Meteorological Observations made by Mr. Thompson *at the Garden of the Horticultural Society at* CHISWICK, *near London; by* Mr. Veall, *at* BOSTON; *by the* Rev. W. Dunbar, *at Applegarth Manse,* DUMFRIES-SHIRE; *and by the* Rev. C. Clouston, *at Sandwick Manse,* ORKNEY.

Days of Month. 1849. May.	Barometer. Chiswick. Max.	Barometer. Chiswick. Min.	Barometer. Boston. 8½ a.m.	Barometer. Dumfries-shire. 9 a.m.	Barometer. Dumfries-shire. 9 p.m.	Barometer. Orkney, Sandwick. 9½ a.m.	Barometer. Orkney, Sandwick. 8½ p.m.	Thermometer. Chiswick. Max.	Thermometer. Chiswick. Min.	Thermometer. Boston. 8½ a.m.	Thermometer. Dumfries-shire. Max.	Thermometer. Dumfries-shire. Min.	Thermometer. Orkney, Sandwick. 9½ a.m.	Thermometer. Orkney, Sandwick. 8½ p.m.	Wind. Chiswick. 1 p.m.	Wind. Boston.	Wind. Dumfries-shire.	Wind. Orkney, Sandwick.	Rain. Chiswick.	Rain. Boston.	Rain. Dumfries-shire.	Rain. Orkney, Sandwick.
1.	30·141	30·008	29·72	30·17	30·05	29·98	29·92	56	39	49	65½	39½	51	47	ne.	n.	se.	ese.	......	......	......	......
2.	29·956	29·854	29·58	30·00	29·94	29·86	29·85	65	48	49	57	43	52	46	ne.	nne.	e.	ese.	·09	·04	......	......
3.	29·810	29·797	29·45	29·94	29·97	29·87	29·87	74	44	58	67	46	55	46	e.	ne.	ne.	se.	·01	·13	......	......
4.	29·840	29·822	29·46	29·93	29·88	29·86	29·85	77	47	61	67½	41½	50	45	e.	ne.	ne.	e.	......	......	......	......
5.	29·819	29·781	29·43	29·92	29·90	29·82	29·84	74	45	58	55	43	47	43	ne.	nne.	nne.	ne.	·40	......	......	......
6.	29·843	29·813	29·50	29·91	29·99	29·85	29·88	62	45	49	53	40½	47	43½	ne.	ne.	ne.	nne.	......	......	......	......
○ 7.	29·989	29·889	29·62	30·03	30·09	29·88	29·97	55	36	46·5	54	37	48	43	ne.	ne.	ne.	ne.	·02	......	......	......
8.	30·015	29·994	29·70	30·11	30·10	29·97	29·90	55	39	48	55	36½	47	43	ne.	ne.	ne.	nne.	......	......	0·00	......
9.	29·992	29·970	29·60	30·00	29·93	29·80	29·76	54	40	44	55	42	46	43	ne.	n.	n.	e.	·06	......	......	......
10.	29·914	29·855	29·50	29·90	29·84	29·73	29·73	51	42	42	55	37½	49	41	nw.	nnw.	ne.	ne.	·01	·25	......	......
11.	30·101	29·837	29·50	29·89	29·98	29·77	29·82	56	30	47	54½	41½	48	44	n.	n.	ne.	e.	......	·16	......	·05
12.	30·205	30·172	29·80	30·09	29·99	29·87	29·82	62	41	52	59½	38	46	43	e.	nnw.	ene–s.	e.	......	......	......	......
13.	30·035	29·728	29·56	29·80	29·66	29·53	29·82	63	41	51	56½	47	45	49	sw.	se.	s.	w.	·02	......	......	·10
14.	29·623	29·525	29·20	29·43	29·31	29·33	29·27	68	47	61	57	47½	55	47	w.	s.	s.	......	·04	·02	......	......
☾ 15.	29·571	29·538	29·06	29·31	29·40	29·35	29·27	69	49	56	58	50	49	48	nw.	sw.	ese.	se.	·37	·05	......	......
16.	29·422	29·352	29·00	29·23	29·18	29·17	29·11	68	50	54	57	43	46	47	sw.	se.	se.	se.	·02	·10	1·30	......
17.	29·376	29·286	28·80	29·80	29·10	28·93	28·86	62	49	61	62	48	49	46	sw.	sw.	sw.	nw.	·05	·13	......	......
18.	29·856	29·457	28·97	29·22	29·58	28·92	29·29	66	47	57	64	47	45	43	w.	sw.	nw.	nw.	·01	·21	......	......
19.	30·000	29·935	29·44	29·80	29·82	29·57	29·68	66	50	51·5	64	40	46	43	w.	nw.	se.	n.	·36	·24	......	......
20.	29·821	29·721	29·38	29·65	29·52	29·65	29·56	56	50	54	52	44	45	44	sw.	se.	e.	se.	·64	·17	......	......
21.	29·836	29·771	29·38	29·62	29·62	29·50	29·71	71	47	60	63	48	45	47	e.	s.	sw.	s.	·22	·30	......	......
● 22.	29·866	29·743	28·99	29·44	29·48	29·32	29·22	66	45	54	60	47	49	49	sw.	w.	s.	se.	·20	·05	......	·25
23.	30·205	29·977	29·48	29·70	30·00	29·42	29·80	69	39	58	60	50	59	53	w.	ssw.	wsw.	sw.	......	·20	0·90	......
24.	30·202	30·036	29·70	30·02	29·85	29·78	29·61	76	50	64	61½	44	57	51	s.	w.	w.	s.	......	·05	......	......
25.	29·971	29·945	29·46	29·76	29·76	29·58	29·50	72	50	58	61½	49	54	51	nw.	calm	sw.	se.	......	·15	......	·12
26.	30·013	30·001	29·50	29·68	29·82	29·40	29·64	73	48	55	60	48½	53	50	sw.	calm	sw.	s.	......	......	......	·14
27.	30·186	29·910	29·55	29·93	30·07	29·68	29·91	77	50	61·5	62	45	59	50	sw.	calm	sw.	sw.	·04	·22	......	......
☽ 28.	30·173	30·131	29·56	30·15	30·17	30·04	30·02	58	50	59	67	40	55	51	ne.	calm	sw.	sw.	·97	·07	......	......
29.	30·208	30·165	29·70	30·13	30·03	29·90	29·78	75	46	58	62	40	59	52	w.	se.	sw.	......	......	·21	......	......
30.	30·183	30·076	29·65	30·00	30·03	29·78	29·88	77	53	61	64	50	56	52	sw.	w.	sw.	......	......	......	0·22	·12
31.	29·999	29·970	29·50	29·88	29·73	29·70	29·37	79	45	66·5	59	42	58	51	sw.	calm	sw.	se.	......	......	......	......
Mean.	29·915	29·840	29·44	29·820	30·090	29·616	29·661	66·13	44·25	55·0	59·6	43·7	50·64	46·82					3·53	2·75	2·42	0·78

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IX.—*A descriptive Account of the Freshwater Sponges* (*genus* Spongilla) *in the Island of Bombay, with Observations on their Structure and Development.* By H. J. CARTER, Esq., Assistant Surgeon, Bombay Establishment.

[With three Plates.]

SINCE my "Notes" on these Sponges were published* I have made many more observations on them, and have extended my inquiries into their structure and development, so as to be able to offer a more accurate account of them than I could formerly. I have also ventured to name four out of the five species I have described, because they either do not appear to have hitherto been met with, or if before noticed, have not had their specific differences described with sufficient minuteness for their present identification. The only species which I think I have recognized is *Spongilla friabilis* (Lam.), that kind so admirably described by Dr. Grant†; but even here the point on which I have founded my distinctive characters, viz. the form of the spicula round the seed-like bodies, has not been mentioned with that minuteness which renders my recognition of it entirely satisfactory. So far as actual observation and the information I have derived from the descriptions of others extend, all the species of *Spongilla* which have hitherto been described appear to be so amorphous, that without a knowledge of their minute structural differences, they are irrecognizable. Had this fact been formerly established, the same course which I have pursued for their specification would in all probability have been adopted from the beginning; but with only two species, *Spongilla fluviatilis* and *lacustris* and their varieties‡, the genus appears to have failed from its insig-

* Trans. Med. and Phys. Soc., Bombay, No. 8. Reprinted in Ann. and Mag. Nat. Hist. No. 4, April 1848.

