On Siphonophores

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The bracketed **[..]** and emboldened comments are Totton's marginalia.

1. Brief History of Siphonophores

It is needless to speak of the inconvenience encountered in the study of siphonophore due to the difficulties in catching the specimens and in their preservation. It is readily understandable that countless insurmountable obstacles must be faced in such investigations, particularly in the days gone by when many (relative) techniques and methods were yet in their infancy and such uses of formalin as known today were still unknown. In spite of these handicaps, many scientists have contributed much to the advancement of this field overcoming the difficulties through their excellent technical skill and their detailed knowledge of the subject. Some have undertaken the work of clarifying the unknown elements in the study of this subject while others have contributed many valuable reports even going to various parts of the world or have diligently devoted themselves in furtherance of the study. To this we scientists of today cannot help but express our profound gratitude and are exceedingly pleased that we are able to follow a comparatively easier yet most meaningful path in the study of siphonophore while in many other fields of science one may often go astray from one thing to another.

The first research report on siphonophores appeared at the turn of the 18th century, in which G.E. Rumphius (1705) and J. Sloan (1707) discussed the subject of *Physalia*. The about 70 years later P. Forskål (1775) recorded 5 new species of siphonophores upon the discovery of these medusae in the Mediterranean. In the 19th century, there were reports of investigations by Bosc (1802), Bory de St. Vincent (1804), Peron and Lesueur (1800-1807), Tilesius (1813), Chamisso and Eysenhardt (1821), Lesson (1826), delle Chiaje (1823-29), Quoy and Gaimard (1827-33), and Eschscholtz (1829), et. Thus, the results of their investigations have become the basis of further studies. Particularly we owe much to their knowledge of the Pacific species of siphonophores since the later reports were mostly devoted to those of the Mediterranean and the Pacific. Of these contributions "System der Acalephe" by Eschscholtz, without doubt, establishes the permanently valuable basis for the taxonomy of Acalephae with exceptional accuracy as it is a minutely detailed account of the species previously known. At the same time it will not be an exaggeration to say that the book equally speaks of by-gone days in which much effort has been exerted. And too, in this publication the name "Siphonophores" was first created.

In the reports by Blainville (1834), Brandt (1835), Milne Edwards (1841), Will (1844), and M. Sars (1846) published between 1830-40, many new general and species were named.

The following period of 10 years is the most noteworthy span in the annals of our science. During this time the alternation of polyp and medusoid and the sexual interchange of siphonophores were discovered. Hence the period is the most brilliant stage in the history of this study in which such scientists as Leuckart (1853-54), Kölliker (1853), Gegenbaur (1854-59), Vogt (1854), Huxley (1851-59) have greatly contributed to the advancement of the science through their invaluable and relentless endeavours. Precisely, it is the period during which such phenomena as the

"alternation of generations" was learned and such questions as whether a siphonophore was an individual or a colony became a matter of scientific discussion.

The following period extends from 1860 to the time when the "Challenger" report on siphonophores was published in 1888. Especially great progress was made in the embryological and morphological field, as well as the investigations on the adults and the larval forms; orderly budding of ecto- and endodermal germinal lobe, discovery of nervous system, the studies on the structure of the nematocysts and on the gametes were important contributions. These progressive researches began with the "Naples Siphonophores" by Keferstein and Ehlers (1861), followed by the studies on a detailed morphological structure of the same (Claus, 1860-78), and on the development after artificial fertilisation (Haeckel, 1869). Subsequently, these were succeeded by such outstanding work and reports abundantly rich in information undertaken by such scientists as A. Agassiz (1863, 1865), P.E. Müller (1871), Metschnikoff (1874), Chun (1881-87), Bedot (1884-86). There is still another noteworthy contribution by Weismann, on the gametes in 1883, which was again followed by Haeckel in his "Challenger" report. This report was, however, not limited to the catches (collections) made on the cruise but covers the siphonophores in the Atlantic and Indian Oceans previously investigated by him in the vicinity of the Canary Islands and Ceylon over a period of 20 years, including already known species, making it a most extensive taxonomic study and in which the inclusion of such an unusual group as the Auronectae caught in the deep sea in the classification was truly a memorable occasion for oceanic biology.

In spite of these marked advances made through such great contributions by Haeckel, further research on siphonophores was relentlessly carried on added with increasing numbers of reports on the new species and other discoveries. Chun, about the same time as the Challenger report, completed the taxonomy of all the Atlantic species of siphonophores in his publications on these animals in the vicinity of the Canary Islands (1897). On the other hand, it is an outstanding fact that C. Schneider in 1898 made public an entirely new taxonomic system augmented by the addition of every known species of the world, outranking the Haeckel publication on the taxonomy.

