Wonders of Nature as Revealed to the Student

MAN cannot rightly claim to be the first inventor of coats of mail and the armor-plated coating used for defensive purposes by our early knights. At least two types of defensive armor are common in nature. The first type almost exactly resembles the jointed armor-plate of mediaeval knights—as shown in the armadillo and the lobster and closely followed by the tortoise, the beetle, and many hard-shelled insects. The second type is both offensive and defensive at one and the same time; as exhibited in the porcupine, the hedgehog, the bramble, the thistle, and a host of other plants and animals. With the second group the armor consists not of plates but of prickly spines and thorns, which repel assailants by wounding the tender flesh of the mouth or lips. Such prickliness of surface is the commonest among all the protective devices invented by living creatures.

The common English hedgehog is a good example of the prickly-armored class. His familiar squat, square, inquisitive appearance, with very short legs and no tail to speak of, in fact one of nature's low comedians, covered on the back and upper surface with dirty white spines, and there you have him. Comic to us he is serious to himself. He is not built for hasty movements, but slowly and sedately he strolls calmly along on his bandy legs, showing little sense of fear, knowing that even when caught out in the open he has only to roll himself into a ball and his coat of spines is a fitting armor when he helps it to be an effective passive resistance. Though he belongs to a very ancient and honorable family—that of the insect eaters—long since superseded in most places of the earth by more advanced types, still he manages to hold his own in the struggle for life against all comers, mainly by virtue of his excellent suit of spiny armor.

Nature is a great utiliser of odds and ends; she always finds some unexpected use of discarded organs. Thus we have some of the cactuses turning themselves into vegetable hedgehogs by turning what should really be the leaves of the plant into spines in order to protect the precious store of internal water laid in by the spongy pith for the plant's own purposes. Even lizards have adopted some such protection from their enemies in hot countries where food is scarce and hunger drives the few animals which can exist in a dry region to attack every living thing they came across, be it animal or vegetable. The Moloch is a good example. It frequents the driest and sandiest soils of Australia, and it is thus specially adapted for holding its own against the local lizard eaters of its neighborhood. Science knows it by the scriptural title of Moloch, and indeed it is ugly enough to be called any bad names; but the Western Australians describe it familiarly as the "thorny devil."

The highest point armor attained to was a splendidly fitting jointed case of iron plates, all exquisitely polished. The joints of the plates were arranged in a most ingenious manner so as to move freely over and under one another, without exposing any part of the body for a moment to the deadly chance of a sword-lunge or a lance-thrust. Yet if one looks at a lobster's tail we see at a glance that all these clever devices of man's imagining had been invented and patented long before by Mother Nature. The elaborate workmanship of the Plantagenet craftsmen, who cased knight and horse for the battlefield or the tournament in moveable plaques of glistening metal, was but a poor imitation of the great skill with which the unheeded crustaceans of the time protected every vulnerable portion of their bodies from the assaults and attacks of their submarine enemies. Shielded by his impenetrable corslet of stony armor, provided with huge pinching claws which can crush a sea-shell like so much paper, he is a soldier and member of a dominant type, capable of atacking almost any foe he meets in his own element.

Perhaps the most marvellous, however, of all the mail-coated animals are our good old friends, the common tortoise and turtles. We have been so long familiar with their shape, and their coating of bone and horn, that we have long ago ceased even to wonder at them. There are usually two shells, one covering the upper part of the body and one the lower, and in many species of tortoise the head and legs can be entirely withdrawn within shelter of the shelly covering. In such cases, just as in that of the armadillo, the gaps in the armor are neatly filled up, for the exposed parts are covered on purpose with horny masks or aprons, which thus complete and round off the entire defensive mechanism. Crocodiles have their backs, tails, and the under side of their bodies amply defended by square horny shields, which move freely against one another at the edges. In the more vulnerable parts, such as the back, however, the wily crocodile does not trust to the strength of these horny plates alone he has developed beneath them a similar series of stout bony plaques, each of which is neatly and deftly jointed at the edge with the ones beside it. Sportsmen will tell you that the only sure way to kill a crocodile is to hit him in the eye. Everywhere else a bullet glides off him harmlessly. He lolls in the water unconcerned and winks at his assailant.