† Edinb. Phil. Journal, vol. xiv. p. 270.

‡ Johnston's Brit. Sponges, Synopsis, p. 250.

nificance to have obtained that attention which would have led to a description of the minute differences now required.

Not so with the nature of *Spongilla*,—that has been a disputed point ever since it was first studied; its claims to animality or vegetability with those of the other sponges have been canvassed over and over again by the ablest physiologists, and yet remain undecided; still this subject does not appear to me to have been viewed in a proper light, for late discoveries would seem to show that there exists no line of demarcation between the animal and vegetable kingdoms, but that on the contrary the one passes by gentle and at last imperceptible gradations into the other. From the existence of cells as the principal component parts and as the elaborators of the most complicated forms of animal and vegetable structures, and the intimate connection that obtains between these little organisms in both kingdoms in their isolated and independent existences and in their simplest composite forms, of which I take *Spongilla* to be one, the time appears to have arrived for abandoning the question of the animality or vegetability of *Spongilla*, for the more philosophical consideration of the position it holds in that transitionary part of the scale of organized bodies which unites the animal and vegetable kingdoms.

Hitherto only five species of *Spongilla* have been found in the island of Bombay; they are the following:—

1. *Spongilla cinerea*, n. s.—Flat, surface slightly convex, presenting gentle eminences and depressions. Vents situated in the depressions, numerous, and tending to a quincuncial arrangement. Colour darkly cinereous on the surface, lighter towards the interior; growing horizontally in circular patches, which seldom attain more than half an inch in thickness. Texture compact, fine, friable. Structure confused, fibro-reticulate; fibres perpendicular, densely aggregated and united by transverse filaments. Seed-like bodies spheroidal, about $\frac{1}{65}$rd of an inch in diameter, presenting rough points externally. Spicula of two kinds, large and small; large spicula slightly curved, smooth, pointed at both ends, about $\frac{1}{67}$th of an inch in length; small spicula slightly curved, thickly spiniferous, about $\frac{1}{560}$th of an inch in length. (Plate III. fig. 5.)

Hab. Sides of freshwater tanks in the island of Bombay, on rocks, stones, or gravel; seldom covered by water more than six months in the year.

Observations.—While the investing membrane of this species remains intact, its surface presents a dark, rusty, copper-colour, purplish under water. It never appears to throw up any processes, and extends over surfaces of 2 and 3 feet in circumference, or accumulates on small objects to the thickness mentioned. It is distinguished from the other species by its colour, the fineness of its texture, and the smallness of its seed-like bodies and spicula.

2. *Sp. friabilis*? Lam.—Amorphous, surface irregularly convex, presenting low ridges or eminences. Vents situated on the latter, large, crateriform. Colour bright green on the surface, faintly yellow towards the interior. Growing in circumscribed masses on fixed bodies, or enveloping floating objects; seldom attaining more than 2 inches in thickness. Texture loose, friable. Structure confusedly fibrous, reticulate, sometimes radiated. Seed-like bodies spheroidal, about $\frac{1}{29}$th of an inch in diameter, presenting smooth points externally. Spicula of two kinds, large and small; large spicula slightly curved, smooth, pointed at both ends, about $\frac{1}{67}$th of an inch in length; small spicula also slightly curved, smooth, pointed at each end, about $\frac{1}{126}$th of an inch in length. (Plate III. fig. 3.)

Hab. Sides of freshwater tanks in the island of Bombay, on rocks, stones or gravel; or temporarily on floating objects; seldom covered by water more than six months in the year.

Observations.—The colour of this species is bright green when fresh, but this fades after it becomes dry. It seldom throws up projections much beyond its surface; does not appear to be inclined to spread much; and is matted and confused in its structure towards its base and round its seed-like bodies. From the other sponges it is distinguished by the *smooth* spicula which surround its seed-like bodies and the matted structure just mentioned. Its green colour combined with the smoothness of its spicula, both large and small, is useful in distinguishing it from the other species, but without the latter it is deceptive, because *Sp. alba* and *Sp. plumosa* become green under certain circumstances. It appears to be *Sp. friabilis*, Lam., from no mention having been made by Dr. Grant (in his description of this species*) of the presence of any but smooth pointed spicula in it, and the appearance of "transparent points" studding the surface of its seed-like bodies, which is not observable in any of the other species, wherein the small spicula are spiniferous or stelliferous.

3. *Sp. alba*, n. s.—Flat or elevated, surface slightly convex, presenting gentle eminences and depressions or irregularly formed projections. Vents large, scattered. Colour yellow, growing horizontally, in circumscribed masses or in irregular patches, encrusting objects, seldom attaining more than an inch in thickness. Texture coarse, open. Structure reticulated. Investing membrane abounding in minute spicula. Seed-like bodies spheroidal, about $\frac{1}{50}$th of an inch in diameter, presenting rough points externally. Spicula of two kinds, large and small; large spicula

* Edinb. Phil. Trans. vol. xiv. pp. 274 and 279.

slightly curved, smooth, pointed at each end, about $\frac{1}{54}$th of an inch in length; small spicula also slightly curved, thickly spiniferous or pointed at each end; the former, pertaining to the seed-like bodies, are about $\frac{1}{200}$th of an inch in length; the latter, pertaining to the investing membrane, are more slender and a little less in length. (Plate III. fig. 4.)

Hab. Sides of the freshwater tanks in the island of Bombay, on rocks, stones, gravel, or temporarily on floating objects. Seldom covered by water more than six months in the year.

Observations.—This species is frequently found spreading over the flat surfaces of rocks to a considerable extent (like *Sp. cinerea*) without throwing up any processes; on the other hand, it is also found in circumscribed portions throwing up irregularly formed ragged projections, of an inch or more in length. It surrounds floating objects, such as straws, or binds together portions of gravel, showing in this latter state a greater degree of tenacity than any of the other species. In structure it is a coarse form of *Sp. cinerea*, but differs from it in colour as well as in the size of its seed-like bodies and spicula; possessing at the same time that peculiarity which distinguishes it from all the other species, of having numerous small spiniferous spicula in its investing membrane, which, when dry, gives it that white, lacelike appearance, which has led me to propose for it the specific term of *alba*.

4. *Sp. Meyeni*, n. s.—Massive, surface convex, presenting large lobes, mammillary eminences, or pyramidal, compressed, obtuse or sharp-pointed projections of an inch or more in height, also low wavy ridges. Colour yellow. Growing in circumscribed masses, seldom attaining more than 3 inches in height. Texture fine, friable, soft, tomatose towards the base. Structure fibrous, reticulated, radiated. Seed-like bodies spheroidal, about $\frac{1}{47}$th of an inch in diameter, studded with little toothed disks. Spicula of two kinds, large and small; large spicula slightly curved, smooth, pointed at each end, about $\frac{1}{63}$rd of an inch in length; small spicula straight, sometimes slightly spiniferous, terminated by a toothed disk at each end, about $\frac{1}{422}$nd of an inch in length. (Plate III. fig. 1.)

Hab. Sides of the freshwater tanks in the island of Bombay, on rocks seldom covered by water more than six months in the year.

Observations.—I have never observed this species either enveloping floating bodies, or growing anywhere but on rocks, in circumscribed portions. It varies like the other species in being sometimes more, sometimes less firm in texture. No other species resembles the officinal sponges in external appearance so much as this when fully developed and free from foreign substances. It is distinguished from the foregoing by the regularity

of its structure, its radiated appearance interiorly, the form of its small spicula, and the manner in which its seed-like bodies are studded with little toothed disks; and from the following species by the fineness of its texture and the spheroidal form of its seed-like bodies. Probably it is the species alluded to by Dr. Johnston* which was examined by Meyen from the kind and arrangement of the small spicula round the seed-like bodies, which however in this species are not cemented together by carbonate of lime as stated by Meyen, but by an amorphous siliceous deposit. I have named it after Meyen, who has characterized it by the description of its minute spicula.

