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belongs to the sexual generation, and if we closely examine the fruit, we shall notice in most cases a difference of form and colour; on the one plant will be the male organ, and on another the female organ which, when fertilised, will produce a seed. This seed when germinated will give rise to a plant, attached to its parent but totally unlike it in structure, which, after passing through many stages of development, bears fruit asexually. This, when germinated *indirectly, produces a plant unlike its parent but similar to its grandparent—hence the alternate generation.

“N.B.—I might say that the Moss is just the reverse of the Ferns—the sexual of the Moss and the asexual of the Ferns being the visible generations, while the asexual of the Moss and the sexual of the Ferns are hidden.

A good deal of misconception prevails as to the position of the founders and present representatives of the family. I cannot agree with the Rev. Hugh Macmillan, Esq., LL.D., F.R.S.E., that Mosses were once the aristocracy of the vegetable kingdom, but whose descendants are beggars now reduced to the lowest ranks, and considered the scum, rabble and riff-raff of vegetation. (Probably these remarks were intended to apply not to the Mosses—“Musci”—but to the Club-Mosses). Mosses, if ever belonging to the aristocracy, belonged to the aristocracy of labour, which honourable position they have held from that day to this.”

It is somewhat remarkable that error, when accepted as truth, maintains a greater ascendancy over the mind, a more overwhelming influence than truth itself. It is a weed difficult to be eradicated.

Yours, &c.,
G. C. BARTLETT.

* I made use of the word “indirectly” as regards the fruit of the second generation. When the spore is germinated, the result is an outgrowth of the inside through the outside coat or covering, in the form of a fine filamentous process, divided by septa or walls usually oblique. These filaments branch generally just below a septum into either a relatively thin filament with brown cell walls and no plant green, these are the roots, or into a relatively thick filament with colourless cell walls and containing plant green, from the base of which as well as from the base of the roots solid buds make their appearance, which develop into the sexual generation of Moss similar to the plant we first observed.

NOTES ON HYDROID ZOOPHYTES.

(With plate.)

By G. CONRAD BARTLETT.

The second step Nature takes is from plants to Plant-animals—Zoophytes—and the chief characteristic of this group of animals, belonging to the sub-kingdom termed Coelenterata or hollow intestine animals, is that their mouths are arranged somewhat like the ray of a flower; so plant-like indeed are their forms that the early observers regarded them as vegetating stones, and invented many theories to explain their growth.

Opposed to all our common ideas of animal life is this singular portion of creation. If we cut a limb off a tree, or sever that of an animal, these parts will wither and decompose, by passing into other forms of matter. Cut a tree across its middle, and its natural symmetry is irreparably disfigured; slit it down its centre, and it is destroyed; all animals so treated suffer instant death, with the exception of the polype tribe; for they will put forth new limbs, form a new head or tail, and if slit, become two separate perfect animals, or under favourable conditions speedily unite again.

The type of the order Hydroida is the Hydra—a little animal found in ponds and rivulets adhering to the leaves of aquatic plants, or twigs and sticks that have fallen into the water. It receives its name from its several long arms being supposed to resemble the many-headed water serpent called Hydra, which, according to fabulous history, infested the Lake Lerna in Peloponesus. It was the offspring of Ichidna's union with Typhon. It had one hundred heads, and as soon as one was cut off two grew up, if the wound was not stopped by fire. It was one of the labours of Hercules to destroy this monster; this he effected with the assistance of Iolaus, who applied a red-hot iron to the wound as soon as one head was cut off. The conqueror dipped his arrows in the gall of the Hydra, and all the wounds which he gave proved incurable.

Leeuwenhoek in 1703 first drew attention to the Hydra, and in 1739 Abraham Trembley, a Swiss tutor in the Bentick family at Sorgvliet, more accurately described its habits. In 1740-44 M. Trembley made some experiments on the Hydra, and published the results in 1744. He succeeded in turning these animals inside out, and the experiment has been frequently repeated, for it is by no means so difficult as it appears. But the conclusions he drew were incorrect. He saw that the Hydra operated upon took food readily, and he hastily judged that the ectoderm or outer layer, did duty as a new stomach, while the endoderm, or inner layer, which had originally formed the walls of the stomach, and contained the digestive cells, functioned as a kind of skin. What really happened was this:—those Hydræ which he saw taking food had, unknown to him, slipped back to their normal condition. He seems to have had some suspicion of this, for when he turned some others inside out he pegged them down with blunt needles. The Hydræ, however, were more than a match for him; for by an outflow of the original outer layer through the puncture, the inner layer containing the digestive cells was restored to its proper position, and so the creatures were enabled to take and digest their accustomed food. When they are prevented from returning to their normal condition they speedily perish. As Trembley's conclusions have been, and frequently are, repeated without any qualification, it may be well to put on record the authority for these statements. This will be found in a paper by Dr. Ischikawa, of Tokio (*Zeits. f. wiss. Zool.*, Band xlix, Heft 3). One could wish that a European had been fortunate enough to correct Trembley's oversight. There is, however, a crumb of comfort; the Japanese doctor is a Jena student, and he has given his researches to the world in a European tongue. And now one word of caution. The pond-hunter will find Hydræ in plenty, but he must not expect to meet with such a monstrous form as that figured with nineteen buds, and reproduced, time after time, even in books of high pretensions—the last Edition of Carpenter's "Microscope and its Revelations" is a case in point—without one word of explanation

