Competitive Exams: Evolution Scale: Animals

Microbic Cannibalism

Now it is plain that in an age of increasing microbic cannibalism the toughening of the skin would be one of the first advantages to secure survival, and this is, in point of fact, almost the second leading principle in early development. Naturally, as the skin becomes firmer, the animal can no longer, like the Amoeba, take food at, or make limbs of, any part of it. There must be permanent pores in the membrane to receive food or let out rays of the living substance to act as oars or arms. Thus we get an immense variety amongst these Protozoa, as the one-celled animals are called. Some (the Flagellates) have one or two stout oars; some (the Ciliates) have numbers of fine hairs (or cilia) . Some have a definite mouth-funnel, but no stomach, and cilia drawing the water into it. Some (Vorticella, etc.) , shrinking from the open battlefield, return to the plant-principle, live on stalks, and have wreaths of cilia round the open mouth drawing the water to them. Some (the Heliozoa) remain almost motionless, shooting out sticky rays of their matter on every side to catch the food. Some form tubes to live in; some (Coleps) develop horny plates for armour; and others develop projectiles to pierce their prey (stinging threads) .

This miniature world is full of evolutionary interest, but it is too vast for detailed study here. We will take one group, which we know to have been already developed in the Cambrian, and let a study of its development stand for all. In every lecture or book on "the beauties of the microscope" we find, and are generally greatly puzzled by, minute shells of remarkable grace and beauty that are formed by some of these very elementary animals They are the Radiolaria (with flinty shells, as a rule) and the Thalamophora (with chalk frames) . Evolution furnishes a simple key to their remarkable structure.

As we saw, one of the early requirements to be fostered by natural selection in the Archaean struggle for life was a "thick skin," and the thick skin had to be porous to let the animal shoot out its viscid substance in rays and earn its living. This stage above the Amoeba is beautifully illustrated in the sun-animalcules (Heliozoa) . Now the lowest types of Radiolaria are of this character. They have no shell or framework at all. The next stage is for the little animal to develop fine irregular threads of flint in its skin, a much better security against the animal-eater. These animalcules, it must be recollected, are bits of almost pure plasm, and, as they live in crowds, dividing and subdividing, but never dying, make excellent mouthfuls for a small feeder. Those with the more flint in their skins were the more apt to survive and "breed."

The threads of flint increase until they form a sort of thorn-thicket round a little social group, or a complete lattice round an individual body. Next, spikes or spines jut out from the lattice, partly for additional protection, partly to keep the little body afloat at the surface of the sea. In this way we get a bewildering variety and increasing complexity of forms, ascending in four divergent lines from the naked ancestral type to the extreme grace and intricacy of the Calocyclas monumentum or the Lychnaspis miranda. These, however, are rare specimens in the 4000 species of Radiolaria. I have hundreds of them, on microscopic slides, which have no beauty and little regularity of form. We see a gradual evolution, on utilitarian principles, as we run over the thousands of forms; and, when we recollect the inconceivable numbers in which these little animals have lived and struggled for life--passively--during tens of millions of years, we are not surprised at the elaborate protective frames of the higher types.

Thalamophores

The Thalamophores, the sister-group of one-celled animals which largely compose our chalk and much of our limestone, are developed on the same principle. The earlier forms seem to have lived in a part of the ocean where silica was scarce, and they absorbed and built their protective frames of lime. In the simpler types the frame is not unlike a wide-necked bottle, turned upside-down. In later forms it takes the shape of a spirally coiled series of chambers, sometimes amounting to several thousand. These wonderful little houses are not difficult to understand. The original tiny animal covers itself with a coat of lime. It feeds, grows, and bulges out of its chamber. The new part of its flesh must have a fresh coat, and the process goes on until scores, or hundreds, or even thousands, of these tiny chambers make up the spiral shell of the morsel of living matter.

With this brief indication of the mechanical principles which have directed the evolution of two of the most remarkable groups of the one-celled animals we must be content, or the dimensions of this volume will not enable us even to reach the higher and more interesting types. We must advance at once to the larger animals, whose bodies are composed of myriads of cells.

The social tendency which pervades the animal world, and the evident use of that tendency, prepare us to understand that the primitive microbes would naturally come in time to live in clusters. Union means effectiveness in many ways, even when it does not mean strength. We have still many loose associations of one-celled animals in nature, illustrating the approach to a community life. Numbers of the Protozoa are social; they live either in a common jelly-like matrix, or on a common stalk. In fact, we have a singularly instructive illustration of the process in the evolution of the sponges.

It is well known that the horny texture to which we commonly give the name of sponge is the former tenement and shelter of a colony of one-celled animals, which are the real

Sponges. In other groups the structure is of lime; in others, again, of flinty material. Now, the Sponges, as we have them to-day, are so varied, and start from so low a level, that no other group of animals "illustrates so strikingly the theory of evolution," as Professor Minchin says. We begin with colonies in which the individuals are (as in Proterospongia) irregularly distributed in their jelly-like common bed, each animal lashing the water, as stalked Flagellates do, and bringing the food to it. Such a colony would be admirable food for an early carnivore, and we soon find the protective principle making it less pleasant for the devourer. The first stage may be--at least there are such Sponges even now--that the common bed is strewn or sown with the cast shells of Radiolaria. However that may be, the Sponges soon begin to absorb the silica or lime of the sea-water, and deposit it in needles or fragments in their bed. The deposit goes on until at last an elaborate framework of thorny, or limy, or flinty material is constructed by the one-celled citizens. In the higher types a system of pores or canals lets the food-bearing water pass through, as the animals draw it in with their lashes; in the highest types the animals come still closer together, lining the walls of little chambers in the interior.

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