5. *Sp. plumosa*, n. s.—Massive, surface convex, presenting gentle eminences and depressions, or low wavy ridges. Colour yellow. Growing in circumscribed masses, attaining a height of 2 inches. Texture loose, coarse, resistent. Structure coarsely fibrous, reticulated, radiated, fibres fasciculated, spreading from the base towards the circumference in a plumose form. Seed-like bodies ovoid, about $\frac{1}{229}$nd of an inch in their longest diameter, studded with little toothed disks. Spicula of two kinds, large and small; large spicula slightly curved, smooth, pointed at each end, about $\frac{1}{54}$th of an inch in length; small spicula straight, sparsely spiniferous, terminated at each end by a toothed disk, about $\frac{1}{292}$nd of an inch in length. (Plate III. fig. 2.)

Hab. Sides of freshwater tanks in the island of Bombay, fixed or floating, seldom covered by water more than six months in the year.

Observations.—This is the coarsest and most resistent of all the species. As yet I have only found three or four specimens of it, and these only in two tanks. I have never seen it fixed on any solid body, but always floating on the surface of the water, about a month after the first heavy rains of the S.W. monsoon have fallen. Having made its appearance in that position, and having remained there for upwards of a month, it then sinks to the bottom. That it grows like the rest, adherent to the sides of the tank, must be inferred from the first specimen which I found (which exceeded 2 feet in circumference) having had a free and a fixed surface, the latter coloured by the red gravel on which it had grown. I have noticed it floating, for two successive years in the month of July, on the surface of the water of one of the two tanks in which I have found it, and would account for its temporary appearance in that position in the following way, viz. that soon after the first rains have fallen, and the tanks have become filled, all the sponges in them appear to undergo a partial state of putrescence, during which gas is generated in them, and accumulates in globules in their structure, through which it must

* Johnston's British Sponges, p. 154.

burst or tear them from their attachments and force them to the surface of the water. Since then the coarse structure of *plumosa* would appear to offer greater resistance to the escape of this air than that of any of the other species, it is probable that this is the reason of my having hitherto only found it in the position mentioned. As *Sp. alba*, without its specific differences, is but a coarse form of *cinerea*, so *plumosa* is, without its specific differences, only a coarse form of *Sp. Meyeni*. The point which distinguishes it from all the other species consists in the form of its seed-like bodies, which are *ovoid*. From *Sp. Meyeni* it is also distinguished by its surface being more even, its projections less prominent, and its tendency to spread horizontally more than to rise vertically.

General Observations.—It should be stated that in all these species except *cinerea*, their forms *en masse* are so diversified and so dependent on accidental circumstances, that not one of them can be said to possess any particular form of its own, or to be distinguishable from the rest by it alone.

The measurements of the seed-like bodies and spicula are taken from the average of the largest of their kind; they differ a little from those mentioned in my "Notes*," but this is owing to their having been the means of a larger number of measurements than I had an opportunity of making in the first instance. However great the number of measurements, it is probable that when made at different times and from different sets of specimens, the results will always somewhat differ; but this is a matter of very little consequence, as these points alone are not required for distinguishing characters.

The large spiculum is of the same shape in all the species, and is therefore of no use as a specific character. (Plate V. fig. 2.)

Structure and Development.

The freshwater sponge is composed of a fleshy mass, supported on a fibrous, reticulated horny skeleton. The fleshy mass contains a great number of seed-like bodies in all stages of development, and the horny skeleton is permeated throughout with siliceous spicula.

When the fleshy mass is examined by the aid of a microscope, it is found to be composed of a number of cells imbedded in and held together by an intercellular substance.

These cells vary in diameter below the $\frac{1}{1000}$th part of an inch, which is about the average linear measurement of the largest. If one of them be selected for observation, it will be found to be composed of its proper cell-wall, a number of granules fixed to its upper and inner surface, and towards its centre generally one or more hyaline vesicles.

* *Op. cit.*

The granules are round or ovoid, translucent, and of an emerald or yellowish green colour, varying in diameter below the $\frac{1}{12000}$th part of an inch, which is the average linear measurement of the largest. In some cells they are so minute and colourless as to appear only under the form of a nebular mass, while in others they are of the largest kind and few in number.

The hyaline vesicles on the other hand are transparent, colourless and globular, and although variable in point of size like the green granules, are seldom recognized before they much exceed the latter in diameter. They generally possess the remarkable property of slowly dilating and suddenly contracting themselves, and present in their interior, molecules of extreme minuteness in rapid commotion.

When living and isolated the sponge-cell is polymorphous, its transparent or non-granular portion undergoing the greatest amount of transformation, while its semi-transparent or granular part, which is uppermost, is only slightly attracted to this side or that, according to the point of the cell which is in the act of being transformed.

The intercellular substance, which forms the bond of union between the cells, is mucilaginous. When observed in the delicate pellicle, which, with its imbedded cells and granules, it forms over the surface and throughout the canals of the sponge, it is transparent; but when a portion of this pellicle is cut from its attachments, it collapses and becomes semi-opake. In this state the detached portion immediately evinces a tendency to assume a spheroidal form; but whether the intercellular substance participates in this act, or remains passive while it is wholly performed by the habit of the cells which are imbedded in it, to approximate themselves, I have not been able to determine.

Seed-like Bodies.—The seed-like bodies occupy the oldest or first-formed portions of the sponge, never its periphery. They are round or ovoid according to the species, and each presents a single infundibular depression on its surface which communicates with the interior. At the earliest period of development in which I have recognized the seed-like body, it has been composed of a number of cells united together in a globular or ovoid mass (according to the species) by an intercellular substance similar to that just described. In this state, apparently without any capsule, and about half the size of the full-developed seed-like body, it seems to lie *free*, in a cavity formed by a condensation of the common structure of the sponge immediately surrounding it. The cells of which it is now composed appear to differ only from those of the full-developed sponge-cell in being smaller, in the colourless state of their germs, and in the absence of hyaline vesicles; in all other respects they closely resemble the sponge-

cells, possessing also a like but more limited power of motion. [I do not however wish it to be inferred from this close resemblance, that I am of opinion that the seed-like body is but an aggregate of separately developed sponge-cells; on the contrary, there are always present among the cells of a piece of sponge which has been torn to pieces, many which contain within them (developing from their upper an inner surface) a number of transparent cells of various sizes, not unlike the hyaline vesicles in appearance, but all adhering together in a mass. It may perhaps be one of these cell-bearing cells which becomes the seed-like body. They are distinguished from the common sponge-cell by the character I have mentioned, by their containing fewer granules, and by their greater transparency, but in every other respect they are exactly like the sponge-cell.] To resume however the subject of the development of the seed-like body,—it passes from the state just mentioned into a more circumscribed form, then becomes surrounded by a soft, white, compressible capsule, and finally thickens, turns yellow, and developes upon its exterior a firm crust of siliceous spicula.

Thus matured, its cells (Plate III. fig. 6 *b*), which were originally unequal in size, have now nearly all become equal, almost motionless, and a little exceed the average diameter of the largest sponge-cells; while their germs (Plate III. fig. 6 *a*), which in the first instance so nearly resembled the granules of the sponge-cells, are now four or five times larger, and vary in diameter below the $\frac{1}{3000}$th part of an inch, which is the average linear measurement of the largest of their kind.

The capsule (Plate III. fig. 6 *f*) has now passed from its soft, white state into a tough yellow coriaceous membrane, presenting in *Meyeni* and *plumosa* a hexagonally tessellated appearance (fig. 6 *c*), on the divisions of which rest the asteroid disks (fig. 6 *e*) of the vertically-placed spicula (fig. 6 *g*) which surround it.

In the two species just mentioned the spicula are arranged perpendicularly to the surface of the capsule, and the interval between them is filled up with a white siliceous, amorphous matter, which keeps them in position. Each spiculum extends a little beyond this matter, and supports on its free end a toothed disk, similar to the one on its fixed end which rests on the capsule; so that the external surface of the seed-like body in *Meyeni* and *plumosa* is studded with little stellated bodies; while in the other species, where there appears to be no such regular arrangement of these spicula, a number of smooth or spiniferous points is presented.

