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LECTURES ON COMPARATIVE ANATOMY AND ANIMAL PHYSIOLOGY,

DELIVERED BY

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LECTURE IV.

ON THE CLASSIFICATION OF THE ORGANS OF ANIMALS,

And on the Organs of Support in Animalcules and Poripherous Animals.

BEFORE we commence with the first system which enters into the structure of the bodies of animals, I shall merely enumerate to you the order of succession in which we shall consider the whole of the various systems, that we may thus have as exact a method as can conveniently be followed in the study of objects so numerous and diversified; and possess every advantage which is to be derived from method and classification when considering a subject of so vast extent.

The organs of all animals, like the organs of man, have most frequently been divided into three great divisions; the one division comprehending the organs which tend to establish relations between the being itself and surrounding nature; the second division, embracing the means by which the individual is enabled to convert foreign matter into its own likeness; the third division, comprising not the mere relation of the animal to surrounding nature, or treating of its powers of nutrition and maintenance, but its adaptation to the continuance of its race.

The first division comprehends several systems, which you will observe are taken from the most perfect forms of organization; and it is convenient for us to follow as much as possible, a system which will embrace all the most complex as well as the simplest forms. We shall occasionally have to pass over whole tribes of animals in our considerations of the separate systems; and in treating of the whole range of animals, we shall have to omit various groups or genera when speaking of the different forms of organs. We shall find that all animals do not possess a complex machinery, but that the lowest are extremely simple. It would be inconsistent indeed with the nature of the developments we observe in the highest forms of animals, to find that the simplest possess all the same systems, in a similar but minuter condition. It was the opinion, in former times, that the minutest forms of animals contained all the systems of human organization reduced to extremely minute proportions. This opinion was the more plausible from its being observed that there were, indeed, animals of extreme minuteness, which required the microscope to examine their parts, but which yet possessed a nervous and vascular system, with all the more important systems which we find in human organization.

Now the first system which we have to consider among the organs of relation, is that which is destined to support and give form to the body, to protect the soft parts—the organs of support—the osseous system as it is termed when applied to man—to the mammalia, and to the vertebrated classes generally. But we shall find in the invertebrated classes, that the muscular system forms a connexion with parts not contained in the *interior* of the animal, but most frequently existing *outside* the body—covering the exterior surface. Under this system, therefore, the *osseous*—we have to consider the various forms of shells, both of the molluscous classes and the articulated division of the animal kingdom,—the various forms of corals, and the other hard substances met with in the radiated animals, some on the exterior and some in the interior of the body,—all these we shall consider under the division of the *Organs of Support*.

When the skeleton is composed of several parts, we find them connected together by portions of a softer texture, parts more pliable, and denominated in the highest animals "ligaments." This epithet is applied to different parts of the skeletons which are not internal or belonging at all to the vertebrated form. We shall find that in the class *Zoophytes* there are parts (as in the specimens of *Isis* and *Coralline* I now show you) which are solid, and connected with each other by intervening pliable substances. We see an instance of this in the common *isis hippuris*. We find it even where the skeleton is external. We also find it in the bivalved molluscous animals. We see it in the articulated animals. The unconsolidated portion of integument serves to unite the different parts of their skeleton. In this class of organs are the active organs of motion, or the muscular system, which we have to examine, whether in the form of fibres or of a homogeneous substance. The organs of sensibility and motility are the nervous system. The organs of sensation are next to be examined—the organs of the senses — the apparatus placed at the extremity of the nerves, and which become less and less developed as we descend to the lower grades of animals, —these requiring less than the more elevated forms. The latter being more easily injured, from their greater degree of complexity, require increased means of protection, and thus have more fully-developed organs of sensation.

The second great system of organs is that of *nutrition*,—a system which is, of course, common to animals and plants; and, indeed, so characteristic is it of the vegetable kingdom, that it has been commonly denominated the system of vegetative life. We see that though plants have not brain, muscles, and bones, yet that they have the means of conveying foreign matter into their own bodies, through inert vessels; that they have a circulating system which is visible, that they have this even in the separate cells; that particles are moving in great rapidity round the interior of those cells; and that they have various other systems by which they are enabled to move and expand their parts, to follow the direction of the sun, and to contract those parts again at the setting of the sun, and that they have organs of respiration in the leaves. And this latter system, containing as it does the organs of nutrition, has been distinguished as especially characteristic of vegetable life.