Visitors to the Alps in early spring know well by sight the dainty little nodding bells of the alpine soldanella. Its twin flowers on one stalk will push their heads boldly through the ice and form a border of blue blossoms on the edge of the snow sheet. This adventurous little plant does not wait like its neighbors for the melting of the snow, but more daring than they are beings to grow under the surface of the ice-sheet, and melts a way up for itself by internal heat, like a vegetable furnace. It burns itself up in order to melt the ice above it. Opening its fringed and pensile blue blossoms in the very midst of the snow, it fearlessly displays its two sister bells among the frozen sheet which still surrounds its bed in the mot incredible manner. The buds begin to grow on the frozen soil before the ground is bare, under the hard and compressed snow, which at its edge is always ice-like in texture. Then they bore their way up by internal heat through the sheet that covers them; and they often expand their delicate blue or white blossoms, with the scalloped edges, in a cup-shaped hollow, while a sheet of re-frozen ice, through which they have warmed a tunnel for themselves, still surrounds their stems and hides their roots and their flattened foilage. The large, leathery, tough, and evergreen winter leaves hibernate under the snow, and it is by using up the nutriment contained and stored up by these at the proper period that the soldanella manages to melt its way out of the wintry ice-sheet, and so steal a march upon its competing species. It is a low-growing type, which must flower early, or else it would soon be overshadowed by its taller rivals. Growth is very rapid in the Alps once the snow has melted. When the flower has forced its way through the ice the nutriment previously stored in the leaves is used up, and nothing but skeletons remain. By doing this the plant attracts the early spring bees and honey-seeking flies to its blossoms, which carry pollen from head to head, and so fertilize its seeds for it, and thus early provides for a future generation.

That little beastie, the common sea-horse, which is a well-known denizen of aquariums, is a deceiver ever. In general shape he bears a striking resemblance to the knight in a set of chessmen. But instead of a round stand he has a prehensile tail like a monkey's, by means of which he securely moors himself to pieces of seaweed or other small objects. Though armed with a rather knobby and prickly coat the sea-horse is exposed by the mere slowness of his gait to the attacks of more active and energetic enemies. Our European seahorse makes no pretence at concealment; he moves about undisguised like an honest gentleman. But there is an Australian relative of his, the leaf-like seahorse (phyllopteryx), which is much softer and more palatable in the body, and therfore stands in greater need of protection from predatory fishes. This curious ragged creature has its tail and fins provided with irregular long waving appendages, exactly resembling in form and color the seaweed in which it lurks. So much so that when it is lying hid in a knotted mass of such seaweed among the overgrown rocks at the bottom of the sea it must be very difficult for even the sharpest-eyed enemy to pick it out from the fronds it so closely resembles. The tint in particular is absolutely identical. This particular sea-horse is a simple case of what is now known as protective resemblance.

A very similar instance is that of the so-called skeleton shrimp, which also moors itself to bits of seaweed, and looks just like the plant it clings to. A large number of butterflies have their under-wings so colored that when they are at rest they form a perfectly natural part of their surroundings, and it needs careful search to distinguish them. In the stick insects, allies of the grasshoppers, crickets, and locusts, the resemblance to leaves and twigs is carried further than in any other insect. Even people who move amongst them habitually are constantly deceived. It has happened more than once to such persons, for them to stand gazing for some minutes into a bush in search of these insects and find none; suddenly a slight movement somewhere arrests atention, and then all at once the twig at which they had been gazing with rapt attention would get up and walk away in the most leisurely and lordly fashion.

The African Baobab, or monkey-bread tree, may justly be called the elephant of the vegetable world. Near the village Gumer, in Fassokl, Russegger saw a baobab thirty feet in diameter and ninety-five feet in circumference; the horizontally outstretched branches were so large that the negroes could comfortably sleep upon them. The Venetian traveller Cadamosto found near the mouths of the Senegal baobabs measuring more than a hundred feet in circumference. As these vegetable giants are generally holow they are frequently made use of as dwellings or stables; and Dr. Livingstone mentions one in which twenty or thirty men could lie down and sleep in a hut. In the village of Grand Galarques, in Senegambia, the negroes have decorated the entrance into the cavity of a monstrous baobab with rude sculptures cut into the living wood, and make use of the interior as a kind of assembly room, where they meet to deliberate on the interests of their small community. As it is of very rapid growth it acquires a diameter of three or four feet, and its full altitude in about thirty years, and then continues to grow in circumference. The oval fruits, which are of the size of large cucumbers, and brownish yellow when ripe, hang from long twisted stalks, and contain a white substance, agreeable to the taste. They are the favorite food of the monkeys, whence the tree has derived one of its names.