Development of Spongilla.—When the cells of the seed-like body are forcibly expelled from their natural cavity, under water, they are irregular in form and motionless, but soon swell out (by endosmose?), become globular, and after a few hours burst. At the time of bursting, their visible contents, which consist of a mass of germs, occupying about two-thirds of the cavity of the cell, subside, and afterwards gradually become spread over the bottom of the vessel in which they are contained. They are of various diameters below the $\frac{1}{3000}$th part of an inch (Pl. III. fig. 6*a*), which is the average linear measurement of the largest, and appear to be endowed with the power of locomotion in proportion to their size; that is to say, that while the largest scarcely do more than turn over now and then, as the globules of the blood, the most minute are incessantly moving backwards and forwards, here and there, and assembling in crowds around the larger ones.

If a germ about the $\frac{1}{3000}$th part of an inch in diameter be selected for examination, it will be observed to consist of a discoid, circular, well-defined translucent cell, which is green or yellowish green at the circumference, but becomes pale and colourless towards the centre. This cell appears to be again surrounded by a colourless transparent capsule, the nature of which is unknown to me, and I am not altogether certain of its real existence.

The green colour is hardly perceptible in germs measuring less than the $\frac{1}{10000}$th part of an inch in diameter; below this they all appear to be colourless.

A few days after the germs have been eliminated, they for the most part become parcelled out into insulated groups, and united together by a semi-transparent mucilage. In this position the contents of the largest, which resemble the endochrome of the cells of Confervæ, undergo a change, becoming nebulous towards the circumference, pellucid in the centre, and then nebulous throughout. The largest germs then disappear gradually, and their disappearance is followed by a successive development of proteans or active polymorphic cells. These proteans for the most part do not exceed, in their globular or passive state, the diameter of the germs which have disappeared, and a successive development of them continues to take place from the contents of the same seed-like body for two or three months after their elimination. There are some proteans present, however, much larger, exceeding even the $\frac{1}{800}$th part of an inch in diameter, which always make their appearance under the same circumstances, but they are not so numerous; the most numerous are those which average in diameter the $\frac{1}{3000}$th part of an inch. The form assumed by the latter when in a state of activity is that of the diffluent protean (Plate IV. fig. 1 *e*), which in progression throws out globular or obtuse expansions of its cells; that of the largest, the denticulated protean (fig. 1 *d*), which in progression

shoots out digital or dentiform processes; and that of the smallest, the vermiform protean (fig. 1 *f*), which progresses after the manner of a worm.

They are all (like the cells of the sponge) composed of a cell-wall, within which are round or ovoid, green, translucent granules, varying in size and number; and one or more hyaline vesicles.

The green granules, although appearing to move over the whole surface of the protean in its active state, are, nevertheless, when it is in its globular or passive state, found to be confined to the upper and inner part of its cell-wall. Sometimes these granules, from their smallness, can hardly be recognized individually, and only appear in the form of a nebular mass; this is frequently the case in the diffluent proteans and in those inferior to them in size; at other times they are few in number and all the largest of their kind.

The hyaline *contracting vesicle*, of which there is seldom a plurality in the smaller proteans, appears to be uninfluenced in its presence or development by the state of the green granules, since there is almost always one at least present, and in the enjoyment of great activity.

Such are the changes in the contents of the seed-like body which are witnessed, under this mode of development, with reference to the germs; we have now to turn our attention to the semi-transparent mucilage, which holds the germs together in their insulated groups, or binds them down singly to the surface of the vessel in which they are contained.

This semi-transparent mucilage appears to be identical with the intercellular mucilage of the sponge; it exhibits the same phænomenon of ever undergoing a change in shape, but, as I have said before, I am not aware of its possessing this property, independently of the presence of the cells and minute germs which are contained in it; neither do I know how it comes into existence, *i. e.* whether it be the product of the germs themselves, or whether it be eliminated with them, in a more elementary transparent and invisible form, from the cells of the seed-like bodies. Be this as it may, threads of it soon appear in straight lines extending over the surface of the watch-glass from portion to portion (Plate IV. fig. 1 *h*), and from object to object starting off from different points of an isolated germ—or from any point of a thread of it already formed—sometimes disposed in a flat reticulated structure over a spiculum, or on the surface of the glass—occasionally as broken portions like the ends of threads thrown together without union or order, and not unfrequently bearing minute germs in their course either at irregular distances from each other, or arranged like a string of beads.

It might be as well to notice here that the yolk-like contents of the dried seed-like body, with but slight modifications, undergo the same changes as those of the fresh one. If the former be divided with a sharp knife or lancet, and a portion of its contents picked out on the point of a needle and put into water, it swells out after a few days into a gelatinous mass; its component parts, *i. e.* its germs and semi-transparent mucilage, begin to evince signs of active life,—a successive development of proteans follows, and threads of the semi-transparent mucilage shoot over the surface of the watch-glass in the manner I have just described.

So far the elements of the sponge are developed from the contents of the seed-like body after forcible expulsion; we have now to examine them after having issued in their natural way.

If a seed-like body which has arrived at maturity be placed in water, a white substance will after a few days be observed to have issued from its interior, through the infundibular depression on its surface, and to have glued it to the glass; and if this be examined with a microscope, its circumference will be found to consist of a semi-transparent substance, the extreme edge of which is irregularly notched or extended into digital or tentacular prolongations, precisely similar to those of the protean, which in progression or in polymorphism throws out parts of its cell in this way (Plate IV. fig. 2 *c*). In the semi-transparent substance may be observed hyaline vesicles of different sizes, contracting and dilating themselves as in the protean (fig. 2 *d*), and a little within it the green granules so grouped together (fig. 2 *e*) as almost to enable the practised eye to distinguish *in situ* the passing forms of the cells to which they belong; we may also see in the latter their hyaline vesicles with their contained molecules in great commotion, and between the cells themselves the intercellular mucilage (fig. 2 *f*).

If this newly-formed sponge be torn up, its isolated cells assume their globular or passive form or become polymorphous, changing their position and their locality, by emitting expansions similar to the proteans or polymorphic cells developed after a forcible expulsion of the contents of the seed-like body, and differing only from them in being more indolent in their movements.

Habits of the Sponge-cell.—In describing the habits of the sponge-cell so far as my observations extend, I shall first confine myself to those which are evinced by it in, or when torn from, the fully-developed structure of the sponge, and subsequently advert to the habits of the polymorphic cells or proteans, which are developed from the contents of the seed-like body when forcibly expelled.

The sponge-cell when *in situ* is ever changing its form, both

partially and wholly; its granules also are ever varying their position with, or independently of, the movements of the cell, and its pellucid vesicle or vesicles dilating and contracting themselves or remaining passively distended, and exhibiting in their interior molecules of extreme minuteness in rapid commotion. When first separated from the common mass, this cell for a short time assumes a globular form, and afterwards, in addition to becoming polymorphic, evinces a power of locomotion. During its polymorphism it emits expansions of its cell-wall in the form of obtuse or globular projections, or digital and tentacular prolongations. If in progression it meets with another cell, both combine; and if more are in the immediate neighbourhood, they all unite together into one common globular mass. Should a spiculum chance to be in the course of a cell, it will ascend it and traverse it from end to end, and, subsequently quitting it or assuming its globular form, embrace some part of it and remain stationarily attached to it. The changes in shape and position of the sponge-cell and its intercellular mucilage are for the most part effected so imperceptibly, that they may be likened to those which take place in a cloud. Its granules however are more active; but there appears to be no motion in any part of the cell, excepting among the molecules within the hyaline vesicle, which in any way approaches to that characteristic of the presence of cilia.

It should be understood however that these remarks are not applicable to every sponge-cell, although fully developed, which appears in the field of the microscope, but rather a statement of what a sponge-cell may evince, than one of what every sponge-cell does evince.