In this division we shall have to distinguish the organs of *digestion*, the most general organs in the animal kingdom. All other organs we shall find to disappear till we have come to animals without any other organ than a common bag for digesting matter. The next system—the *chyliferous*—will confine us to a very few animals. The organs of *circulation* are much more widely extended through the scale. Here we shall find that fluids at first meander through the body without distinct vessels—that vessels at length are formed, and that a sanguiferous system is completed, by the formation of a heart to convey the blood to the different parts, and particularly in the higher grades, carrying it to the air-cells, when it is acted upon by the function of respiration, which brings the surrounding element more immediately in contact with the blood. Then we consider the organs of *secretion*—the various parts of the glandular apparatus, whether developed at the surface, or in the interior. The organs of *absorption*—the lymphatics, by which the decayed materials are conveyed to the blood to be removed from the body, and the organs of *excretion*, by which they are thrown out, whether by the secretion of urine or otherwise, are next in order. After this the *tegumentary* parts come to be considered, and these we shall find to be curiously connected with the habits of various animals,—that the feathers of birds, and the scales of reptiles, for example, are beautifully adapted to the whole internal systems. The feathers of birds constitute organs of progressive motion of great lightness. They are ordinary appendices, developed hairs, thus increased by the great extent of the respiration, but from their lightness, from their being, as it were, air-tubes of a strong structure, they are the best possible organs for that class of animals. The wings are better for birds than those of the bat would be. You observe also the strong muscles of the organs by means of which they fly. So in animals which swim. But cold-blooded animals do not require to be covered with a bad conductor of caloric, like down or hair. That would be superfluous. They do not incubate. Therefore, simple layers of scales are sufficient both for fishes and reptiles. The living habits of amphibious animals render the absence of hairs and scales best for them. Immersed in water for months together, and in mud, they respire through the surface of their skin. They necessarily respire, when in a state of torpor under water, through the skin.

The last organs to be considered, are those by which the race is continued. The lowest tribes of animals present nothing more than the first element of the generative system, whether you consider all these tribes as females or not, the poriferous and the polypiferous animals have the means of continuing their species by the detachment of gelatinous parts of their bodies. No impregnation is required, but portions are simply detached which afterwards grow. Other animals are more complex, and require a passage for this ovum. Sometimes a further connexion with the body is formed, a sufficient process to induce the necessary development not having been undergone; and organs of excitement are necessary to enable the animals to complete the function. That addition, of course, exists in those instances in which we find the male and female separate. The male and the female, in all the higher forms of animals, are at first precisely the same, but they assume very different forms as they advance. The clitoris, for instance, shrinks in the one, and develops into a penis in the other. In the organs of impregnation and conception, therefore, we find a great resemblance indeed. Being at first the same, they continue essentially so, with the exception of the higher development of parts in the one case, and the retarded development of them in the other. These are organs for secreting, conveying, and maturing, the seminal fluid or the ovum, comprising also the organs of excitement.

There is a point of consideration which should be mentioned at the present moment. In treating of each of the several systems, I must either proceed from some portion of knowledge which you must be supposed already to possess, that is, from that structural form which is most nearly allied to the human frame (presuming you to have already an acquaintance with the human structure)—we must either proceed from that point as a standard of comparison, and then go progressively downwards through the class of quadrupeds, birds, reptiles, and fishes, to the forms which are more simple, thus gradually diminishing the complexity of the different systems; or we must take the opposite plan, that which nature adopts. Nature begins by simple forms. The animal kingdom itself began by the most simple forms, as is attested by what is found in the earth. Gradually it became more complex. That is attested alike by sacred and profane evidence. It accords with the sacred writings; it agrees with all the best facts drawn from the strata of the earth. Those beings which occur near the surface are of more complex structure, and man, whose remains have yet only been found in the newest strata, is the most complex of all. In the animal kingdom nature begins with the simplest forms: so again with plants. You find a little vesicle to be the nucleus of what is to be formed; but the stem is not commenced in the first instance. All systems of organs begin with their most elementary, their most essential parts, and we could arrive at the most essential parts of a system, either by tracing it downwards in the animal kingdom, or by tracing it backwards in the march of its development in higher animals, as we shall have ample opportunity of seeing in every system that will come under our notice.