that it was artificially produced by high feeding. Trembley is careful to state that he never took a Hydra with more than seven buds, and that specimens with so many as seven were rare. (*Memoires a l'histoire d'un genre de Polypes d'eau douce, a pour servir bras en forme de cornes. Leyden 1744*). Those who copy his plate should, in fairness to him and to collectors, give his explanation also.

Mr. W. M. Bale, author of the "Catalogue of the Australian Hydroid Zoophytes," describes the Hydra with the exception of its relatively longer body and fewness of tentacles as externally a miniature sea-anemone, comporting itself in the same fashion, seizing with its tentacles and devouring any small animal that may come in contact with it.

The body of the Hydra which, like the tentacles, is exceedingly extensible and contractile, is occupied by a cavity which extends from the base to the apex, and is without internal organs of any kind; being, in fact, a simple digestive tube, or food-sac, with a single aperture—the mouth—by which the food is received and the undigested residue expelled. (The absence of a distinct alimentary canal divided off from the general cavity of the body, distinguishes the sub-kingdom Coelenterata, to which the Hydrozoa belong, from all the higher groups; while in the one lower sub-kingdom—the Protozoa—there is no permanent body-cavity at all, and the food mixes freely with the soft protoplasmic material which occupies the interior). The body-wall is composed of two layers, which also extend throughout the tentacles; of these the outer is known as the ectoderm, and the inner as the endoderm. Each consists of numerous nuclear bodies, or "endoplasts," embedded in a granular "intercellular substance," or "periplast"; and each may be rendered more or less complex by vacuolation or fibrillation. Between these two layers the reproductive elements are developed, the male organs consisting of small conical receptacles, situated somewhat below the tentacles, while the globular ova are produced lower down on the body in a simple sac, and are ultimately set free by the rupture of the ectoderm.

Hydrae are not vegetarians; M. Trembley fed some of these animals on minced fish, beef, mutton, and veal; they are voracious and active in seizing worms and larvae much larger than themselves, which they devour with avidity. They carefully and adroitly bring their food towards their mouth, and, when near, pounce upon it with eagerness. To make up for the want of teeth, the mouth enlarges to receive the food brought to it by the arms that have twined around the sacrifice.

Dr. Johnston states:—"Sometimes it happens that two polypes will seize upon the same worm, when a struggle for the prey ensues, in which the strongest gains, of course, the victory; or each polype begins quietly to swallow his portion, and continues to gulp down his half, until the mouths of the pair near, and come at length into actual contact. The rest that now ensues appears to prove that they are sensible to their untoward position, from which they are frequently liberated by the opportune break of the worm, when each obtains his share; but should the prey prove too tough, woe to the unready! The more resolute dilates the mouth to the requisite extent, and deliberately swallows his opponent; somewhat partially, so as, however, to compel the discharge of the bait; while at other times the entire polype is engulfed! But a polype is no fitting food for a polype, and his capacity of endurance saves him from this living tomb; for, after a time, when the worm is sucked out of him, the sufferer is disgorged with no other loss than his dinner."

The most common mode of increase in Hydra, as in all the members of the order, is by gemination. The young Hydra first appears as a slight protuberance on the body of the parent; it increases rapidly in size, often showing the rudiments of the tentacles on the second day, and on the third or fourth day it is sufficiently developed to seize and devour its prey, though it usually remains attached to the parent for a few days longer. Sometimes the vegetative activity is so great that a third, and even a fourth generation may be developed before the separation of the first bud from the parent stock, forming, for the time being, a composite plant-like structure. Occasion-

ally the Hydra multiplies by fission, which may be either transverse or longitudinal.

In the majority of the genera of this interesting order, the polypites remain organically connected, forming a permanent colony, and do not become detached, and enter upon a solitary existence, as in the Hydra.

The whole organism, whether simple or complex, is called the hydrosoma, the plant-like structure of the composite form the hydrophyton. Mr. Hincks compares the hydrosoma to a tree of which the coenosarc or common flesh constitutes the roots, trunk and branches, while the polypites represent the leaves, and the gonozoids or reproductive buds the flowers, the similarity consisting not merely in appearance, but to a great extent in function also; and this is further exemplified by the fact that all the polypites and other appendages may fall off, leaving only the coenosarc, from which a new growth of zooids is produced. This occurs in Tubularia, and from one to two days is often sufficient for the formation of a new polypite in place of that which has fallen off, though it appears that sometimes the zooids may be absent for several months of the year. The polypites instead of falling off, are sometimes absorbed by the coenosarc.

