

ROOM XI. Seven Eyes, and the skin under the tail forms a kind of fin. Their mouth is armed with teeth.

The Gastrobranchus differs from the Lam-prey, in the tongue only being armed with teeth, like the Lobworms (*Nereis*). These animals emit such a quantity of mucus through the pores of the lateral lines, that it converts the water in which it is placed into a jelly.

CASES No. 9—23 contain the general collection of Fish preserved in spirits. They are at present under arrangement: when finished, they will be disposed in the same order as the Dry fish.

The Table Cases in the centre of the room contain the continuation of the collection of Radiated animals.

The TABLES No. 1—8 contain the Animal Flowers, or *Zoantharia*, and the stellated corals which they form for the protection of their soft bodies. These animals have a regular flower-shaped, very contractile body, with a single opening to their digestive cavity. Their mouth is surrounded by numerous variously shaped tentacula. The body is very soft, of a uniform cellular texture, and usually covered with a coloured coat. The digestive cavity is lined inside with longitudinal membranaceous folds. The tentacula are cylindrical and tubular, placed in a single or multiple series round the mouth, or

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on the lobes of which the mouth is formed when it is parted. ROOM XI.

Most of these animals are attached to marine bodies by their expanded base, but some few of them, especially of the naked kinds, have the faculty of moving about, when they use their base as a foot. A few are always floating about on the surface of the water, like the *Medusæ*.

The Sea Anemones (*Actiniidæ*) are soft and very contractile, and for that reason cannot be preserved in a dry state. They are much influenced by the state of the atmosphere, expanding or closing according to the state of the sky. They are said to be viviparous, the young being emitted by the mouth. They eat all kinds of animals, more especially crustacea, shells and small fish, which they catch with their tentacula.

The *Lucernariæ* only differ from the Sea Anemones in their base being contracted, and the apex being dilated like an umbrella, with their tentacula placed in six or eight groups on its edge.

The Zoanthi (*Zoanthidæ*) are very like the Sea Anemones, but their body is protected by a hard, coriaceous case into which the body is contracted when in repose. Most of these sheaths are united together by a common base, which varies in form in the different genera. Thus, in the *Zoanthus* and *Isaurus* the base of the

ROOM XI. the sheaths is narrow, and they arise from a creeping fibre. In the *Mamellifera* the sheaths are placed on a membranaceous expansion, and in the *Corticifera* the sheaths are covered with a sandy coat, and are united side by side, so as to form a kind of crust on the marine bodies to which they are attached.

The major part of the animals of this Class are surrounded by a stony covering or coral, into which they can withdraw themselves from external danger. This coral is always solid and calcareous, and the cells which are inhabited by the animals are furnished with more or less distinct longitudinal lamellæ, placed in a radiating position round the central axis, so as to give the cavity a star like appearance. These corals are most of them attached to marine bodies during the whole of their growth. Some few kinds, as the Sea Mushroom (*Fungia*), and Sea Slug (*Polyphyllia*), are attached when they are young by a short stem, but the crown separates from the stem by a natural absorption as the coral enlarges, leaving it at length quite free.

The reefs and islands, which are constantly and gradually rising above the sea, especially in the Pacific Ocean, are formed by animals inhabiting these kinds of coral.

Corals, on account of the different forms which they present, have been divided into several

several different genera, which may be easily separated into groups by the manner in which their cells are placed with reference to each other.

In the first of these groups the cells are simple and separate, having a regular circumscribed edge, over which the internal laminæ are often inflexed, as in the Sea Mushroom (*Fungia* and *Cyclolithes*), both of which are expanded and hemispherical. The genera *Turbinolia* and *Caryophyllea* resemble these in many particulars, but they differ in being of a conical or cylindrical shape: the former of these, like the *Fungia*, becomes free by age, while the latter is always attached.

The second group only differs from the former in the cell springing from a branchy base, the branches ending in simple stars: these, in their young state, are scarcely to be distinguished, except by their cylindrical form, from *Caryophyllea*. In one of these, *Dendrophila*, the stars are simple; in the other, *Lobophylla*, they are irregular, and the laminæ of which the stars are formed are irregular and jagged.

In by far the larger part of these Corals the cells are placed side by side, united together by a larger or smaller quantity of calcareous cement into a rounded mass, a broad foliaceous expansion, or a branched subcylindrical coral. The animals of these corals cover them with a soft, gelatinous,

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ROOM XI. gelatinous, very contractile coat, on the surface of which are studded the groups of tentacula, while the body is included in the lamellar cells.

The cells in some of those which form rounded masses are compressed and irregularly twisted, and only separated from each other by irregular ridges, as in the Brain Stone (*Meandrina*), so called from its resemblance to the convolutions of the human brain, when the coral is covered with its soft animal. In some allied species the cells are small, and the intermediate spaces, instead of being long ridges, form conical eminences, from whence the genus is called *Monticularia*.