Now it is more philosophical to commence with the simplest conditions of the systems, and mount upwards to their more complex forms. It is, perhaps, attended by some difficulties, as it leads the student early to consider forms of animals which are the least known, and to conditions of organization the most remote from the human frame, with which alone we suppose him to be acquainted. By proceeding from the most complex forms, however, we lose the order of development of the various systems, and are constantly restrained in our account of the development of organs; or we must continually suppose a previous knowledge of the simpler forms of animals, which have not been demonstrated. Nature in the formation of organic beings, and in the perfecting of individual organs, does not proceed by lopping off parts, but by superadding to the central element. She gradually superadds to her elements or organs, more and more complex parts. Hence I shall adopt the ascending order in treating of the various systems.

CLASSIFICATION OF THE ORGANS OF ANIMALS.

1. *Organs of Relation or of Animal Life.*

Organs of support	Osseous system.
Organs of connexion	Ligaments.
Organs of motion	Muscular system.
Organs of sensibility and motility	Nervous system.
Organs of sensation	Organs of the senses.

2. *Organs of Nutrition or of Vegetative Life.*

Organs of digestion	Alimentary canal.
Organs of chylification	Chyliferous system.
Organs of circulation	Sanguiferous system.
Organs of respiration	Lungs, branchiæ, cilia.
Organs of secretion	Glandular organs.
Organs of absorption	Lymphatic system.
Organs of excretion	Kidneys, skin.
Organs of tegumation	Tegumentary organs.

3. *Organs of Generation.*

Organs of impregnation	Male organs.
Organs of conception	Female organs.

ORGANS OF RELATION.

1. *The Osseous System.*

I commence with the organs of *relation*; and in considering this group of organs, I begin with the *osseous system*. This is far, however, from being the most important system among the organs of relation. The knowledge of the animal kingdom which we acquire by the study of the osseous system, is important in various points of view. It is important to the geologist, to the anatomist, to the physiologist, and to the naturalist. In tracing this system, we are carried down far in the scale. Were I to take the nervous system in this group of organs, I should not be led so low. By taking the osseous system, however, we are led from very low in the scale to almost all the higher forms of animals, and thus obtain the opportunity of becoming familiar with all the forms which are presented by the animal kingdom, a great advantage to us in commencing this study.

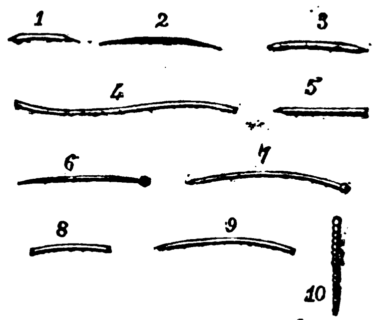
Now considering this system in an abstract point of view, we find it important in all forms of animals where it presents itself as a means of giving attachment to the organs of progressive motion, and as a means of giving protection to the more soft and delicate parts. We find, particularly in the lower animals, innumerable beings which are totally destitute of a skeleton; and from knowing that in the human being there originally is no skeleton, you would expect that to be the case. When all the parts of the human body are soft and gelatinous, there is no earthy skeleton, and often none until a pretty late period, when those parts which are to constitute the solid system have begun to be formed, but not begun to be consolidated by the phosphate of lime. So, in ascending through the skeletons of animals, we find that, originally, the animals are without skeletons. There is no proper skeleton in the entire class of animalcules called *polygastrica*; nor at first is there any in the higher classes, although afterwards they require some solid protecting shield to be thrown over their structure. Again, when we examine the skeleton in the vertebrated classes, we see its gradual development, from the soft and cartilaginous substance which first presents itself in fishes, through all its different stages, until we arrive at man himself. Now in the simplest form of animals—the polygastric, though there is no internal solid part which we can consider as a skeleton, nor any secretion of shell on the surface of the body; yet there are parts which we should not altogether omit when speaking of parts that are destined to give support.