The tentacles are thickly beset with nematocysts or thread cells. They consist of minute sacs embedded in the flesh, and filled with fluid, which contain a long and delicate thread, capable of being projected with considerable force, and inconceivable rapidity. These threads bury themselves in any soft substance against which they may be directed, and, it is supposed, convey into the wound which they make some poisonous fluid. It is, however, doubtful if they have either the power to sting or benumb their prey, as asserted by many authorities. Agassiz likens this thread to a lasso thrown by the polype to secure its prey. Mr. Lewes writes:—"On a survey of the places where 'urticating cells' are present, I stumbled upon an unlucky fact, and one likely to excite our suspicion. They are present in a few jelly-fish which urticate, in Actiniae which urticate, and in all polypes,

which, if they do not urticate, are popularly supposed to do so, and at any rate possess some peculiar power of adhesion. In all these cases, organ and function may be said to go together; but the cells are also present in the majority of jelly-fish which do not urticate, in Oeolids which do not urticate, and in Planariae which do not urticate. Here, then, we have the organ without any corresponding function; urticating cells, but no urtication. It thus appears that animals having the cells, have none of the power attributed to the cells; and that, even in those animals which have the power, it is only present in the tentacles, where the cells are much less abundant than in parts not manifesting the power; the conclusion, therefore, presses on us, that the power does not depend upon these cells. When at rest and in an ordinary natural state, the animal is never seen to dart out these threads, nor upon capturing his prey; it is only when some force is used to dislodge him from some spot to which he has securely attached himself, that he presses or squeezes out these threads, more for the purpose of compressing himself into a closer and smaller mass, to add to the difficulty of detaching him."

Besides the thread-cells, the arm of the Hydroid bears another organ, which has been named by Dr. Wright the "palpocil," and which is connected, no doubt, with the sense of touch. It consists of a long and delicate spine, springing from a small bulb, which is buried in the ectoderm. These palpocils or sensitive hairs are scattered over the tentacles in many species, and over other portions of the body, and must aid the capture of prey by giving instant notice of the presence of any animalcule or other small creature that may brush against them.

Professor Allman divides the order Hydroida into five sub-orders:—

- Sub-order I.—Gymnoblastea, or naked sprout
 " II.—Calyptoblastea, or covered sprout
 " III.—Eleutheroblastea, or free sprout
 " IV.—Monopsea, or solitary polypite
 " V.—Rhabdophora, or rod-bearing polypite.

It is to the sub-order Calyptoblastea, which are protected by an external horny integument, that I have directed special attention, and have collected from the coast around the following species, which I hope to describe on some future occasion.

CALYPTOBLASTEAE.

CAMPANULARIIDAE.

- 1—*Campanularia caliculata*, var. *makrogona*
 2— " *marginata*
 3— " *rufa*
 4— " *serrulata*
 5— " *tincta*
 6— " *tridentata*
 7— " *Sp. (a)*
 8— " *Sp. (b)*
 9— " *Sp. (c)*
 10— " *Sp. (d)*
 11—*Obelia Australis*.
 12— " *geniculata*

LINEOLARIIDAE.

- 13—*Lineolaria flexuosa*
 14— " *spinulosa*

PERISIPHONIIDAE.

- 15—*Lafoea fruticosa*
 16— " *Sp.*

HALECIIDAE.

- 17—*Halecium gracile*
 18— " *parvulum*
 19— " *Sp.*

SERTULARIIDAE.

- 20—*Sertularia acanthostoma*
 21— " *Australis*
 22— " *bicornis*
 23— " *bidens*
 24— " *bispinosa (?)*
 25— " *crenata (?)*
 26— " *divergens*
 27— " *elongata*
 29— " *geminata (?)*
 30— " *loculosa*
 31— " *Maplestonei*
 32— " *macrocarpa*
 33— " *minima* and var. *pumiloides*
 34— " *minuta*