In some, which form foliaceous expansions, the upper, and rarely the lower surface of the frond is covered with roundish cells, the laminae of which are extended over their sides, so as to unite the stars one with the other, as in the genera *Agaricia*, *Pavonaria*, and *Polyphyllia*.

The remainder, the corals with aggregate stars, are distinguished by each of the stars being distinctly circumscribed.

The cells of many of these are only longitudinally striated on their inner surface, and are generally united into a cylindrical, arborescent coral. Some of these, as the Madreporæ, (*Madrepora*,) have the cells prominent and closely spread over the whole surface; in others,

as the genera *Porites*, *Astreopora*, and *Alveopora*, the centre of the cells, instead of being lamellar, are filled with close-set tubercles, and the interstices between the cells are porous. In the Deer's-horn coral (*Palmipora*) the cells are very minute, shallow, and scarcely striated on the sides. In the *Pæcillopore* and *Heliopore* they are larger, with raised dentated edges, but shallow, and sunk into a very hard solid coral: from these last the *Seriatopores* only differ in the pores being placed in longitudinal lines. The genus *Distichopora* is allied to these in some characters, but its cells are simpler and placed in three series on each side of the coral, those of the two lateral series being much smaller than the central one.

The cells in the rest of these corals are furnished with regular and distinct rays, like those of the first group. In a few of these, as the White Coral (*Oculina*), the coral is subcylindrical and arborescent, and in others, as the Star-stones (*Astreæ*), the coral forms a globular, or expanded, encrusted mass.

In some of the Star-stones the axes of the cells are solid and produced, as in the *Astrea Pleiades*, so as to resemble in that respect the fossil genera *Sarcinula*, and *Stylina*, peculiar for the centre of their stars being produced. The *Explanariæ* only differ from the star-stones in the mass being more expanded and foliaceous,

ROOM XI. or in the under surface being free and destitute of stars.

The genera *Sarcinula* and *Lithodendron* are very like the star-stones, but the cells are cylindrical and prominent, and instead of being arranged side by side in one mass, they are, in these genera, united together by cross bands of calcareous matter, between which there is often placed a cellular structure, and in their young state the cells are prominent, and spring from a flat calcareous expansion.

Some fossil genera have much the appearance of the Star-stones (*Astreæ*). Their cells are aggregate, side by side, forming a rounded mass, but they are quite separate from each other; these masses increase in size by new cells springing from the centre or margin of the older cells, as in the genera *Aceroularia*, and *Strombodes*. It may be remarked, that in the thin extremities of the Arborescent Corals, the cells often appear proliferous from the side of each other.

The CASES 9 to 12 contain the *Polypiaria*.

The Polypes of this class differ from the Sea-Anemones in the mouth being provided with only a single series of long tentacula, the body being more slender, and in the cells which they form being quite simple, or without any radiating laminæ.

This class may be divided into distinct groups, characterized by the substance of the coral.

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The Polyparia which have stony corals are separated according to the structure of the cell which the Polypes inhabit. In the first of these, the mouths of the cells are terminated and often closed with a horny operculum, and the cells themselves are placed side by side, so as to form a variously shaped stony coral.

In some of these the pores are placed on all sides of the coral, which has often an arborescent form, as in the genera *Millepora* and *Seriatorpora*, which are cylindrical and branchy, and *Adeona* and *Eschara*, which are flat and foliaceous. The first of these is peculiar for the base of the stems which support the leaves being jointed, like the stems of the *Isis Hippuris*.

Others have the cells placed only on one side, the coral being usually attached by the other. In some, as the *Retepores*, the cells are short and not prominent, and the coral foliaceous, and variously netted together. In others, as the family of Tubulipores (*Tubuliporidae*), the cells are long, subcylindrical, and more or less prominent on the surface. These corals vary greatly in shape; in the *Fron dipora* they are reticulately branched, and the cells placed in irregular tufts, whilst in the *Hornera*, which has nearly the same form, they are placed in regular order; in the *Tubulipores* and *Obelia* the cells are tubular, and crowded together on a cup-shaped crust; the genus *Idmotea* has the same shaped



ROOM XI. shaped cells, but they are placed in lines across the two upper sides of a triangular tree-like coral.

The cells of the *Cellepora* are distinct ventricose urn-shaped, with a round mouth, and united together into a spongy coral. The genera *Berenice* and *Discopora* consist of similar cells, sunk into an expanded chalky crust.

In the second division the mouths of the cells are two-lipped, and the cells are united laterally on one or two planes into a crustaceous, or arborescent coral. In the genus *Flustra* the cells are very flat, and placed in a regular manner, forming a crust on marine bodies, or on one or both sides of an expanded foliaceous coral. The genus *Electra* differs from *Flustra* in the cell being ciliated, and placed round a cylindrical stem, and the *Lunulites* in the cell being thicker, and forming a cup-shaped disc, which is attached to sand or stone in its young, and free in its adult state.