The polymorphic cells or proteans which appear in the watch-glass after the contents of a seed-like body have been forcibly expelled into it under distilled water, are much more active in their movements. Their cell-walls frequently assume the most fantastic figures, spheroidal, polygonal, asteroid, dendritic, &c. Their green granules move backwards or forwards, to this side or to that, with great activity, as the part of the cell to which they are attached is attracted in one direction or another; while their hyaline vesicle or vesicles (in progression) appear occasionally in every part, not only of the body of the cell, but in its tubular prolongations. The contraction of the hyaline vesicle seems to take place most frequently when it arrives at the posterior extremity, that is, according to the direction in which the cell is progressing; next in frequency at the sides, seldom in the anterior or central part of the mass. When contraction takes place it is effected more or less completely, more or less suddenly; if complete, a dark speck or opacity marks the original position of the vesicle, in the centre of which, if watched, it may be observed to

re-appear, and as it is carried forward in the movements of the cell with the portion to which it is attached, it gradually regains its original size, and returning in due course to the point from which it started, again contracts as formerly.

In progression, some of the large proteans developed in the way just mentioned appear to be conscious of the nature of certain objects which they encounter in their course, since they will stop and surround them with their cell-wall. It is not uncommon to see a portion of a spiculum in the latter position (Pl. IV. fig. 3), the larger germs of the sponge itself, the body of a loricated animalcule, the $\frac{1}{900}$th part of an inch in diameter (fig. 4), on which the pressure exerted by the protean may be seen by the irregular form assumed by the animalcule the moment it has become surrounded. I once saw one of these proteans approach a gelatinous body, something like a sluggish or dead one of its own kind, and equal to itself in size, and having lengthened itself out so as to encircle it, send processes over and under it from both sides (fig. 6), which uniting with each other, at last ended in a complete approximation of the two opposite folds of the cell-wall, throughout their whole extent, and in the enclosure of the object within the duplicature. Even while the protean was thus spreading out its substance into a mere film, to surround so large an object, a tubular prolongation was sent out by it in another direction to seize and enclose in the same way a large germ which was lying near it. After having secured both objects the protean pursued its course rather more slowly than before, but still shooting out its dentiform processes with much activity. It took about three-quarters of an hour to perform these two acts.

Lastly, I have frequently seen it grapple with its own species; when, if the one it meets is near its own size, they merely twist round each other for a short time and then separate; but when it does not exceed the sixth or eighth part of its size, then there is much struggling between them, and the smaller one escapes, or is secured by the aid of the digital prolongations of the larger one, and enveloped as the object before mentioned in a fold of its cell-wall.

On one occasion I witnessed a contest between two proteans, wherein the large one, after having seized the smaller one with its finger-like processes, passed it under its body, so as to cause it to lie between itself and the glass. For a moment the small protean remained in this position, when the cell-wall raised itself over it in the form of a dome, in which so-formed cavity the little protean began to crawl round and round to seek for an exit; gradually however the cell-wall closed in beneath it in the manner of a sphincter, and it was carried up as it were into the inte-

rior of the cell, securely enclosed in a globular transparent cavity resembling a hyaline vesicle, but much larger (Plate IV. fig. 5); it then attached itself to the upper part of this cavity, assumed a globular form, became opake and motionless, and the larger protean took on its course.

Such are a few of the habits evinced by the sponge-cell, developed in its natural way and by the process I have mentioned.

Now, although no doubt may exist in the mind of the reader as to the identity of the sponge-cells developed in the natural way, and most of those developed from the contents of the seed-like body when forcibly expelled; yet it may be a question with him, whether *all* the proteans developed by the latter method come from the contents of the seed-like body, and therefore whether the proteans whose habits I have just been describing, which slightly differ from those of the sponge-cell, taken from its natural structure (only so far as this, however, that I have not seen the like evinced by the latter), have not been developed from some other source.

All that I can say in answer to this question is, that although the proteans, which have evinced the remarkable habits I have described, are larger than the sponge-cell, more active in their component parts, more active as a whole, and appear to possess a greater share of intelligence; yet their general aspect and component parts being the same, their constant appearance in the watch-glass with the other polymorphic cells in the progress of the development of the contents of the seed-like body after forcible expulsion, when they are nearly as numerous as any other form of the protean cells then present, together with the fact, that the sponge-cell *itself* frequently contains pieces of confervæ within duplicatures of its cell-wall, and other foreign matters, just as these proteans include within the duplicatures of their cell-walls the objects I have mentioned, leaves me no conclusion to come to so reasonably, as, that the proteans or polymorphic cells so developed are but a higher condition of the sponge-cell met with *in situ*. How they obtain this condition, whether it be from the peculiar circumstances under which they are developed, or whether it be the development peculiar to a particular class of cells of the same animal, are queries for future inquiry to determine.

Next to the development of the fleshy substance comes that of the horny skeleton and its spicula, of which little more has been made known to me by my observations, than has been published by others who have already directed their attention to the same subjects. I have not had time to continue my investigation beyond the development of the fleshy substance, which is the utmost to which the contents of the seed-like body when forcibly

expelled reaches; although from my "Notes" it should appear that it went farther, for I have therein stated, that I had seen the semi-transparent mucilage take on an arrangement in form and disposition like that of the spicula in the skeleton; but this was an illusion, for I afterwards found out that this appearance had arisen from the semi-transparent mucilage having attached itself to a series of minute scratches on the surface of the watch-glass.

My impression however is, that both the horny skeleton and its spicula are formed in the intercellular substance, and not within the cells.

The spicula are membranous, and at an early period of their development pliable; they afterwards become firm and brittle. If they be exposed to the flame of a blowpipe, many of them swell out towards the middle or one end into a bulb, like that of a thermometer. This is more particularly the case with spicula of *friabilis* than with those of any of the other species. They are hollow, and the form of their cavity corresponds with that of their own form, being widest in the centre and narrow towards each extremity. Sometimes they contain a green matter like the endochrome of cells of Confervæ.

Growth.—This only takes place during the time *Spongilla* is covered by water, which in the tanks of Bombay is not more than eight, or at the farthest nine months out of the year, but the duration of its submergence of course again varies with the position it occupies on the sides of the tank. Its increase however appears to be most rapid in September and October, *i. e.* about two months after the tanks have become filled; subsequently it appears to go on more slowly. During the season of its growth, or while it is under water, it may extend from a portion, not more than a few lines in diameter, over a surface 2 or 3 feet in circumference, or it may evince no disposition whatever to advance beyond its original bulk throughout the whole season. It increases in size by successive additions to its exterior. To whatever extent this increase may reach, either vertically or horizontally, during the first season (assuming that it commenced from a central point or germ), but few seed-like bodies are developed in it, and these few, as I have before said, are found in the centre or first-formed portion. The next year the development of its fleshy substance appears to commence from these seed-like bodies, which a few weeks after it has again become submerged, pour forth their contents over the last year's skeleton, and reaching its circumference develope a new portion; and in this way, by successive additions, it gradually increases in bulk, while the seed-like bodies accumulate about its centre, till at length it be-

comes based on a mass of them, the lowermost of which merely consist of the refuse of those which have fulfilled the purpose for which they were originally destined*.

Connected with the growth of *Spongilla* is also the following fact, which presented itself to me and which is interesting, inasmuch as it seems to point out, that germs or full-developed cells of it abound in the water of the tanks, independently of those which exist imbedded in their natural structure: viz. one day I observed a few fresh straws floating together on the surface of the water of a tank which abounded with several species of *Spongilla*; they had been accidentally thrown there, but before they began to change colour from putrescence, and therefore but a few days after they had been in the water, a growth of *Spongilla alba* took place around each straw separately, which soon increased to the thickness of half an inch. I do not remember to have seen another instance of such rapid growth, and the freshness of the straw proved this rapidity, for in this country it changes colour after a very few days' immersion.