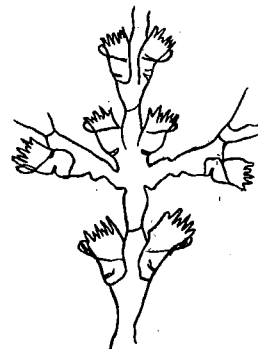
- 35— " operculata
 36— " patula
 37— " penna (?)
 38— " pulchella
 39— " recta
 40— " tenuis
 41— " tridentata (?)
 42— " trispinosa (?)
 43— " tuba
 44— " unguiculata
 45— " Sp. (a)
 46— " Sp. (b)
 47— " Sp. (c)
 48— *Diphasia attenuata*
 49— " *sub-carinata*
 50— *Sertularia distans*
 51— " *divaricata*
 52— " *indivisa*
 53— " *Johnstoni*
 54— " *laevis*
 55— " *longithecata*
 56— " *macrotheca*
 57— " *neglecta*
 58— " *polzonias*
 59— " *pygmaea*
 60— " *ramosa* (?)
 61— " *simplex*
 62— " *solidula*
 63— " *Sp. (a)*
 64— " *Sp. (b)*
 65— " *Sp. (c)*
 66— " *Sp. (d)*
 67— *Thiuraria fenestrata*
 68— " *lata*
 69— " *Sp.*

PLUMULARIIDAE:

- 70— *Plumularia alata*
 71— " *Australis*
 72— " *Buskii*
 73— " *campanula*
 74— " *compressa*
 75— " *delicatula*
 76— " *filicaulis* and var. *indivisa*
 77— " *flexuosa*
 78— " *Goldstenei*
 79— " *hyalina*



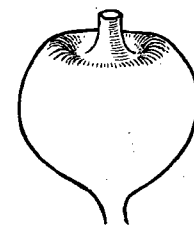
x 20

SERTULARIA RECTA, (*Bale*) and new *Gonatheca*.

x 20

SERTULARIA ACANTHOSTOMA, (*Bale*) & new *Gonatheca*.

x 20

SERTULARIA RENTONI, N.S.P., and *Gonatheca*.

- 80— „ *obliqua*
 81— „ *procumbens*
 82— „ *pulchella*
 83— „ *setacea*
 84— „ *setaceioides*
 85— „ *spinulosa*
 86— „ *Wattsii*
 87— „ *Sp. (a)*
 88— „ *Sp. (b)*
 89— „ *Sp. (c)*
 90— „ *Sp. (d)*
 91— „ *Sp. (e)*
 92— „ *Sp. (f)*
 93— *Kirchenpaueria mirabilis*
 94— „ *producta*
 95— *Schizotricha Sp.*

AGLAOPHENIIDAE.

- 96— *Aglaophenia divaricata* and var. McCoyi
 97— „ *parvula*
 98— „ *plumosa*
 99— „ *ramosa*
 100— „ *Whiteleggei*
 101— „ *Sp. (a)*
 102— „ *Sp. (b)*

HALICORNARIIDAE.

- 103— *Halicornaria ascidioides*
 104— „ *humilis (?)*
 105— „ *ilicistoma*
 106— „ *longirostris*
 107— „ *prolifera*
 108— „ *superba*
 109— *Halicornopsis avicularis*
 110— Gen. (?) *Sp. (?)*

N.B.—I have not collected specimens of the following numbers, though they are recorded from the district by other observers:—24, 25, 29, 37, 41, 42, 60, 104.

SERTULARELLA RENTONI, N. Sp.

A simple or pinnately disposed hydrocaulus of about a quarter of an inch in height; each internode divided by a twisted joint and bearing a hydrotheca on its upper part. Hydrothecae adnate about two-fifths of their length, divergent, tubular,

smooth; aperture not contracted, margin with three teeth, one superior and two lateral.

Large rotundate gonothecae with depressed area around top, from which arises a short tubular neck with entire margin.

Hab.—Queenscliff; Bream Creek.

This species closely resembles *S. pygmae* (Bale), but the gonothecae at once marks it as a distinct form. The first gonotheca I observed was entirely orbicular with the spout or neck rising direct from the summit, but on Mr. Renton bringing me some specimens in a fresh condition, I found that the form was as figured, and that the shape of my first specimen had been altered by drying or the mounting in balsam.

SERTULARIA ACANTHOSTOMA (Bale).

Cat. Aust. Hydroid Zoophytes.

Shoots pinnate, attaining a height of above an inch; pinnae opposite, slender at their origin, each pair springing from the stem immediately below a pair of hydrothecae on the stem between every two pairs of pinnae. Hydrothecae opposite on the stem, subalternate on the pinnae; one pair on every internode except the proximal internode of each pinna, which bears a single one on the lower side; tubular, expanding upwards, the inner side sinuous; aperture oval, not contracted, with eight pointed teeth on each side, three of which are longer than the other five; every alternate tooth somewhat incurved; a small process projecting horizontally into the hydrotheca from about the middle of the inner side, with a fold continued from it across the cell; a second process projecting into the cell from the outer side, near the base; and a small fold extending from about the bases of the outer pair of teeth to a point a little distance down the front of the hydrotheca.

Gonothecae.—Long, obovate, smooth, aperture operculate.