Dracaenas, or dragon-trees, are found growing on the West Coast of Africa and in Cape Colony, but it is only in the Canary Islands, in Madeira, and Porto Santo that they attain such gigantic dimensions as to entitle them to rank among the vegetable wonders of the world. The venerable dragon-tree of Orotava, in Teneriffe, reverenced for its age by the extinct nation of the Guanches, and which the adventurous Bethencourts, the conquerors of the Canaries, found hardly less colossal and cavernous in 1402 than did Humboldt, who visited it in 1799, was destroyed by a severe storm in 1871.

The Hindoos are peculiarly fond of the stately banyan. They consider its long duration, its outstretching arms, and over-shadowing beneficence as emblems of the Deity; they plant it near their temples; and in those villages where there is no structure for public worship they place an image under a banyan, and there perform a morning and evening sacrifice. Many of these trees have acquired an historic celebrity; and the famous cubbeer-burr, on the banks of the Nerbuddah, thus called by the Hindoos in memory of a favorite saint, is suposed to be the same as that described by Nerchuus, the admiral of Alexander the Great, as being able to shelter an army nder its far-spreading shade. Space does not permit of the enumeration of many other marvels of animal and vegetable life, the subject being an inexhaustible one.—Belfast Whig.

Midshipman to Professor

REVIEWING the "Autobiography of Montagu Burrows," edited by Stephen Burrows, the Belfast Whig says:

This is an age of autobiographical revelation, but few of those who have essayed the art have a tale to tell marked by such varied experiences or abounding in such piquant contrasts as the career of the late Professor Burrows. A man who began life as a midshipman in the navy of 1834, and ended it in 1905 as a professor of All Souls' College, Oxford, has seen changes worth recording, and in the early part of his life at least, if Burrows did not make history, he was an instrument in the hands of those who did. At an age when most boys are still in the schoolroom he was chasing Malayan pirates, and filling his journal with incidents like this:

"Having got a great deal of way on our boat, and not being able to back at once, we found ourselves closer to the prahu than we intended. . . . . Before we touched her we received the fire of a 'lela,' or jinghal, which wounded our bowman severely, and O'Callaghan, as well as our two marines, slightly. But we had no sooner got entangled with the spars of our enemy than a shower of spears from behind the cadjans or bulwarks on the stern came rattling in. . . . One of these wounded a seaman, who was trying to shove the boats clear, mortally, two others severely. One of these got a spear right through the upper part of his leg as he was in his place as coxswain sitting on the sternsheets. I was standing just inside of him, and was saved by his receiving the thrust. However, we got clear, and fired gunshot and musketry into her till all was dead silence."

The navy at that time was still a fine fighting organization, but its tone, as far as young men were concerned, was vicious and debased, though Burrows managed to escape contagion, and in his first lieutenant found a mentor who gave him these golden rules of the service: "Never taste grog; never smoke; always touch your cap to a superior officer on duty; always run when you are called by a superior officer." One had need of such rules, for the first entry in his journal about his second ship, the Edinburgh, runs: "The mass of my messmates are exceedingly depraved. They drink, swear, and gamble all day long; their language is dreadful." A not unnatural sequel to that pithy sentence is the description of how the ship, rounding Cape Corrientes, owing to the slovenly practice of the master in taking observations two nights running from the planet Jupiter, ran ashore, losing some of her false keel, and in the crisis the youthful critic notes that there was great confusion and "want of presence of mind amongst the superior officers."

Burrows was present at the battle of Acre, in 1840, which settled England's position in the Levant, and saw the tremendous explosion of the great central magazine, like "a great waterspout of many colors reaching the clouds with an umbrella-shaped cone, out of which flew millions of detached substances, and lasting for what seemed to us some minutes." Like many others in the fleet, he was deaf for three weeks afterwards, and he attributed to the explosion the deafness which afflicted him in later years. He helped to transport to Durban in 1843 the troops sent to turn back the Boer "voor trekkers," amongst whom was Paul Kruger, and boasts that in a certain sense he was entitled to be called one of the "Founders of Natal."

