than in most Coelenterates. It is also supported by a considerable amount of agreement in the early stages of development, up to the formation of the ciliated larva. According to this view the Olynthus, or at any rate the imaginary “ *Protolynthus ”* is only a slightly modified gastrula, and the Sponges are there­fore Enterozoa without any coelom, or in other words Coelen­terata. The extraordinary histological differences between the Sponges and other Coelenterates (Cnidaria), combined with the highly characteristic canal System and the absence of tentacles, are, however, alone sufficient to throw grave doubts upon the probability of a close relationship between the two groups, and these doubts are greatly strengthened by recent embryological researches, which tend to show that the so-called ectoderm and endoderm arc not homologous in the two cases.

There remains the third view, in accordance with which the Sponges are multicellular animals which have originated quite independently from Choanoflagellate Protozoon ancestors, and this is the view which at present seems to have most in its favour. It is especially associated with the name of W. J. Sollas, who invented the term “ Parazoa ” for the group. In support of this view it may be pointed out that the tendency to form hollow, spherical colonies, resembling the blastosphere stage in the development of Enterozoa, is met with in very distinct groups of Protozoa (e.g. *Volnox, Sphaerozoum).* This form of colony is obviously polyphyletic in origin. The fact that the segmentation of the ovum leads to such a form in both Sponges and Enterozoa is therefore by no means conclusive evidence that Sponges and Enterozoa have originated from the same Protozoon group. While, as has been repeatedly pointed out, the universal and characteristic collared cells of sponges point emphatically to a Choanoflagellate ancestry, it is impos­sible, in the present state of our knowledge, to indicate the par­ticular Protozoon group which has given origin to the Enterozoa. We may then consider the Metazoa, or many-celled animals, as a polyphyletic, or at any rate diphyletic group, including two perfectly distinct lines of descent from the ancestral Protozoa, the Sponge-line on the one hand, which leads to nothing higher than Sponges, which retain in many respects the characters of Protozoa, and the Enterozoon fine on the other, which leads through the Coelenterata to the Coelomata and so on to the highest divisions of the animal kingdom.

*Economics.*

All the bath sponges belong to the two genera *Euspongia,* Bronn, and *Hippospongia,* Schulze, subdivisions of the old genus *Spongia,* auctorum, distinguished from one another by the fact that in *Hippospongia* the body of the sponge is traversed by wide ramifying canals or vestibules, in addition to the proper canal system of the sponge. Species of these two genera occur in many parts of the world, probably wherever the temperature of the sea-water is sufficiently high and the depth and bottom suitable. It is only in a few localities, however, that they occur in sufficient numbers and of sufficiently good quality to render a sponge fishery practicable. The sponges of commerce are obtained chiefly from the Mediterranean, the coast of Florida and the Bahama Islands. From the Mediterranean three dis­tinct species are obtained—(1) *Euspongia officinalis,* which includes the “ fine sponges,” with two chief varieties, *mollissima* (the Levantine sponges, very soft and often cup-shaped), and *adriatica*; (2) *Euspongia zimocca,* including the “hard” or Zimocca sponges; (3) *Hippospongia equina,* the “ common ” or “ horse ” sponge.

Of the Florida sponges five principal kinds are recognized by the dealers—(1) the sheep’s wool sponge *(Hippospongia gossypina)—*this appears to be by far the most abundant in the market and also the most valuable; (2) the yellow sponge *(Euspongia agaricind),* resembling the Zimocca sponge of the Mediterranean; (3) the grass sponges (including both *Hippo­spongia graminea* and *H. cerebriformis);* (4) the velvet sponge *Hippospongia maeandriniformis),* which is not so common as the others; (5) the glove sponge *(Euspongia tubulifera),* which is the least valuable. In the year 1900 the Florida sponge fisheries yielded 418,125 lb of sponges, valued at $567,685. The Bahama sponges appear to be very similar to those of Florida.

Bath sponges occur in comparatively shallow water and are obtained by diving, by dredging, or by means of a trident or long-handled fork. The preparation of the sponges for the market is extremely simple. The slimy soft tissues very soon begin to decay and run off when they are removed from the water; after this has gone on for some time the sponges are washed and beaten until the skeleton is clean, they are then threaded on string and dried. They are frequently “ loaded ” with foreign matter by the dealers in order to increase their weight; rock-salt, glucose, molasses, lead, gravel, sand and stones being used for the purpose. They are also often bleached by means of chemicals to give them a better colour, but though their appearance is thereby greatly improved, their durability is said to be impaired.

In spite of the undoubted rapidity with which sponges grow, as shown by the fact that on the coast of Florida marketable sponges are found commonly in places that had been stripped of saleable specimens in the preceding year, there appears to be considerable danger of injury to the sponge industry by over­fishing and by the reckless destruction of young specimens, and it has been found necessary to introduce special legislation in America to counteract these evil tendencies. The question of the artificial propagation and cultivation of sponges has also been much discussed, but although some very interesting experiments have been made, they have not as yet led to any great practical results. As far back as 1862 Oscar Schmidt showed that “ cuttings ” of sponges will attach themselves and grow. This idea was followed out in the experiments of G. Buccich on the Island of Lesina, from 1863-1872, but these ex­periments were brought to a close by the hostility of the native fishermen. Similar experiments have since been made on the Florida sponge-grounds. The possibility of rearing sponges in this way from cuttings has thus been fully demonstrated, but whether it can be done profitably is another question. Accord­ing to the experience of G. Buccich it appeared that it would take seven years for the cuttings to attain marketable size in the Mediterranean. The Florida experiments, on the other hand, indicate a much more rapid rate of growth, and it has been stated that under favourable conditions the cuttings will attain marketable size in as short a time as one year. It has been doubted, however, whether the total weight of sponges produced by cuttings would be greater than the weight of the sponges from which the cuttings were taken if these sponges were allowed to continue their growth undisturbed. H. V. Wilson has suggested that sponges may be artificially reared from the eggs, in the same way that fishes or oysters are reared. The eggs of the bath sponge, like those of other sponges, develop into free-swimming ciliated larvae, and these might be made to attach themselves, like oyster-spat, to suitable objects, on which the young sponges could be cultivated under appropriate conditions. Detailed experiments are required to demonstrate the feasibility or otherwise of this interesting suggestion.

For further information on the economic aspect of the subject the student should consult the annual Bulletin and special papers of the United States Bureau of Fisheries and also the work of Seurat referred to in the bibliography.

Bibliography.—A very full list of the literature of the group up to 1889 is given in Lendenfeld’s work on the Horny Sponges, published by the Royal Society. We have only space here to refer to a very limited number of memoirs. Other references will be found in the works cited.

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