Hab.—Robe, S.A. (Mr. Smeaton); Belfast (Mr. Maplestone); Torquay (Mr. R. E. Trebil-

cock); Queenscliff. (The gonothecae of this and the following species have not hitherto been described).

SERTULARIA RECTA (Bale).

Hydrocaulus pinnate, stem flexuous, each internode bearing a pinna with a pair of hydrothecae above it, and one in the axil, pinnae alternate, divergent, with one pair of hydrothecae on each internode. Hydrothecae in pairs, not in contact with each other, sub-alternate, flask-shaped, upper side horizontal; aperture small, looking upwards, with two broad rounded lateral teeth, one of which almost or quite conceals the other in front or back view of the polypidom.

Gonothecae—Large obovate lower portion with slightly oblique rugae, upper portion with transverse rugae, and tubular expanding neck; aperture operculate.

Color, brownish, hydrothecae pale, except towards the mouth, where they are red.

Hab.—Brighton, S. Australia (Mr. Smeaton); Queenscliff, with gonothecae (Mrs. Bartlett).

Mr Bale notes that he has not met with this species except in Mr. Smeaton's collection. The calycles project directly outwards and consequently present no noticeable difference whether the polypary be viewed from the back or front of the slide.

NOTE.—Figures of Gonothecae were drawn before specimens were permanently mounted in balsam.

NOTES ON THE RUFOUS BRISTLE-BIRD.

By J. A. ROSS.

After reading in "The Geelong Naturalist" (No. 31) Mr. C. F. Belcher's instructive article on the Rufous Bristle-bird (*Sphenura broadbenti*), I decided to become personally acquainted with this very interesting species as soon as an opportunity should present itself, and the opportunity came during last November. When I knew that I would be able to visit some of the dense scrubs in the direction of the Cape Otway Forest, I obtained

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of generation, sexual, and asexual, &c. A reference to my paper will show that my aim was to give without "unnecessary detail," the main outline of a Moss plant's life, suitable to any ordinary thinking observer.

I thought, and still think, that for a beginner my paper contained—for all practical purposes—everything really essential for him to know; to have added further would have been "unnecessary detail." I hold, Sir, that a lover of Nature is, above all things, a lover of truth, so that I have no quarrel with my friend for his attempt to correct what he conceives to be error, though I am afraid the impetuosity of his nature has led him to see error where none exists.

It is a debatable point whether the alternation of generation in the sense he uses it really exists. Neither Dr. M. C. Cook, in his Introduction to "Handbook of British Hepaticae"; Dr. Braithwaite, the prince of Biologists, in his "Study of Mosses"; nor H. N. Dixon, M.A., F.L.S., in his "Student's Handbook to British Mosses" favor that view, though L. Rodway, Government Botanist of Tasmania, does, and possibly others. When Doctors differ, who's to decide?

I am, Yours, &c.,
J. R. MURDOCH.

NOTES ON HYDROID ZOOPHYTES.

(With Plates).

By G. CONRAD BARTLETT.

SERTULARIA OPERCULATA (Lin.)

- "Sea-hair," Ellis, Corall. (fig.)
Sertularia operculata, Lin., Syst.; Esper, Pflanz. Sert. (fig.); Lamk., An. s. Vert.; Johnston, Brit. Zooph. (fig.); Hincks, Brit. Hyd. Zooph. (fig.)
Sertularia usneoides, Pall., Elench.
Dynamena operculata, Lamx., Hist. Pol. Flex., Encyc. Meth.
Dynamena pulchella, D'Orb., Voy. dans l'Amer. Merid.

Amphisbetia operculata, Agassiz N.H.U.S.
Dynamena fasciculata, Kirch., Verhand. Akad. der Naturf., 1864 (fig.)

Hydrocaulus attaining a height of seven or eight inches, much branched dichotomously, a hydrotheca at each side of every axil. Hydrothecae opposite, a pair on each internode, not in contact with each other, tubular, slightly divergent, adnate up to the margin, or nearly so; aperture with a spine-like tooth in front, and the back and outer side produced upwards into a similar tooth, usually slightly incurved.

Gonothecae long, obovate; aperture operculate with slightly elevated border.

Color, light brown.

Hab.—Torquay; Bream Creek; Dredged 20 fath. $4\frac{1}{2}$ miles W.S.W. from C. Sir John, Barren I. (Mr. R. E. Trebilcock); Queenscliff (Mrs. Bartlett).

SERTULARIA BISPINOSA (Gray).

Dynamene bispinosa, Gray, Dirf. N.Z.
Sertularia bispinosa, Coughtrey, Tr. N.Z. Inst., VII. (fig.)
Sertularia operculata (?) D'A. W. Thompson, An. Nat. Hist. February, 1879.

