

Nature's Touch-Me-Not

NATURE is no haphazard experimenter. She is striving to promote the strength and fitness of her children, and by the process which we term "natural selection" is constantly weeding out the weaklings and evolving more perfect types. But Nature is not needlessly changeful. When she has discovered a good device she repeats it over and over again.

A striking example of this is seen in protective prickles. Nature seems to have proved that under certain conditions prickles form the best possible protective armament, and she has emphasized her discovery by an enormous number of instances, each brought through a different channel of development to the same conclusion. In the plant world, as everyone knows, prickles are common in the extreme; while, with the exception of birds, every important group of animals possesses its spiny representatives.

The hedgehog is a well-known type of protective prickliness, and its habit of rolling itself into a ball when alarmed must be familiar to all. This action is made possible by its thick layer of subcutaneous muscle, the panniculus canosus, which is more developed than in the case of any other animal. The young of the hedgehog, when born, have the prickles soft and white; but soon after exposure to the air they harden and become effective weapons.

The widely distributed porcupine, which get their name from the French porc-epin, or "spiny pig," form another interesting group of prickly mammals. The porcupine is a formidable antagonist, rattling its quills and running backward at the enemy, and will often succeed in driving off a jaguar intent upon its destruction. Mammalian prickles are really tightly packed masses of hair. This is well shown in the accompanying photograph of a series of specimens selected from a porcupine skin, showing the complete gradation from an ordinary hair to a perfect, sharp-pointed quill. (Fig. 8.)

Passing over the birds, whose marvelous powers of flight and diving seem to render any highly specialised protective devices unnecessary, we come to the reptiles. Of these the armour plating of the tortoises and turtles, and the venomous means of the snakes are all-sufficient safeguards. But among the more vulnerable lizards we find numerous examples of protective prickliness. One of the most striking is the Australian moloch, termed the "thorny devil" by the early settlers. This remarkable creature is about eight inches in length, and its skin is studded all over with sharp, conical thorns. The moloch is very sluggish in its habits, feeding mainly upon ants, for which it lies in wait. One would imagine it to be exposed to continual attack from birds and rapacious animals; yet no animal is more perfectly immune. Its prickles are its safeguard. Equally well protected but perfectly harmless lizards are the so-called "horned toads" of California and Mexico. About twelve species of these quaint-looking creatures are known, all being alike in the possession of a formidable array of spines—several long ones at the back of the head, and a vast number of lesser prickles all over the back and limbs. (Fig. 12.)

Of fishes, a large number are protected from hostile attack by a covering of prickles. By far the most curious examples are the globe fishes, or "sea-hedge-hogs." The extreme length of the globe fish is something less than two feet. It has thick lips and goggle eyes which gave it the appearance of a good-natured countryman. Courage it seems to lack, and one might suppose that such a simpleton would fall an easy prey to the first shark or dogfish it encountered. Yet the globe fish is able to take care of itself. It never, under any circumstances, attacks the enemy, yet it is always ready to receive him in a suitable manner should he provoke hostilities. Let us suppose that a shoal of globe fishes is swimming tranquilly in the clear waters when it is suddenly surprised by a hungry shark. Of course the little fellows scuttle hither and thither in uncontrollable alarm. But the shark, poisoning himself upon his powerful tail, leisurely singles out one of the flee-

ing globe fishes, and sets out in pursuit. Now although the globe fish is a good swimmer, it is no match for the shark. The chase is in every way unequal, and can have but one ending. Within a few minutes of its commencement the shark must overtake the globe fish. But the quarry is well aware of its danger. It makes a bee-line for the surface, and as soon as it gets there begins to take in great gulps of air. Then a strange thing happens. The fish that only a moment before was thin and small begins to grow stouter and stouter, until, like the frog in the fable, it seems in danger of bursting. It stops inflating itself, however, just in time to avert this catastrophe. But its skin has become as taut as drum-head, and the whole of its body is covered with sharp, erect prickles. It has become a sea hedgehog, and the hungry shark which comes surging through the water dares not touch it, but turns tail in search of something more eatable.

Unlike its land prototype, however, the sea hedgehog is unprovided with a special muscle for erecting its prickles, so when danger threatens, it has recourse to the mechanical method of inflating the whole body with air, or with water, if it cannot reach the surface quickly. In the sea, prickliness is a very common method of protection, especially among the smaller and more persecuted denizens. A number of large fishes, such as the plaice and cod tribes, pass much of their time searching for shell-fish upon which they feed greedily. The plaice has particularly good teeth, which are strong and blunt.