Although I was perfectly aware that *Spongilla* might be uncovered by water for many months in the year and still retain its vitality, yet I wished to see if this would be the case after the interval of *more* than a year. I therefore placed some portions, which I had kept for this purpose, in tanks supported on bits of cork, and others on stones from which they had been undetached; but from some cause or other, whether from the partial putrescence which its dry fleshy substance subsequently underwent, or from this being present in a larger quantity in sponges taken out of the water in their living state and carefully preserved, than in those exposed to the sun and winds on the dry rocks throughout the greater part of the year, or from both combined, the shrimps and crabs were attracted towards the former and devoured them with rapacity, while they left the latter untouched; so that I was at last compelled to enclose a portion in a gauze-wire case, which was kept 3 or 4 feet beneath the surface of the water for several months. This portion was fixed on a stone, in the position in which it had grown, and when the case was taken up it was found to have exceeded by many times its original bulk, was covered with its natural pellicle, and in the active performance of all its vital functions.

Colour.—This in all, excepting *cinerea*, appears to be yellow.

* Dutrochet has noticed the fact, that in a piece of *Spongilla* which he kept in water for some months, and which contained seed-like bodies, all the soft parts died, became putrid, and dissolved away during the winter, and that in the following spring the fleshy substance became renewed.—Mémoires pour servir à l'Hist. Anat. et Physiol. des Végétaux et des Animaux, t. ii. p. 436.

The contents of the dried seed-like body are yellow, and although the new sponge when it first grows from them appears to be white, yet, if its cells be examined under a high magnifying power, their granules will be found to be translucent and yellow, closely resembling, under transmitted light, the colour of chlorine.

Sometimes the green colour of the yellow sponge is evidently owing to the presence of numerous solitary spherical corpuscules, at other times it is as evidently owing to the presence of an *Oscillatoria* or to *Diatomaceæ*, but more frequently it appears to depend on the presence of some colouring matter in or about its cells or granules themselves.

If some fresh cells of *cinerea* be examined under a high magnifying power, they and their contents will present the gray or lilac tint peculiar to the species, and in like manner the cells of yellow sponges which have become green would seem to indicate a similar position of their colouring matter, which in this instance however generally appears to depend on an extra tint of green added to the cell-granules only.

Undoubtedly the sun has the power of turning the yellow sponges green when they are taken from the tank and exposed in a glass vessel to his rays. At the same time the greater part of the sponges are exposed to the sun in their natural habitations throughout the whole year, and yet, with the exception of *friabilis* (which is always green, at least externally), it is only here and there that you find a portion of the others taking on that colour. Exposure to light again does not appear to have this effect on the small pieces of sponge grown from the seed-like bodies, if care has been taken not to admit the presence of other organisms, for they retain their white cotton-like appearance, although exposed to the sun for several days, *i. e.* from the moment they have become perceptible, up to the time that they perish from the want of nourishment in the distilled water in which they have been brought into existence.

It is impossible therefore under these circumstances to say without further research, if the green colour is owing to an additional tint to the colouring matter of the cells or granules themselves, or to the presence of some foreign organism. Bory St. Vincent supposed it to be owing to the presence of *Anabaina impalpabilis**, but when it is due to an *Oscillatoria* or to *Diatomaceæ*, or to solitary organic corpuscules, they are distinctly visible; the green colour however is frequently present when neither can be observed.

Among other experiments I instituted a set to ascertain if each species of *Spongilla* had its peculiar form of *Proteus*; and for this

* Johnston, Brit. Sponges, foot-note, p. 156.

purpose I took small portions of the yolk-like substance from the seed-like bodies of dried pieces of each of the sponges, and after having placed them in separate watch-glasses with distilled water, set them aside for a few days until the protcans made their appearance*. I then began to compare the latter with one another in the different watch-glasses, but instead of finding that each species of *Spongilla* had its peculiar form, I frequently found that the kind of protean I had determined on as proper to one species, was to be seen on the same or on the following day in a watch-glass containing yolk-like substance from the seed-like bodies of another species, and so on throughout all the glasses. It therefore would appear, that in whatever the specific distinctions of the different protcans consist, too much stress must not be laid upon their external forms.

Respecting the position which *Spongilla* holds among organized bodies, I feel incompetent to offer an opinion. All who know anything about the subject are aware that it is closely allied to both the animal and vegetable kingdoms, but it is for those who are best acquainted with that part of the chain which unites these two great conventional divisions, to assign to it its proper link.

I might here state, however, that we are indebted to Dujardin for the earliest notice of the resemblance of the sponge-cell to the *Proteus*†. Ehrenberg's name for the *Proteus* is *Amœba*; he has also applied the same name to the fifth family of his naked *Phytozoaria polygastrica*, Sect. 3, *Pseudopodia*, in which is included the genus *Amœba*.

Finally, I stated in the P.S. to my "Notes‡," that the *Proteus* fed on its like after the manner of the *Hydra*. The fact which induced me to make this assertion has been already mentioned, but the subject requires further investigation before it can be considered conclusive. It is difficult to conceive why the *Proteus* should enclose within its cell-wall one of its own like, if it were not for the purpose of feeding upon it; added to which the constant accumulation of refuse matter, which, issuing from the fæcal orifices, settles on the surface of the living sponge, when kept in a horizontal position, shows that there is a continual elimination going on of material which is no longer useful in its œconomy, and in connection with the fact to which I have alluded, would seem to point out the probability that such *ejecta*, to a certain extent, consist of the cast-off parts of organisms from which the nutrient parts have been abstracted.

* Throughout all my experiments distilled water was used, and every precaution taken to preclude as far as practicable the introduction of foreign matter.

† Ann. des Sc. Nat. n. s. x. p. 5. ‡ Ann. and Mag. Nat. Hist. *loc. cit.*

EXPLANATION OF PLATES III. IV. AND V.

PLATE III.

Fig. 1. Section of *Spongilla Meyeni*, natural size.
a. Small spiculum and seed-like body of the same, magnified.
Fig. 2. Section of *Spongilla plumosa*, natural size.
b. Small spiculum and seed-like body of the same, magnified.
Fig. 3. Section of *Spongilla friabilis*? natural size.
c. Small spiculum and seed-like body of the same, magnified.
Fig. 4. Section of *Spongilla alba*, natural size.
d. Small spiculum and seed-like body of the same, magnified.
Fig. 5. Section of *Spongilla cinerea*, natural size.
e. Small spiculum and seed-like body of the same, magnified.

As none of these species possess specific forms, it has been deemed advisable to give sections of them, showing their average and relative thicknesses, the form of the projections from their surface, and the peculiarity of their internal structures respectively.

Fig. 6. Magnified section of a seed-like body of *Spongilla Meyeni*, showing, *f*, spicular crust; *g*, coriaceous capsule; *h*, internal cells, and *i*, infundibular opening.
a. Germs of cells magnified,—the largest $\frac{1}{3000}$th part of an inch in diameter.
b. Cell of seed-like body containing germs, magnified.
c. Portion of coriaceous membrane magnified to show hexagonal divisions and transparent centres.
d. Small spiculum of *Spongilla Meyeni*, magnified.
e. One of its toothed disks with central aperture, magnified.

PLATE IV.

Fig. 1. Disk to show the appearance which is presented on the surface of the watch-glass a few days after the matter of the seed-like body has been forcibly expelled into it under distilled water.
a. Denticulated proteus in progression, showing its granules and hyaline vesicles, magnified.
b. Passive state of the same, magnified.
c, c, c. Germs parcelled out in semi-transparent mucilage, magnified.
d. Denticulated proteus, magnified.
e, e. Diffluent proteus, ditto.
f. Vermiform proteus, ditto.
g, g. Animalcules about $\frac{1}{1000}$th part of an inch in diameter, which, to the almost complete exclusion of all other kinds, were generally present with the proteans, magnified.
h, h, h. Threads of semi-transparent mucilage, ditto.
Fig. 2. A magnified view of a newly-formed portion of *Spongilla*, grown in distilled water from a seed-like body, as seen with Ross's microscope, under a compound power of $\frac{1}{8}$th of an inch focus.
a. Sponge-cell with its granules and hyaline vesicles magnified, taken from the same portion.
b. The same in a passive state, magnified.
c, c, c. Marginal or thinnest portion of newly-formed *Spongilla*, ditto.
d, d. Form of its extreme edge, ditto.
e, e. Hyaline contracting vesicles, ditto.
f, f. Sponge-cells *in situ*, ditto.
Fig. 3. Magnified view of a denticulated proteus with a portion of a spiculum in a fold of its cell-wall.
Fig. 4. Ditto, with a loricated animalcule and germ in ditto.