Hydrocaulus attaining a height of eight or nine inches, much branched dichotomously, a hydrotheca at each side of every axil. Hydrothecae opposite, a pair on each internode, not in contact with each other, tubular, slightly divergent, adnate for about half their height; free part contracted on the inner side; aperture with the outer margin produced upwards into two spine-like teeth, the back one more elevated and larger than the other, which is almost in front of it.

Gonothecae obovate, widened laterally, with angles at the sides of the aperture, which are often produced upwards into erect tubular processes, aperture operculate, with a slightly elevated border.

Color, light yellowish brown.

Hab.—Bass' Sts.; Brighton, S.A. (Mr. Smeaton); New Zealand.

SERTULARIA TRISPINOSA (Coughtrey).

Trans. N.Z. Inst. VII (fig.)

Hydrocaulus one or two inches in height, dividing dichotomously and forming short bushy tufts, a hydrotheca at each side of every axil. Hydrothecae opposite, a pair to each internode, not in contact with each other, tubular, divergent, adnate for the greater part of their length; aperture with two nearly equal long erect spines or teeth on the outer margin, and a shorter one on the everted inner margin, the latter recurved towards the hydrocaulus.

Gonothecae.—Pyriform, much widened laterally at the summit with erect tubular processes at the angles; aperture operculate, with a slightly elevated border.

Color, dull brown.

Hab.—New Zealand; Bass' Sts.

SERTULARELLA McCALLUMI (N. Sp.)

Hydrocaulus simple, about one-third of an inch in height, divided by twisted joints into inter-nodes, each bearing a hydrotheca on its upper part. Hydrothecae adnate one-third their height, divergent, ventricose below, contracted above, aperture expanding with two broad lateral teeth.

Gonothecae. (?)

Hab.—Queenscliff; Bream Creek.

Color, light brown.

I have much pleasure in associating with this species the name of our President, Dr. McCallum, who is so actively interested in the present endeavour of the members of the Club in recording the flora and fauna of the district.

CAMPANULARIA MARGINATA (Bale).

Cat. Aust. Hydroid Zoophytes.

Hydrocaulus simple, smooth or slightly ringed, about half an inch in height, divided into three or four long internodes, each bearing on its slightly curved summit a hydrotheca with a very short penduncle, and giving rise on the convex side, just

below the summit, to the next internode. Hydrothecae large, campanulate, four-toothed, with a thickened margin, and a thickened ring parallel with it at a little distance below.

Gonothecae. (?)

Color, yellowish brown.

Hab.—Torquay; Bream Creek (Mr. Renton); Queenscliff (Miss R. Bartlett).

SERTULARIA ADCOCKI (N. Sp.)

Hydrocaulus simple and pinnate, about a quarter of an inch in height. Hydrothecae sub-alternate on the pinnate part of the stem, opposite on the pinnae, tubular, swollen on the upper side, upper half free, divergent, those on the pinnae in pairs, in contact in front, separated behind, a small process within the outer wall of the cell a little above the base, aperture large, round, with two small lateral teeth.

Gonothecae. (?)

Color, light brown.

Hab.—Bream Creek; Port Fairy (Mr. S. Mathews).

I have much pleasure in associating with this species the name of G. H. Adcock, Esq., F.I.S., who is well known for his many valuable contributions to the Botany of the district.

SERTULARIA BIDENS (Bale).

Cat. Aust. Hydroid Zoophytes.

Hydrocaulus pinnate, four or five inches in height, stem flexuous, each internode bearing a pinna with a pair of hydrothecae above it, and one in the axil; pinnae alternate, divergent, with internodes bearing from one to three or four pairs of hydrothecae, the proximal ones longest. Hydrothecae in pairs, not in contact with each other, sub-alternate, flask-shaped, upper side horizontal; a small process usually within the outer wall of the cell, a little above the base; aperture small, looking upwards, with two teeth on the outer margin.

Gonothecae borne on the stem, long, ovate, with two sharp angles at the sides of the aperture; aperture operculate, margin elevated and slightly everted.

Color, dark brown.

Hab.—Queenscliff; Bream Creek; Torquay.

THUIARIA FENESTRATA (Bale).

Cat. Aust. Hydroid Zoophytes.

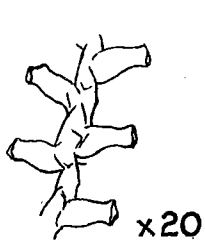
Sertularia crisioides, Busk., Voy. of Rattlesn. (nec Lamx?)

Salacia tetracythara, Lamx., Hist. Polyp. Flex. (fig.); Expos Meth (fig.); Deslonch., Encycl. Meth.?

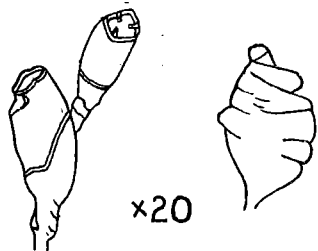
Salacia tetracythara, Lamx., Hist. Polyp. Flex. (fig.); Expos Meth (fig.); Deslonch., Encycl. Meth.?

