty-eight quarto pages, from Mr. Halifax, containing a very full description of the place; and in No. 218 are printed the journals of both expeditions, occupying thirty-two pages more. The discovery appears to have excited the highest degree of public curiosity. In the same number of the Transactions in which the journals appear, is a paper, by the learned astronomer Dr. E. Halley, on the Ancient State of the City of Palmyra, being an able attempt to elucidate its history from the inscriptions which the discoverers had brought away with them.

After this Palmyra was visited by Bruyn, Maundrel, and other oriental travelers; but the journey that has done most for the illustration of its antiquities, is that which was undertaken in 1751, by Messrs. Wood, Bouverie, and Dawkins, accompanied by the Italian draughtsman, Borra. The results of their investigations were published at London, in 1753, in a magnificent folio volume, bearing the title of "Ruins of Palmyra, otherwise Tedmor," and consisting principally of fifty-seven plates, finished in the highest style of art.

The travelers left the ship at Beirut, on the coast of Syria, and crossing

Mount Libanus to Damascus, proceeded thence to Hassia, a village four days' journey to the north, from the Aga of which, whose jurisdiction was found to include Palmyra, they received an escort of horse, under whose protection they pursued the remainder of their journey. They left Hassia on the 4th of March, and reached Palmyra on the 13th. Their approach to the ruins was from the south-west, through a sandy plain, about ten miles in breadth, and unenlivened by either tree or water. On both sides rose barren hills, forming the horizon. About two miles before reaching Palmyra, the hills seemed to join; and upon coming up, it was found that a narrow valley led to the city. Ancient and singularly fashioned sepulchres rose here and there on each hand, and occupying the hollow of the valley were the ruins of an aqueduct which had formerly conveyed water to Palmyra. Immediately after, the city itself burst upon their view. "We had scarcely passed these venerable monuments," says Mr. Wood, "when the hills opening, discovered to us all at once the greatest quantity of ruins we had ever seen, all of white marble; and beyond them, towards the Euphrates, a flat waste as far as the eye could reach, without any object that showed either life or motion. It is scarce possible to imagine anything more striking than this view: so great a number of Corinthian pillars, mixed with so little wall or solid building, afforded a most romantic variety of prospect."

The highest hills in the neighborhood of Palmyra are on the west and the north-west; but the city itself stands on ground somewhat elevated above the extensive plain which stretches around its other sides. In Mr. Wood's work is given a general view of the ruins from nearly the same point from which that in the Philosophical Transactions must have been taken, namely, from the north-east. The persons who visited the city in 1678 had found in the neighborhood "a garden full of palm-trees;" but Mr. Wood and his companions did not see a single palm remaining. The principal part of the ruins is enclosed by a wall, greatly decayed, and in some places barely traceable, being probably that erected by Justinian. Its circuit is about three English miles. On a height beyond it to the north-west is a tower, which is said to have been erected by an Arab chief about the end of the sixteenth century. On the lower grounds, in all directions, are seen the tombs mentioned above, which are tall square towers; such of them as have been explored containing mummies, exactly resembling those of Egypt, and being in general elaborately adorned in the interior, like the sepulchres in that country. Occupying a small space around the eastern extremity of the ruins, are some olive and corn fields, divided from each other by enclosures of mud. "Almost the whole ground within the walls," says Mr. Wood, "is covered with heaps of marble." The Arabs say that the ancient city extended far beyond the limits of the present walls, its circumference being fully ten miles. Wherever the ground is dug up within that space, the ruins of buildings, they assert, are found. The fame of the founder of Tadmor still flourishes among its ruins. "All these mighty things," said the Arabs to Mr. Wood, "Solomon ebn Doud (Solomon the son of David) did by the assistance of spirits."