Fig. 5. Ditto, showing a small proteus attached to the side of a transparent cavity in ditto.
Fig. 6. Ditto, in the act of surrounding a foreign body.
Fig. 7. Most striking forms assumed by proteans, developed from the matter of the seed-like bodies (seen at various times), magnified.

PLATE V.

Fig. 1. Remarkable forms assumed by proteans, developed from the matter of the seed-like bodies, magnified.
Fig. 2. General form of large spiculum, ditto.
Fig. 3. Magnified view of spiniferous spiculum.

X.—*Notice of a Bottle-nosed Dolphin* (Delphinus Tursio, *Fabr.*) *upon the Suffolk coast.* By W. B. CLARKE, M.D.

A SPECIMEN of this Dolphin has been sent to the Ipswich Museum within a few days; it was discovered upon the beach at Bawdsey, which is a village about fourteen miles from Ipswich. The animal was stranded on the shore and left by the retiring tide. There are many regular transverse marks across the anterior edge of the dorsal fin, and across the back posterior to that fin: there was also a deep wound in the underside of its throat, a little anterior to the sternal region, apparently inflicted by a lance, and also various marks upon several parts of the body, as if produced by the blunt hook and point of a "boat-hook." By these I am induced to suppose that the creature was entangled at sea, in the net of some fishing vessel, the crew of which, upon finding it there, exerted their best means of despatching it, and afterwards turned it adrift.

Prof. Bell remarks (in his History of Brit. Quad. including the Cetacea), "Considerable ambiguity appears to have rested upon this rare species of northern Dolphin, which has been gradually removed by Desmarest, G. Cuvier, and particularly by F. Cuvier, in his admirable book already quoted (Fr. Cuv. Hist. Nat. Cet. p. 141)." It now appears certain that the "Nisarnak" of Fabricius and of Bonnaterre, and the first of the two Bottle-nosed Whales figured by Hunter, are identical with the *Delphinus Tursio*. Desmarest and G. Cuvier had at first considered them distinct, but the latter distinguished naturalist afterwards corrected the error, and his brother has subsequently fully established their identity.

The first account which we have of its appearance on our shores is that of J. Hunter, in which he considers it as the common Dolphin, *Delphinus Delphis*. The specimen figured (Hunter, Phil. Trans. 1787, p. 373. t. 18) was caught, says Hunter, upon the sea-coast near Berkeley, where it had been seen for several days following its mother, and was taken along with the old one: the latter was 11 feet long.

Mr. Jenyns mentions another instance of its occurrence in the river at Preston, the length of which was 11 feet.

Col. Montagu apparently describes another taken in the river Dart in Devonshire, the length of which was 12 feet.

Prof. Bell continues, "The history and description of this animal are still deficient; it is probably a rare or local species, and may be chiefly confined to the northern seas;" he also believes it probable, with Mr. Jenyns (Brit. Vert. p. 41), that *Delphinus truncatus* of Mont. (Mem. Wern. Soc. iii. p. 75. t. 3) may be admitted as a synonym of this species. The one described by Montagu as taken in the river Dart in Devon, about five miles from the mouth of the river, was 12 feet in length and 8 in circumference at the largest part. When wounded it is said to have made a noise like the "bellowing of a bull."

Our specimen is a female, 8 feet 4 inches in length and 4 feet in girth. In colour it is black on the back, gray and purplish gray on the sides, and white with tinges of dusky white beneath. Forehead convex; jaws produced, subrostral, lower a little longer than the upper. Teeth conical, $\frac{22}{20} : \frac{22}{20}$.

In taking a general view of the creature I noticed the following proportions, viz. the dorsal fin appears to occupy the middle region between the point of the jaw and tip of the caudal fin: then drawing an imaginary line perpendicularly down from the anterior base of the dorsal fin, the pectoral fins appear to occupy the middle region between this line and the point of the jaw; whilst the cloaca occupies the middle region between the same line and the base of the caudal fin.

There is a degree of beauty and elegance about the creature with regard to its general colouring and form, the fins presenting a series of ogee curves: the dorsal fin is ample and curves backward; the pectoral fins appear rather small in proportion to the size of the animal; the caudal fin, being the principal instrument of propulsion, is ample. The *compressed* character of the caudal extremity of the body is carried from the base along the middle region of the *depressed* fin so as to produce a ridge both above and below it, giving that part a peculiarly elegant form, and ensuring the greatest amount of effect in its vertical action upon the medium in which the creature is swimming.

The respiratory aperture is 1 foot 2 inches from the point of the nose, and looking at the animal in profile appears to form an isosceles triangle with the eye and point of nose, the short side of which triangle is bounded by this aperture and the eye: it is so completely closed by the valvular arrangement as to appear like a curved crescentic line with the *ends* or *horns* directed *forwards*. The extremities of this aperture are one inch and three-

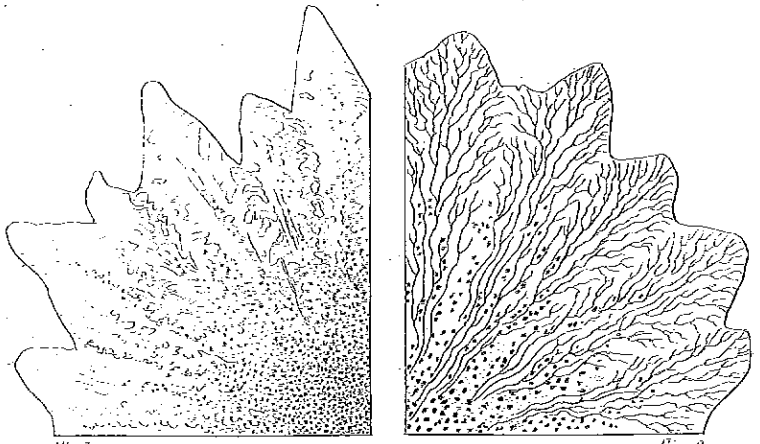

Fig. 1

Fig. 2.

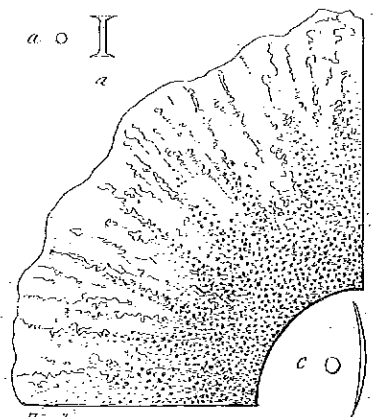

Fig. 3.

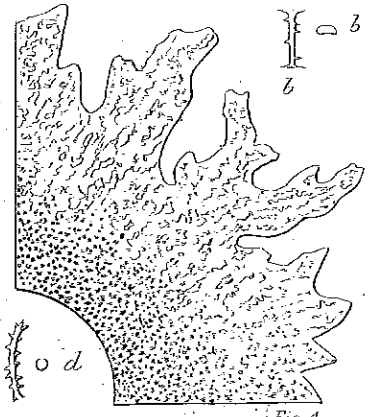

Fig. 4.

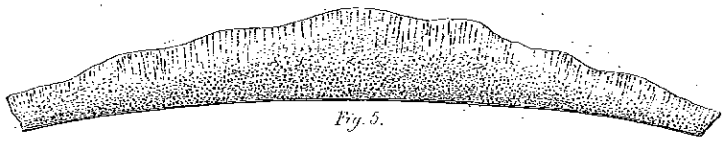

Fig. 5.