Hydrocaulus, 1—2 inches in height, pinnate or bipinnate, often forming a tangled mass by the anastomosing of the pinnules; stem indistinctly and irregularly jointed, fascicled below; pinnae alternate, jointed at irregular intervals, three hydrothecae between every two on the same side of the stem. Hydrothecae opposite or sub-alternate on the pinnae, alternate on the stem, a rather wide space between the two series; closely adnate to the hydrocaulus throughout their length; conical, slightly curved outwards, the square base of each (on the pinnae) with its outer angle in contact with the upper and back part of the one below, so that a small triangular space is left below each hydrotheca; aperture rounded, vertical, with two indistinct lateral teeth.

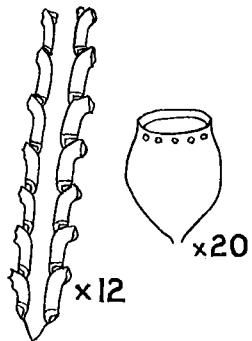
Gonothecae.—Mr. Bale corrects the description and figure given by saying, "the gonothecae are more nearly globular than those of any species known to me." The sketch of one of them by Mr. Busk, which I copied in the "Catalogue of the Australian Hydroid Zoophytes," and from which I took the description, is evidently erroneous, which may possibly be due to some other species having been mixed with the material. The description in the "Voyage of the Rattlesnake" did not mention the gonosome.



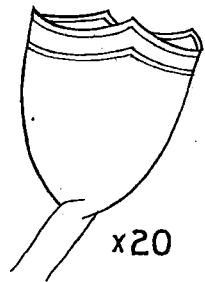
SERTULARELLA M^cCALLUMI, **SERTULARELLA MACROTHECA**
(*New Species*)



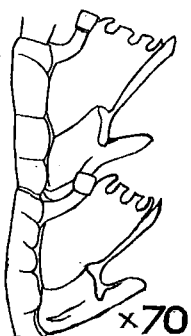
(*gonotheca after Bale*)



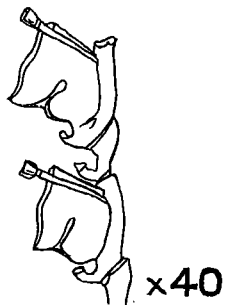
THUIARIA FENESTRATA
(*gonotheca after Bale*)



CAMPANULARIA MARGINATA



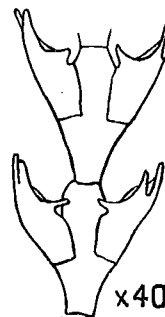
AGLAOPHENIA MULDERI
(*new species*)



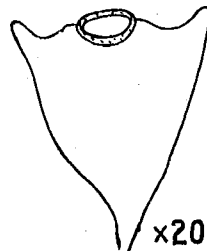
PLUMULARIA BALEI
(*new species*)



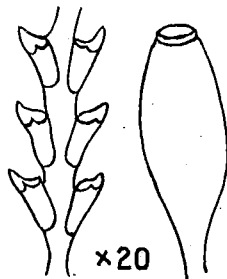
SERTULARIA ADCOCKI
N. S.P.



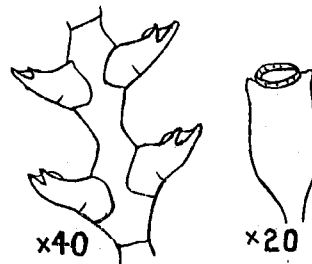
SERTULARIA TRISPINOSA,
with gonotheca (after Bale)



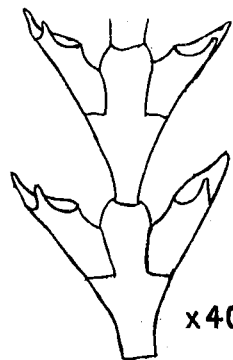
x20



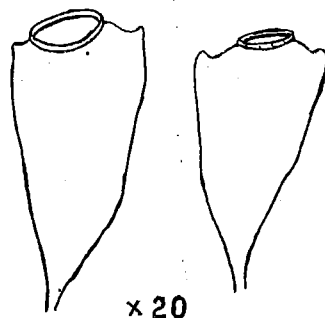
SERTULARIA OPERCULATA
with gonotheca.



SERTULARIA BIDENS
with gonotheca



SERTULARIA BISPINOSA (*after Bale*)



x20

SERTULARELLA MACROTHECA (Bale).

Journ. Mic. Soc. Vict., Vol. II. (fig.)