You will here perceive that we have to use the term "skeleton" in a very extended sense, in order to embrace all the solid parts of the animals described. Some of the polygastric animals exude on their surface a secretion which agglutinates, lays hold of, foreign particles floating in the waters which surround them, and thus form for themselves a partial covering. The earthy matter, however, is not their own produce—is not due to their vital powers, but is an example of what we shall find to be very common in the class of worms which form for themselves an adventitious covering of foreign matter. There are, however, organs of progressive motion in these lower animals, and in which, as in this instance, the surface of the body is covered with minute vibratile cilia. These, you will observe by the magnified drawings before you, are disposed in regular series. Now in carrying the microscope over the surface of these minute polygastric animals, we find that they present a striated appearance, as if a network of vessels extended over a great part of their surface; and in some this covering appears extremely like vessels in which a homogeneous fluid is in motion, though no action of the vessels themselves is observable. You have that process going on, as in plants, without any visible active agent resulting from the contraction of fibres, because there is nothing of that kind in them. The striated surface of the polygastric animals gives attachment to the cilia by which they move. These striæ form parts, therefore, which give support to the organs of progression, and may be seen here, in the *trichoda*, and some others. This structure is, however, exceedingly small, when compared with what we find in the *beroe*. In the beroe, a magnified figure of which is before you, you will find cilia disposed in eight regular longitudinal series; and in these very minute animals, which are about three quarters of an inch in length, you can see with the naked eye the tough bands on which the cilia are disposed. There is no skeleton composed of earthy matter in the class of polygastrica, though their surface is frequently more dense and loricated.

The next class of animals (for we have to stop but a short time at present upon the first class, as we shall have occasion to dwell more on the polygastric animals, when we come to consider their more complex structures, and the digestive organs to be found in them); the next class of animals, the *poriferous*, is one which presents various and remarkable forms in the skeleton. The poriferous is that class which comprehends all the spongy masses before you. In this class of animals the body consists of a cellular tissue, which is so extremely soft, and the globules or cells of which have so little connexion with each other, that when the living animal is torn, the fleshy substance runs down like oil from the lacerated parts. As in the common officinal sponge, when torn from the rocks at the bottom of the sea, these animals are found to have the fleshy substance of the body so soft, and so completely permeating the whole mass, that it runs down when lacerated like the white of an egg, or like oil. From this little connexion between the component parts of the fleshy substance of the body, and there being no irritability, you would scarcely expect those rapid motions which are seen to result from certain unknown actions which take place in them. The organs of support are formed of fasciculi and bundles of fibres. We find that no stimulus which has been employed in this class of animals has ever excited in them the slightest sign of irritability. Pressing them, burning them, tearing them,—nothing has ever excited so far as is known the least indication of irritability in their adult state. Now in this curious class of animals—the *poriferous* animals—we find that the simple gelatinous body is supported by a skeleton composed of different kinds of earth. In one great group the earth is silica; in another it is the carbonate of lime; in another it is a horny substance.

First, then, with regard to the siliceous skeleton of the poriferous animals. The *halinæ* I now place before you belong to this group; they are poriferous animals with a siliceous skeleton. This siliceous skeleton consists of minute spiculæ, (*A*, Figs. 1 to 10,) minute needle-shaped crystalline particles, which are transparent, and require the microscope in the examination of their form.

A



These spiculæ are grouped together into fasciculi, and these fasciculi are disposed in longitudinal series, so as to serve as a general framework for the whole animal. The fasciculi are disposed, also, in such a manner as to surround the pores by which the water enters into the interior of the body; they surround the canals through which the water passes when it has entered the body; they surround the large orifices through which the streams rush when water is to pass out from the body. These minute siliceous bodies are common to these animals with many forms of the raphides of plants; and, indeed, we are speaking of a form of animals which many naturalists in the present day are inclined to regard as plants. We see them, however, moving spontaneously in their embryo state—moving with great rapidity through the water, and, in their adult state, although we do not perceive the motion that causes the rapid currents of water, we see those currents rush through their bodies.