The ruins extend from the south-east to the north-west in an unbroken line of nearly a mile and a half in length. At the eastern extremity stands the most magnificent building of the whole, that which is supposed to have been the Temple of the Sun. The enclosed court around the temple is a

square, each side of which is 660 feet in length, the great gate of entrance being to the west. It is within this court that the tribe of Arabs who occupy the place have erected their mud cottages, to the number of thirty or forty. To the west of the temple is a Turkish mosque, in ruins too, like the more ancient structures around it. A little way beyond this, in the same direction, is the stately arch, of which, as seen from the east, a representation is given. This is the entrance to a portico which extends in a north west direction for the amazing length of nearly 4,000 feet, till it terminates at the sepulchre. The columns of which it was formed, some entire and erect, others broken or prostrate, or both, are strewed over the whole of this long line. Among the other buildings is one which had been a Christian church. Another, a little to the west of that, consists of four immense columns, towering to a height far above everything around, and surmounted by an entablature of surpassing richness. The building, which appears from the inscription on it to have been erected by Diocletian, is near the north-western termination of the vast field of ruins.

BALBEC.

NEXT in renown to Palmyra, among the ruined cities of the ancient world, is Balbec, situated in the same region, the extraordinary fate of which has been, to be first the seat of luxury and magnificence almost unparalleled, and then, as if the curse of Heaven had fallen upon it, to be reduced to little better than a desolate wilderness. It is man, however, and not nature, that has wrought the change; no blight has made the soil or poisoned the air, but a degrading despotism has as effectually dried up the sources of social prosperity as if some elementary convulsion had suddenly turned the clime of beauty cold and dark, and struck the teeming earth with hopeless barrenness. Indeed, Turkish oppression has done what no unkindness of nature could have effected. The splendors of Palmyra rose under the breath of a free commerce in the midst of a sandy desert; but nothing has been able to preserve that and many other great cities from crumbling into heaps of ruins at the death-touch of the gloomy tyranny that now hangs like a pall over the land.

We are indebted for the most complete account of Balbec, as for that of Palmyra, to Mr. Wood and his friends, who, after visiting the two cities, gave to the public, in successive volumes, most accurate and splendid delineations of every thing they had seen in each, accompanied with historic notices and short descriptions. It was on their return from Palmyra that they proceeded to Balbec, which lies almost on a line drawn from the former city due west to the sea. It is, however, a little to the north of Palmyra. The spot in which it is placed is in one of the valleys of Mount Libanus (the Lebanon of Scripture,) now called the Plain of Bocat, a fertile and well-watered opening to the sea, which forms its south-western extremity, while Balbec stands immediately under the high ground which closes it in

RUINS—BALBEC

CIRCULAR TEMPLE AT BALBEC.

the opposite direction. Its breadth, from Mount Libanus to Mount Anti-Libanus, varies from four to two leagues.

Balbec is situated, as nearly as possible, half way between Damascus to the south-east and the port of Tripoli, in Syria, to the north-west. When Wood was there in 1751, the place contained about 5,000 inhabitants, among whom were a few Jews and Christians; but later accounts describe its population as greatly reduced. The collection of miserable huts which form the modern town, probably do not now harbor more than a thousand half-savage Arabs.

Ancient writers, in general, are as silent respecting Balbec as respecting Palmyra. But it is no doubt the same city which Macrobius, in his Saturnalia, mentions under the name of Heliopolis, and to which he tells us the worship of the sun was brought, in very remote times, from the other city of the same name in Egypt. Heliopolis in Greek means the City of the Sun; and the signification of the Syriac term Balbec is the Vale of Bal, the oriental name for the same luminary when worshipped as a god. It is probable that Balbec was the ancient, as it is the modern, name of the place, although, from not having been mentioned, like Tadmor, the old name of Palmyra, in the Hebrew Scriptures, it has come down to us only in the form of the Greek translation, Heliopolis.