Hydrocaulus simple, twisted at the base, about half an inch in height; divided by twisted joints into internodes, each bearing a hydrotheca on its upper part. Hydrothecae very large, adnate about half their height, smooth, close, slightly divergent, both series directed towards the front; aperture contracted, with three inconspicuous marginal teeth, one superior and two lateral; three internal compressed vertical teeth within the front margin, the central one largest, extending about one-third across the cell; a similar tooth, but narrower, within each of the other two sides of the aperture.

Gonothecae.—Sub-globular, between two and three times as long as the hydrothecae, with a few slight distinct transverse rugae; summit truncate. Mr. Bale remarks later that he has obtained some smaller than his former specimens, which have the transverse undulations much deeper, closely approximating to those of "*S. solidula*."

Color,—brown, very dark and opaque before preparation.

Hab.—Queenscliff (Mrs. Bartlett).

Mr. Bale remarks that each gonotheca was surmounted by a globular body about equal to it in size, which is probably an external marsupium, but which could not be seen distinctly owing to it being coated with sand and other foreign matter.

PLUMULARIA BALEI. (N. Sp.)

Hydrocaulus about three-eighths of an inch in height, monosiphonic, unbranched, bearing hydrothecae as well as pinnae, pinnae alternate, one on each internode of the stem, both series springing from the front, divided into long and short internodes, of which only the former bear hydrothecae.

Hydrothecae attached only by the base, back constricted midway between the base and the aperture, with well-developed intrathecal ridge, aperture with four marginal teeth, the back one produced or peaked shape.

There are

Anterior sarcothecae fixed, the lateral sarcothecae long, tubular, adnate to and raised above the hydrothecae.

Gonothecae (?).

Hab.—Bream Creek; Queenscliff (Mrs. Bartlett); Airey's Inlet (Mr. Mulder).

I have much pleasure in associating with this species the name of W. M. Bale, Esq., F.R.M.S., Author of "The Catalogue of Australian Hydroid Zoophytes," to whose kindly assistance I am greatly indebted.

AGLAOPHENIA MULDERI. (N. Sp.)

Hydrocaulus monosiphonic, unbranched, about $\frac{3}{8}$ -inch in height, pinnae close, alternate, one on each internode, both series springing from the front of stem.

Hydrothecae cup-shaped, deep, set at an angle about 35 deg., aperture with a nearly erect tooth in front and two on each side, the two centre ones being more or less truncated at the tips.

Mesial sarcotheca about half the length of hydrotheca, free part expanded.

Lateral sarcothecae adnate two-thirds, free part directed forwards, terminal orifice distinct.

Gonothecae (?).

Hab.—Bream Creek.

This species is seemingly of rare occurrence, as I have only found one small specimen, fortunately in very good condition.

I have much pleasure in associating with this species the name of Mr. Mulder, who is well-known for his many valuable contributions to the geology and zoology of the district.

ABOUT TORQUAY.

By A. G. CAMPBELL.

On the road South from Geelong a marked change is noticed in the character of the country about Bream Creek. The basaltic area is left behind with its rich pasture and crop lands, and soil of a loose sandy nature is met with, which extends thence to the coast. These Tertiary sands

are clothed with heather-like plants, chief among which is "Calycotrix tetragona," and there are numbers of grass-trees ("Xanthorrhoea australis") to be seen. A person familiar with the heathy country on the Eastern side of Port Phillip notices these two plants at once. Though the soil in both localities for all practical purposes is identical, yet the two plants mentioned are only found commonly on the Western side. They are both characteristic of Tertiary sandy areas to the Westward right into South Australia, but this locality seems to mark their Eastern limit. Common also are the Hibbettias, Orchids and Pea-flowers so frequently met with to the East of Port Phillip. There is this difference, however, in the two areas. While, in the vicinity of Torquay and in the heaths of Portland the Tertiary sandstone rock is abundant in lime, the areas of the same age to the East of Port Phillip, and also about the Gippsland Lakes are quite devoid of it, though iron is in greater quantities. The limey nodules that are found a few feet down in the sandy sub-soil prove a fine material for road-making near Torquay, forming on short exposure to the weather an excellent concrete surface for light traffic over the otherwise heavy sand.

Along the Eastern side of the road is a sand levee blown up off the track by the prevalent wind which is from the South-west. The boundary fence about the 11th mile is almost covered. In the deep body of sand the largest and best plants are growing, and this is a striking effect of the influence of depth of soil on vegetation. Calycotrix is especially abundant on this mound, with some "Cladium radula," and but little grass-tree, which is abundant on flatter and poorer tracts. The character of this vegetation seems to indicate that the life of the heather cannot be more than 50 years at most. Perchance a natural bush fire would clear it out for a fresh start, or young plants push their way up among the old and failing ones. The grass-tree, it is noticeable, shoots out readily from its blackened stumps after a bush fire, and has then a good chance of crowding out other plants. It also puts up its striking flower-stalk after a fire has passed over.