Now these minute spiculæ have regularly defined and even beautiful forms which are peculiar to each species. In some they present the form of short, straight, crystals, acuminating to a point at one extremity, and obtuse at the other; sometimes they are acuminated to a point at both extremities, sometimes they are slightly curved; but each form is indicative of a particular species. The animal which I hold in my hand is the *halina panicea*. What you look upon is a mass of siliceous spiculæ, which, upon being thrown into muriatic acid, would be detached from the animal mass and collect at the bottom of the vessel; or if you were to use the blow-pipe, and burn off the animal matter, you would get the siliceous spiculæ alone (*A* 5). You can thus examine their form. They are of extreme minuteness, being scarcely the fifth part of a line in length; and when you examine them thus washed and cleaned, on a watch glass, with a light striking and shining obliquely upon them, they exhibit the sparkling appearance which results from facets of a crystal. It is therefore extremely probable that they actually are crystalline bodies in which the silica has assumed the same natural form that it assumes in inorganic substances, — the appearance of a six-sided prism, terminated by a six-sided pyramid. You have crystals of silica in nature, from these fine fibres of asbestos, which can be woven into cloth, to the largest masses of rock crystals, the one being as much crystallised silica as the other, the crystals, however, being so extremely fine in the asbestos, that it even exceeds in delicacy the spiculæ of which I am speaking. It is however an important fact, that when we have got to the lowest forms of animals (and this is common to them with plants), we observe that in the consolidation of the skeleton the earthy matter obeys the same laws, as far as we can discover, as in inorganic nature. The calcareous matter which consolidates the skeleton in the radiated and molluscous classes of animals has generally an obvious crystalline arrangement. It is asserted by Blainville in his lectures on physiology, that if you observe the manner in which one part of the phosphate of lime is united with another in human bones, you find the particles so arranged as to produce a crystalline arrangement— an arrangement which they obey in inorganic nature. We see nothing to contradict this; but there are so many counteracting agents influencing the complex forms of organization, that it is almost impossible to trace in them the laws of inorganic nature. The phenomena become so complex, the composition becomes so intricate, that it is difficult to trace the ordinary operations of physical laws so high in the scale. This, however, is not a sufficient reason for us to conclude, as many do in the present day, that the laws by which organic substances are governed, are something altogether different from the laws which regulate inorganic nature. Everywhere the natural philosopher and the chemist are making encroachments on the province of the physiologist. Everywhere do we find the laws of natural philosophy in operation in our bodies. Various physical instruments exist in animals;— acoustic instruments, pulleys, levers, hydraulic instruments, with all their valves, moving powers, fluids, &c.; but some philosophers are inclined to retard investigation, by assuming as a fundamental fact that the laws which govern organic and inorganic bodies are totally different, and even at variance with each other.

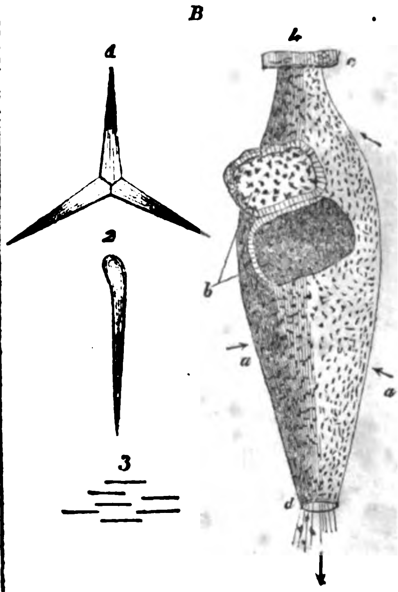
The forms of these minute siliceous spiculæ are important, should you ever come to study the natural history of the animals presenting them; should you ever devote yourselves to their study, you will find that these hard parts, regular and definite in their forms, present valuable characters for the discrimination of species. Here is the form of the *halina patera*, which I mentioned to you. Here is another extremely common species, which is found in the fresh waters around London—the *spongilla friabilis* of Lamarck. It differs from the *halina panicea*. It is acuminated to a point at both ends (*A* 1), the other form of halina panicea being acuminated only at one end. The large cup-like bodies—"Neptune's cups"—which you have seen in the *British Museum*, and in the *Zoological Society*— regularly-formed cups, three or four feet in height, and with a diameter sometimes of more than a foot—these are animals belonging to this group, and they have a skeleton composed of silica. The form of their spiculæ is that of a pin, with a head at one end, and a point at the other end (*A* 7). So that these minute spiculæ, requiring a microscope to see them, would, though brought at the point of a pin from the most remote part of the earth, serve to identify the animal to which they belonged.