The universal tradition of the country, Wood informs us, is, that Balbec, as well as Palmyra, was built by Solomon. Many stories, it seems, are told by the inhabitants, of the manner in which the celebrated Jewish king spent his time in this retreat. Some critics have supposed that some building at Balbec may possibly be that spoken of in his writings as "The Tower of Lebanon that looketh towards Damascus." One of the stories current on the spot is that the city was built by him as a residence for the Queen of Sheba. It is believed, of course, that in this, as in all his other similar undertakings, the wise monarch availed himself of the agency of genii or spirits.

The ruins of the ancient magnificence of Balbec do not present a crowd of fallen edifices, spread over a large extent of space, like those of Palmyra: they consist only of three distinct buildings, which stand not far from each other, in a plain at a short distance from the inhabited part of the town. The engraving presents a view of these buildings, with some others in the modern town, as seen from the south. To the left of the picture, or on the west, is the immense structure commonly called the Temple of the Sun, with its courts. More in the foreground is another smaller, but more entire temple; and at a considerable distance west from that, and still farther to the south, is a third temple, of a circular form, distinguishable by a modern spire, which has been erected over it, to convert it into a Greek church. A Doric column, a Turkish mosque, and some other modern erections, are seen interspersed. Surrounding the whole is the city wall, ten or twelve feet high, and defended at intervals by square towers.

The entry to the Temple of the Sun is from the east, through a noble portico of twelve circular columns; and the first apartment in which the visitor finds himself is a magnificent hexagonal (six-sided) hall, 180 feet in diameter, exhibiting on all sides the remains of an architectural beauty and magnificence of the richest character, in the columns and other ornaments of a circle of chambers which run around it. Beyond this is a still larger court of nearly a square form, being 374 feet in one direction by 368 in

another, and at the further extremity of that is the far-stretching pillared structure forming the proper temple. As may be observed from the view, nine of the lofty columns which had composed this part of the edifice are still to be seen standing together. There had been originally fifty-six in all, namely, ten at each end, and eighteen others along each side. The entire length of the space which they include is 285 feet, and its breadth 157. The height, including the plinth, is 87 feet. Nothing grander can be conceived than the aspect presented by this immense and richly ornamented temple, when seen in its full extent. No part of the structure is perhaps more wonderful than the terrace or soubassement by which the whole is surrounded, the stones composing which are in general 30 feet in length by 10 in breadth, and 13 in height. At the west end are three of the enormous length of 63 or 64 feet each. A freestone quarry still remains open, not far from the city wall, from which these colossal blocks appear to have been hewn, and where many of similar dimensions are to be seen cut from the rock, and left ready to be removed. From this and other circumstances, Mr. Wood concludes that the soubassement of the temple was never finished. One of the stones lying in the quarry, which is not quite detached, is even larger than any of those in the temple, measuring 70 feet in length by 14 in breadth, and 14½ in height. Its weight would be about 1135 tons.

The other temple, to the south of this, is, as we have mentioned, of smaller dimensions, but is still a large building, being 222 feet in length by 114½ in breath. Its columns have been originally 34 in all, namely, 8 in front, and 13 along each of the sides. Their height, including the plinth, is 76½ feet; but the ground on which this temple stands is lower than the site of the other. The ornaments here are all likewise of the richest description. The Turks have built two great square towers on the ruins of the portico of this temple, but in other respects it is considerably less dilapidated than the former. In Wood's time, nearly all the pillars composing the peristyle, together with their entablature, were entire.

Our second engraving is a view of the circular temple, a small building of exquisite beauty. The building itself, exclusive of the pillars by which it is surrounded, is only 32 feet in diameter; and the height is divided into two parts, in the lower of which the architecture is Ionic, and in the higher, Corinthian. The lower has been at one time converted into a Greek church. The grace and lightness of the exterior of this edifice make it a perfect gem of art.

The buildings of Balbec are for the most part of the Corinthian order. John of Antioch states that the great temple was built by the Roman emperor Antoninus Pius, in the second century; and other circumstances would also lead to the conclusion that it is of this age.