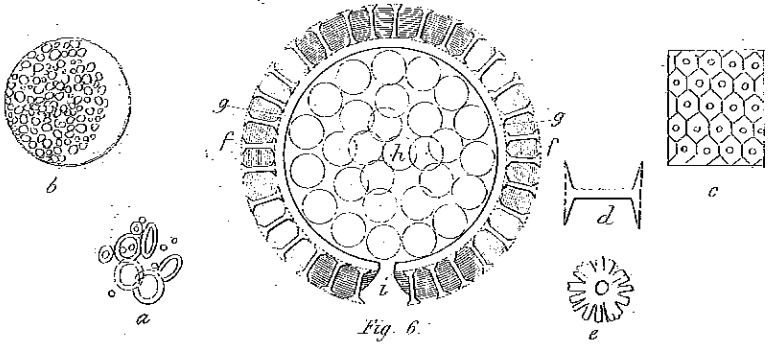

Fig. 6.

H.I.C. del.

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VI.

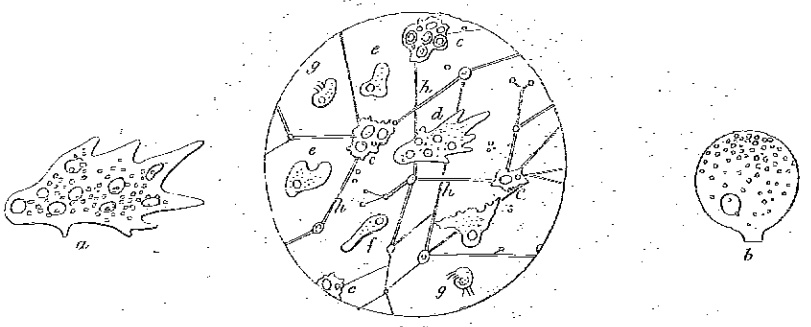


Fig. 1.

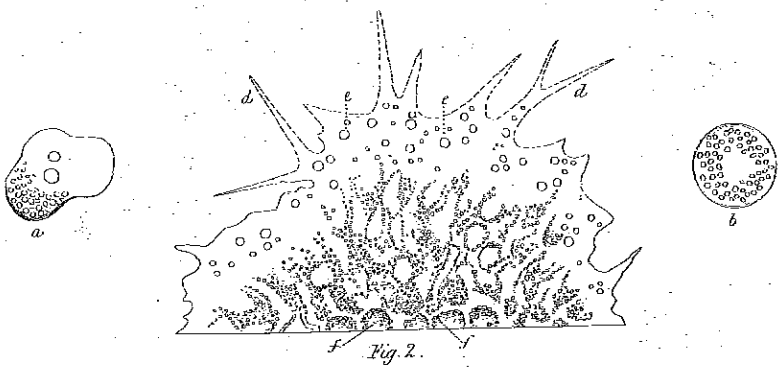
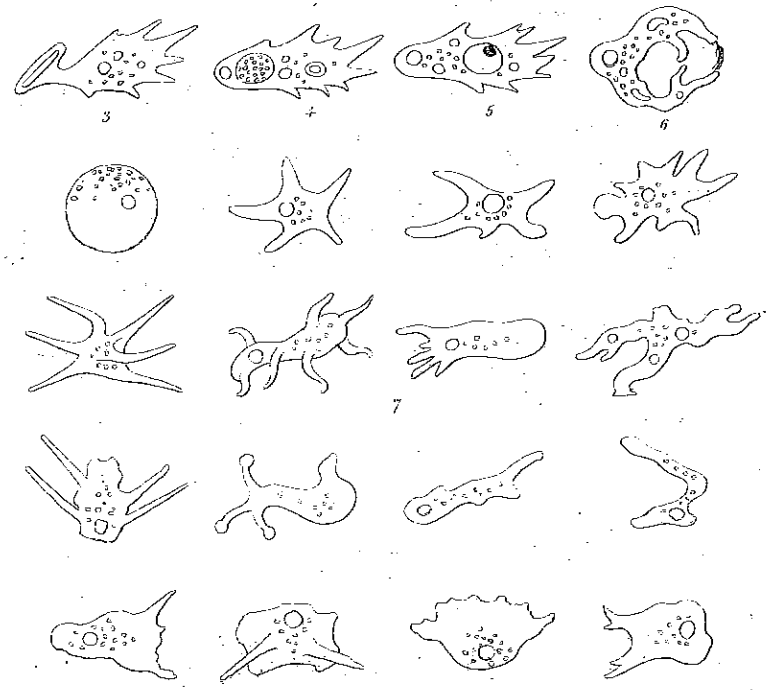


Fig. 2.



H.L.C. del.

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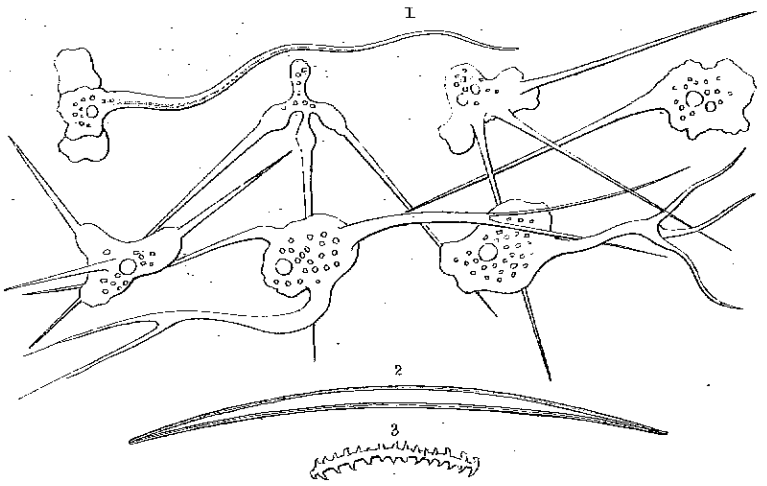
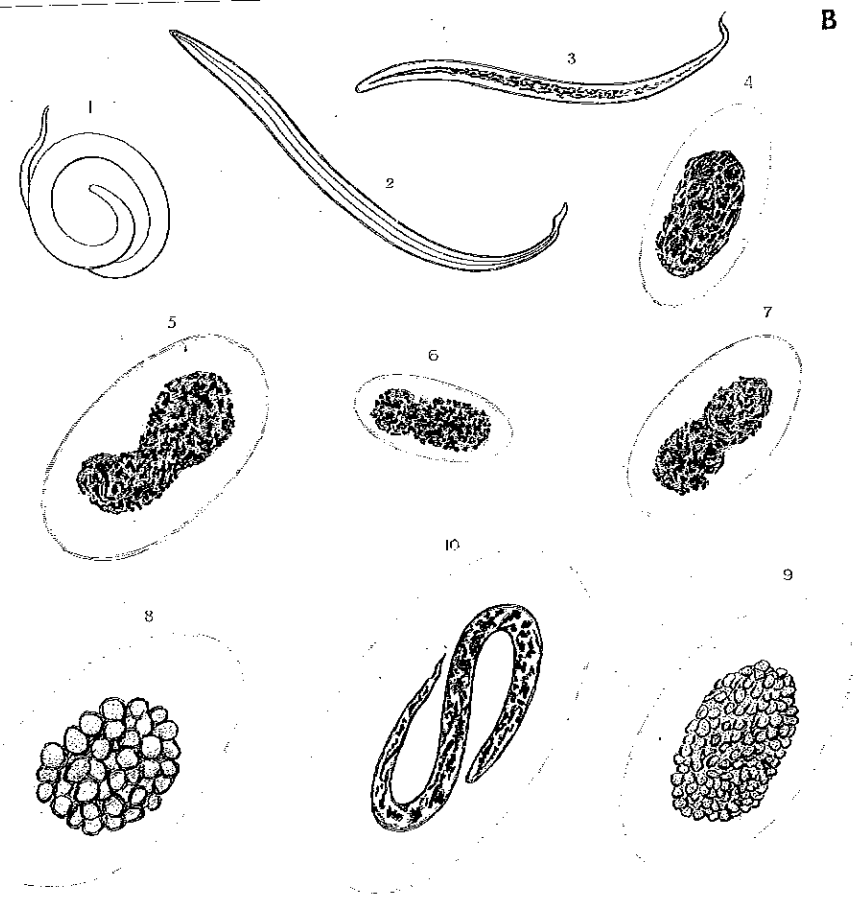


B



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