It goes nosing about in the mud of the sea-bottom, turning up cockles, razor-shells and clams, the shells of which it cracks as easily as a schoolboy cracks a hazel nut, and feeds upon the mollusk within. But certain species of shell-fish furnished with prickly shells, seem to object to being cracked in this manner, for, when a hungry fish, rooting in the mud, comes in contact with one of these, it gets a nasty prick on the nose. Naturally, the finny searcher hastily abandons investigation in this particular direction, and the prickly mollusk is left uncracked and uneaten.

Similarly, many crabs, shrimps, and lobsters are protected by an array of spines and prickles. Crabs are much relished by certain fishes. As many as a dozen have been found in the stomach of one big cod. These, however, were a smooth-backed species, and a cod would never dare to swallow one of the thorn-backed crabs, of which numerous kinds are found in various quarters of the globe.

Before leaving the ocean, the sea-urchins, or echinoderms, must be mentioned, for, with the hedgehog, the globe fish, and the thorn-backed crab, they rank among the most prickly creatures known. They are enveloped in a wonderful shell, or test, composed of a great number of accurately fitting plates. The test is covered with needle-pointed spines, in some species these spines being eight or ten inches in length. Thus the urchin dwells within a home the walls of which may be said to be guarded by scores of permanently fixed bayonets.

The world of insect life supplies us with myriads of examples of protective prickliness. Many of the big insects, such as species from New Guinea, are simply beset with spines. Not a few caterpillars, too, are protected by closely set stiff hairs which correspond to the

prickles of bigger animals, and are probably quite as effective for repelling small birds and lizards, the chief enemies of the caterpillar tribe. Some of the most remarkable insects yet discovered are certain Brazilian bugs, known as Umbonia spinosa. Each insect is an exact imitation of a single large thorn, such as is seen upon the stems of roses and other plants. This deceptive aspect is gained by a hard shield which completely covers the insect's body and wings, and under which its legs are drawn when it is at rest.

Turning from the animal to the vegetable kingdom, we still find prickliness a common means of protection. Sometimes we see sharp spines, which are to be regarded as modifications of branches, of leaves, or of parts of leaves. In other instances we find plants protected by true thorns, which are really massed vegetable fibres or hairs, and are therefore analogous to the quills of the mammalia. The main object of vegetable prickliness is, of course, to defeat the attacks of browsing animals.

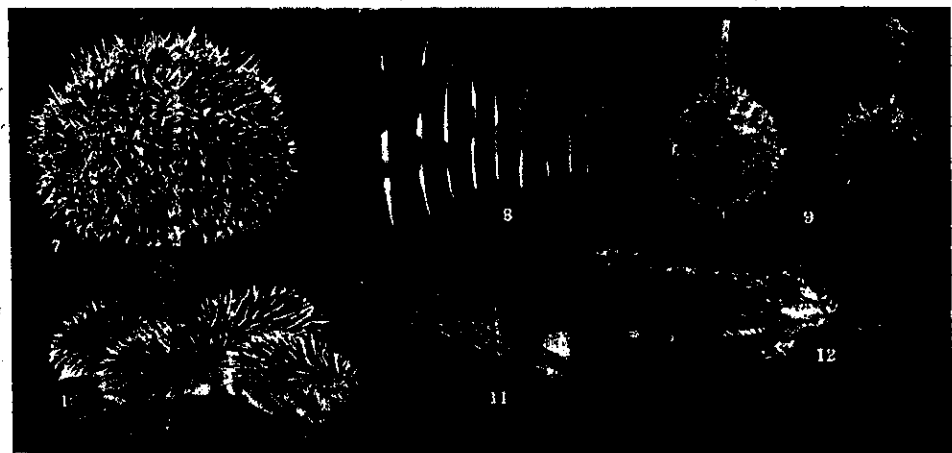
The cacti are, perhaps, the most interesting of all prickly plants. Here the sharp spines are to be regarded as the remains of departed leaves, although in the cacti the leaf functions are delegated to the swollen stalks, the spines being wholly protective.

We have all admired the beautiful flowers and have marvelled at the quaint shapes of cacti, but to understand these plants it is necessary to call to mind the conditions under which they grow and flourish. Probably no plants have been content with more adverse circumstances. Typical of the arid districts of Central America, cacti must keep green and fresh under a scorching sun through long periods of complete drought. This they manage to do by making themselves into what are really water cisterns. A

NATURE'S TOUCH-ME-NOTS.



1. Globe Fish Inflated for Protection. 2. Normal Form of Globe Fish. 3. Typical Spiny Shell. 4. Cactus. 5. Teasel Heads. 6. Sea Urchin.



7. Rolled-up Hedgehog. 8. Porcupine Quills Developed from Ordinary Hair. 9. Prickly Fruit Capsules of Horse Chestnut. 10. Family of Baby Hedgehogs. 11. Thorn Bug; the First and Last Projections on Under Side of Branch Show the Bugs. 12. Horned Toad.