His last piece of active service is of special interest to Irish readers, for he accompanied the fleet under Sir Charles Napier which was sent to pacify and overawe the South of Ireland during Smith O'Brien's ill-fated insurrection of '48. He saw no actual fighting, but had some exciting adventures in the hunt after the four rebel leaders, Meagher, Doheny, Dillon and O'Gorman. On one occasion they had them cornered inside a ring of soldiers drawn across the isthmus between Kilrush and Kilkee, but owing to the action of a magistrate, who withdrew a part of the cordon, the quarry slipped through their fingers and escaped to West Galway. Burrows has left a vivid picture of an Irish hedge-school, where in a barn open to wind and weather he discovered about fifty children being taught by a "tattered schoolmaster with uncombed hair and a most unwashed face."

"We asked what he taught them, scarcely supposing that he exceeded the limits of the alphabet, or perhaps a little reading and writing—for he told us that he was not one of the National Society's masters, but just taught for one shilling a quarter what he could, and this was enough to live upon. To our surprise, however, he began to enumerate so many branches of knowledge that I thought he would never stop—algebra, euclid, astronomy, geography, etc. Hardly believing this, we called out a boy that we might examine him. We gave him the 47th proposition in the 1st Book of Euclid; the boy took up his slate, drew the figure correctly, repeated the enunciation and proved the theorem in masterly style. . . . . The master told us that he was the son of a poor farmer, and would probably be a priest. All his children were from the very lowest classes, and he believed their parents would rather go without dinner than neglect to send them to school. I thought what a pattern they were to our English children, but it must be remembered that the Irish do not recognize that they ought to be tillers of the ground; they have the tastes of gentlemen and indulge them; their idea is to live without working with both hands, and to enjoy as far as they can the pleasures of the intellect."

An incident such as that meant more to Burrows than to the ordinary naval officer. Education always had a fascination for him, and as a midshipman his spare time was spent in the study of subjects like Italian and algebra, and the hours not a few of his messmates gave to perfecting themselves in the art of drinking grog and playing cards were devoted by him to books like Milner's "Church History," Butler's "Analogy," Herschel's "Astronomy," and scores of others not usually looked on with favor by boys outside or inside a man-o-war.

He married in 1849, was appointed commander three years later, and almost immediately afterwards left the navy to become a student at Oxford. It was an astounding decision, but Burrows rarely made a mistake about his own capabilities, and the experiment turned out a brilliant success. After a distinguished undergraduate course he became a popular tutor, "making £600 a year by my pupils," as he tells us, and in 1862 was unanimously elected Chichele Professor of Modern History, though Freeman was one of the candidates for the chair. That post he held for forty years, and, though at first hostile critics raged loud and long, he points out that "it was notorious that neither Stubbs nor Freeman, who successfully became Regius Professors, could ever keep a class together," while "I at least kept up an average attendance of twenty men during many years, and published books or articles in leading reviews every year."

The volume gives interesting glimpses of his work at Oxford, notably on its religious side, but also touching on his political activities. He was throughout life a strong Conservative, and it was largely through his efforts that the Conservative party was reorganized and made a power in Oxford life. In all that he took up he displayed the same determination and fixity of purpose, and the resolution that had enabled him to enter as an undergraduate at thirty-three led him to begin golf at seventy-two, and learn the art of bicycling a year afterwards. Some of the breeziness of the sailor always clung to him, and, though he championed many unpopular causes and struck shrewd blows in the heat of battle, his personality had its effect on his opponents, and when Gladstone visited Oxford in 1890 and stayed for a week at All Souls' it was Burrows, who had fought against him first and last, whom he selected for close conversation and graceful compliment. A chapter added by his son to the "Autobiography" describes the end of his career:

"His death (July 10, 1905,) was such as he would perhaps have chosen for himself, sudden and painless, with his natural force but little abated by the weight of eighty-six years or the hardships of his early youth.