In another form of these animals, met with in the layers of oyster shells, the *cliona*, we find a spiculum approaching to that of the *halina patera*. It is in the form of a pin, having a head at one extremity and being pointed at the other. But in comparing the spiculum of this animal with the last, you perceive a striking difference. The one is cylindrical throughout; that of the cliona is fusiform in the middle, and tapering to the ends (*A* 6). These are, no doubt, minute differences, but when examined they serve as important characters in distinguishing the species.

Now the spiculæ which I have mentioned are connected and retained together in the form of groups or continuous fibres, by being held in aggregation by means of a more condensed part of the general gelatinous substance of the body; so that although the gelatinous body itself has been removed from the spiculæ, yet you perceive that they do not fall down, that they are not detached from each other. A kind of cartilaginous substance embodies all the spiculæ and gives stability and a certain degree of flexibility to the whole mass. Now there are before you various forms which these siliceous skeletons assume. Sometimes the animals are branched, ramified, hanging from the under surface of rocks; sometimes they are in the form of cups, which generally hang from the rocks in the sea; sometimes in the form of encrusting masses over rocks, shells, or other submarine substances. You observe that these shells before you are covered with crusts composed of this material. From the one I now present to your view, the soft gelatinous part has been removed, and the silica, with the cartilaginous substance embodying it, only are left.

Now were we to refer the consideration of these substances to the geologist, we should furnish him with a curious subject for reflection. No fossil is more abundant in the chalk formations of England, and indeed in all countries where chalk occurs, than siliceous bodies of a bulbous irregular form, composing the chalk-flints. Those siliceous bodies have belonged to animals of the class of which I am now speaking, the poriferous animals. The pores you have almost lost sight of in the fossils, but you perceive the large orifices from which the currents of water before mentioned rushed. These bodies, although found fossilised in the carbonate of lime, are fossilised with siliceous matter, and they are converted into flints. Silica is found in the water which permeates the strata of chalk, and you know that every substance is soluble in water. Silica is soluble, though proportionally in small quantities. The waters containing the siliceous matter permeating the chalk strata for thousands of years, and coming through the strata of carbonate of lime, have no particular inducement to part with the siliceous matter like that which they have when the siliceous matter comes in contact with a nucleus of silica already existing there in the skeletons of poriphera. You will, perhaps, say that the *echinus* has no silica. But its intestines are filled with silica. Substances will adhere to particles of their own likeness. Siliceous particles will pass the carbonate of lime, but will attach themselves to siliceous particles. Thus, then, we find a reason for the abundance of those poriferous animals in chalk formations. It is owing to their siliceous nature, and that is the reason of their being converted into flints, which you know are siliceous matters.

Some of the poriferous animals have skeletons composed of the carbonate of lime, and all the known forms of the skeleton of the poriferous animals which are composed of the carbonate of lime, are composed likewise of spiculæ. I now place before you animals belonging to



this group having a skeleton composed of carbonate of lime, and you see that in consequence they are white. This is the *leuconia nivea*, as I have called it. This is the *leuconia compressa* (*B* 4), and I believe that term has been adopted by Blainville. These forms possess the same simple gelatinous condition in their fleshy substance—have the same pores (*B* 4, *a a*) on their surface—have the same canals permeating them, and the same fecal orifices (*B* 4, *b*) from which the currents of water rush which pass through them (*B* 4, *d*). They are permeated in all directions by minute spiculæ of the carbonate of lime. These spiculæ of the carbonate of lime have different forms belonging to the same species. In all the known forms of these calcareous poriferous animals, a spiculum occurs, having a tri-radiate form, such as that which I now place before you; a spiculum composed of three