In the *Cellariæ* the cells are placed in a quin-cuncial band round the joints of a cylindrical, forked coral, which is attached by fibrous tubular roots.

In the family of *Crissieæ* the cells are placed in longitudinal rows, opening on one side of a forked, flat, subarticulated, branchy coral, attached by tubular fibres. In the genera *Crissia*, *Chanda*, *Achamarchis*, and *Bicellaria* the cells are

are placed alternately, in two rows, their characters consisting in the different forms of the cells. In *Gemicellaria* the cells are equally disposed in two rows; they are opposite, and together form an ovate joint. In the genus *Tricellaria* the cells are disposed in three rows, whilst in *Eucratea*, *Catenicella*, and *Menipea* the cells are placed one above the other, in a single unilateral series; these genera differing in the position of the mouth of the cells.

The Polyiparia, which are characterized by the horny nature of their coral, are also peculiar for the cells which the animals inhabit being united together by a common tube, and by their being also formed with external vesicles, whose structure is not distinctly known, but which are usually considered as ovaria. According to the observations of Cavolini, Thompson, and others, the structure of the animals of these corals is far more complicated than their minute size would lead one to suppose.

The *Tubulariæ* are known immediately amongst these corals by the long, tubular, cylindrical shape of their cells. They are to be distinguished from the eggs of the marine Mollusca, with which they have been confounded by Esper, who has even figured the Bysus of the common Muscle as a species of this

ROOM XI. this genus, under the name of *Tubularia Splachna*.

The genera *Anguinaria* and *Tibiana* are allied to the *Tubulariæ*, but they require to be further examined.

In some genera the cells are either urceolate, or bell-shaped, and pedicelled ; in *Campanularia*, the stem is simple and creeping ; in *Laomedia*, it is arborescent.

In the next group the stems are fistulous and branchy, but the cells are cylindrical, and placed in an unilateral series. In *Plumularia* the cells are placed in a continued, and in *Sertularia* in an interrupted unilateral series, whilst in *Amatea* they are disposed in a continued spiral line. The genera *Biseriaria* and *Idia* have two rows of cells, placed on one side of the stem.

In the *Sertulariadæ* the cells are small, sessile, and tooth-like, placed on the side of the branches. In most, as the true *Sertulariæ*, the cells are subalternate. The genus *Idia* only differs in the cells being placed rather more on one side than the other. The *Dynamenæ* are like the *Sertulariæ*, but the cells are nearly opposite, so as to be placed in pairs. In *Pasythoa* the cells are in pairs, separated from each other by a long stem, and in *Lirizoa* they are in groups of three, similarly separated.

The genus *Antennaaria* is peculiar, for the  
cells

cells being very small, and situated on the inner side of the hair-like joints placed in whorls round the fistulous jointed stem.

The genera *Cymodocea* appear to be only *Sertulariæ* which have lost their cells.

The last group of these kinds of Corals are the *Fluviatile Polyparia*, characterized by their tentacula being numerous, long, simple, and retractile, and expanded in the form of a horse-shoe. They are inclosed in a long, tubular, horny sheath. This division includes two well-known Corals, both found commonly in England; *Alcyonella*, in which the coral forms a globular mass, composed of numerous hexagonal tubes placed side by side, and *Plumatella*, in which the tubes are solitary, or united in a creeping group. It is probable that the *Plumatella* may be only the young of the former, and M. Raspail has attempted to prove that *Cristellaria* and *Diffugia* may be also the same animal in its very young state.

The common fresh water Polypes (*Hydra*) are distinguished from the other *Polyparia* by the body being naked, with only a very simple stomach, without any trace of any other organization; by the tentacula being long, simple, and very contractile; and by the animal reproducing its kind by buds springing from its external surface. These Polypes appear to be the most simple animals in the creation, since the  
*Infusoria*

ROOM XI. *Infusoria* have been proved to be much more complicated than they were generally supposed, by the microscopic observations of Dr. Ehrenberg.

The CASES No. 13—16 contain the Zoophytes (*Zoophytaria*), so called from the general resemblance which their corals bear to plants. These animals are known from all the other radiated animals by their bodies being soft, and their mouths furnished with a determinate number (usually eight) of pinnated or feathered tentacula, and their stomachs furnished with eight intestines, of which two are prolonged into the common mass, the others ending in the ovaria. They live united together in cells of a shelly tubular structure, or sunk into a fleshy or chalky bark. This class is divided into three groups, characterized by the structure of the coral which they form.

In the first family, *Cornicularidæ*, the cells of the animal are tubular and horny, or fleshy. In the genus *Cornicularia* they are long and funnel-shaped, springing from a creeping base. In *Telesto* and *Clavularia* they are branchy and fleshy, with eight longitudinal grooves.

In the family *Tubiporidæ* the cells are cylindrical, tubular, placed vertically side by side, at some distance from each other, and united together into a mass by means of horizontal lamina, placed at certain distances from each other,

*Handwritten signature*

**SYNOPSIS**

**OF**

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