Reformed Diet Advantages

AN attack upon the "underfeeding fad," by Sir James Crichton-Brown, and the arrival from England of a pamphlet giving reasons for food reform, are simultaneous incidents. A man like Sir James is extremely useful to the public, for he can be depended upon to check tendencies which, proper enough in themselves, shows a disposition to reach extremes. There is also much useful work to be done by the National Food Reform Association, and for such gatherings as that which resulted in the publication of the pamphlet just received.

There may be a few people in danger from too zealously obeying the instructions of Prof. Chittenden, of Yale, and other reformers; but more are suffering from over-eating than from under-eating. At this time of year, especially, too much heating food is devoured, and the evil effect of a roast beef dinner is not corrected by gulps of iced water through the meal and a dish of ice cream at the end of it. For one man who undermines his constitution through abstemiousness, a hundred injure themselves through gluttony. It is rather unfortunate that the general public when urged to eat less is instantly suspicious that you wish to make it a vegetarian public. The suspicion is not unfounded, for nearly all food reformers are vegetarians, just as nearly all Socialists are Single Taxers. The trouble is that the public declines to experiment with itself and find a happy medium, such, for instance, as being vegetarion in June, July and August and resuming a meat diet again when the cool weather comes.

The hope of the ladies and gentlemen who have published the "Reasons for Food Reform" is that people in high places may adopt what they call a more "refined diet," and that the public, learning of the fashion, will blindly follow it. The chairman of the meeting, Mr. Eustace Miles, who is one of the greatest tennis players of modern times and a fine all-round man, said that if the King and Queen and the Prince and Princess of Wales would only change their diet for one year, at the end of that time half of England would have followed their example. Mr. Miles discussed vegetarianism, pointing out that vegetarians were not necessarily persons who eschewed meat but as the general public thought they were, the usefulness of that body was limited. It appealed to those who were already convinced. Mr. Miles' ambition was to be associated with some new society that would not definitely commit itself to any single food theory, but would advocate the best features of the several that are now offered to the public.

The Hon. Neville Lytton spoke as one whom food reform had rescued from ill-health, and who was full of the evangelizing spirit. He was able to name some distinguished vegetarians, among them being Tolstoi, George Bernard Shaw, and Gen. Booth. Their careers and those of such athletes as Mr. Miles showed that meat was not necessary for either mental or physical vigor. He warned his hearers that food reform was not a pretext to get them to live "the higher and purer life," by starving the flesh into submission to the spirit. On the contrary, the races that ate no meat, like the Japanese, the Goorkhas and the Arabs, were famous for their warlike qualities. He wished the people to understand that if they reformed their diet they would be better able to knock down anyone who assaulted them on the street.

Hon. Rollo Russell spoke of the flesh-abstaining nations and told of Chinese coolies carrying 170 pounds 40 miles a day over rough country. Rickets, gout, feebleness and nervousness are rare among them. They are healthy and happy. The Burmese are the happiest people on earth, according to Mr. O'Connor. Mexican laborers eat little meat, but perform prodigies of endurance, though they are lazy. In parts of Finland, where the cold is intense, the natives eat mainly rye, potatoes and barley. This speaker also cited a representative of the High Commission of Canada in praise of the vegetarian Doukhobors. They are "remarkably energetic, contented and joyous." He does not add that many of them are demented.—Toronto Mail and Empire.

CONTROL OF AUTOS IN GERMANY

A bill dealing with automobile traffic has been laid before the German Federal Council and will become law for the empire in a short time. Under the bill the owner of the machine is responsible for compensation in case of accident unless he can show that the accident was not the fault of himself or his driver, or that it was the result of a defect in the machine.

The maximum compensation payable on account of an accident shall not exceed $12,500, or a yearly payment of $750. In case of injury to another vehicle the maximum compensation shall not exceed $1,250. Where several persons are killed or injured in an accident the maximum compensation payable is not to be more than $37,500, or a yearly payment of $2,250. Penalties of from $38 to $125 or three months imprisonment await the driver who transgresses local regulations, refuses to show his license, or fails to carry or alters or conceals his car number.

A woman on the train asked the conductor how long the cars stopped at the station.

He replied: "Madam, we stop just four minutes, from two to two to two two."

The woman turned to her companion and said: "I wonder if he thinks he's the whistle on the engine."