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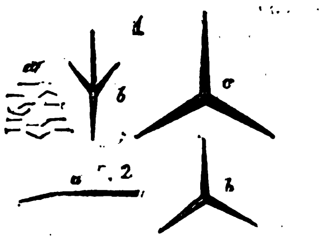

rays, radiating at equal angles from a centre (*B* 1, *C* 1 *c*, 2 *b*). Now, that spiculum occurs in combination with other forms of spicula. Sometimes it occurs in combination with a spiculum of a clavate form (*B* 2); that is the case in the leuconia compressa. In other cases it occurs in connexion with a spiculum of a quadriradiate form, with four rays (*C* 1, *b*) instead of three; and other forms also present themselves, so that we must take all these spiculæ of each species into our consideration, and they afford as valuable a character for the distinction of the different species. These spiculæ are connected together like the silica, by enveloping cartilaginous substance. These calcareous spiculæ surround the pores, the

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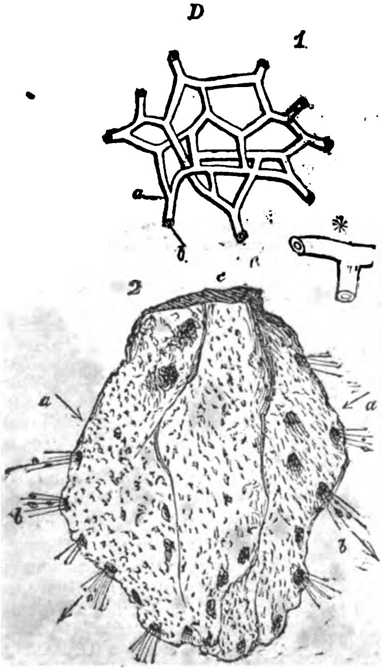

canals, the fecal orifices; they give stability to the whole texture of the body, and general form to each species.

There is another form of skeleton in this class of animals, which is very different from the others. It is that which we see in the *officinal sponge* (*D* 2). Here the spiculæ are composed of horny flexible substances, where there is neither silica nor carbonate of lime. The skeleton is composed of spiculæ of a horny substance, which run into each other, and form a horny network *D* 1, *a*) through the whole body of the animal. In the interior of these horny spicula there is the tubular cavity (*D* 1, *b**), which is common to them with the siliceous and calcareous spiculæ which I hold in my hand. These horny spiculæ unite and form fibres which surround the pores (*D* 2, *a*); they surround the orifices (*D* 2, *b*), and they give form and stability to the whole mass. They have, therefore, the same relation to these species as the calcareous and siliceous spiculæ which I have already mentioned.

I have said, that in the interior of these fibres, or horny spiculæ, there is a cavity. This cavity exists also in the siliceous form of the spiculum. It exists also in the calcareous form of the spiculum.

This detached spicular arrangement of the earthy or solid parts through the whole gelatinous or cellular tissue of the *poriphera*, reminds us of the first commencement of ossification in innumerable detached points of ossific matter, in the fœtus of man and all higher *vertebrata*.

Now these are the forms presented by the siliceous, calcareous, and horny skeletons of the poriferous animals—the three principal groups of this class, and you can judge of the substance which results from the union of all these minute spiculæ, and their grouping together to form a framework—a covering and scaffolding, for the whole body, from the numerous specimens of the animals before us.

To-morrow I proceed to the next class.

CASE OF

HÆMATEMESIS,

WITH REMARKS ON THE FUNCTION OF THE SPLEEN.

By FREDERICK CUMMING, *M.D.*, *Dundee*.

HAVING read in the number of THE LANCET for 15th December, 1832, an account of a case of hæmatemesis treated in St. Bartholomew's Hospital by Dr. Latham, I am induced to transmit to the Editor the following account of a fatal case of that disease which occurred in my practice in June last, in the hope of its assisting the