During this period of the investigations, siphonophores were most minutely explored covering every phase of the study: the morphological analysis by Chun (1897) and Schneider (1896), the embryological study of the larva of *Velella lata* by Woltereck (1906), and in the histology, the study of the nematocyst bands and nematocyst by Schneider (1899, 1900), the study of the nervous system by Schaeppi (2898), and of the gonophores by Dr. Goto (1897) and W. Richter (1907). In the field of taxonomy and the fauna there are such notable records of siphonophores as those reported by Chun (1897) in the "Plankton Expedition", by Romer (2901) in "Fauna Artica", by Bedot (1903-1905) of species caught during the expeditions by Prince of Monaco and by Vanhöffen (1906) in "Nordisches Plankton", including the taxonomic studies of Chun and Schneider.

Thus, only the names of well known investigators have been mentioned so far in this paper yet there are countless scientists participating in this scientific work. Despite so many enthusiastic and tireless efforts there are still such tremendous amounts of unknown facts to be uncovered by us all that we cannot escape the feeling of being slightly inferior to the fellow scientists of other zoological fields. Particularly this is true with the Pacific species that have been investigated over 50 years ago from which many of the present day classifications are made. Therefore, we cannot help

but wonder that, perhaps the research of Pacific siphonophores are based on such indefinite findings that the identifications are doubtful.

2. Various anatomical parts.

Leuckart has classified a metazoan phylum called Coelenterata, lacking a special coelom, in which two different forms are seen - one is the "polyp" having either columnar epithelium or pear-shaped cells and the other free-swimming soft bell-like chrysomitra (medusae). There is a close relation between polyps and chrysomitra (medusae), and between chrysomitra (medusae) and polyps the so called "alternation of generations". In siphonophores these two forms appear - as a colony on one stem in nectophores and in each case they develop a polyp or a medusoid, are nothing more than simple organs when considered from the functional standpoint because they have lost independent functions through fusion. Thus, the question of whether a siphonophores is an individual polymorphic form arises. Therefore, it would, perhaps, be more appropriate to proceed first with morphological differentiation of polyps and chrysomitra (medusae) setting aside the other phase of the subject previously mentioned. Of various anatomical structures of siphonophores those of the medusae type are "the pneumatophore [**NO! pneumatophore not a medusoid - (outmoded idea)**] and the gonophore" while those of the polyp stage are the siphons, the palpons and the bract [**NO**].

The pneumatophore is a sac that stores a gaseous substance and is situated at the upper end of the body which is variable provided with or without a stigma for the passage of gas to the outside. In any case, the sac functions to maintain the vertical equilibrium of and to regulate the buoyancy of the animal. The secretion of the gas within is accomplished through a special gas gland.

Ordinarily many nectosacs or nectophores are attached to the lower part of the pneumatophore. These are of a thick agar-agar like quality and have the circular canals and somatocyst. However, there are a type of medusae devoid of a gastrovascular cavity [**manubrium**], the oral tentacles and the palpon [**? manubrium**]. The shape indicates a definite symmetry and with this agar-agar like structure, a well developed, muscular subumbrella is found by whose contraction the water within the cavity is ejected and through its pumping motion, the movement of the entire body is carried out.

Gonophores are usually found on the lower part of the body and are either male or female. In no case is dioecious. However, in some cases gonophores of both sexes are found on the same stem while in others they are attached to different stems. The germ cells, that is, eggs and sperm develop and the stalk [**of the oozoid (protosiphon at its tip)**] grows more or less definitely. The medusae usually have four radial canals which are linked together by a circular canal. The gonophores, in most cases, develop [**? on**] the gonodendra at the basal part of the gonopalpon or the siphon. The period of growth of gonophores to medusae form and of the generative period of germ formation vary for each species. In some cases the fast growing germ cells are enclosed by chrysomitra [**not siphonophores**] (medusae) and continue their growth and when the cells are fully developed, most of them become independent, separate medusoid forms having acquired free-swimming characteristics. However, there are instances in which the separation does not occur or in other cases the growth and the ejection of the gametes (germ cells) commence after the separation of the complete chrysomitra (medusae).

Thus, it is assumed that the above 3 developmental types comprise the medusoid stage of the life cycle. However, the appearance of the bud nucleus when

budding is indisputable fact. The siphons are a well developed muscular cone, spindle-form or inverted club-like tube (canal), having usually four different anatomical parts: a slender stalk: a basigaster (tentacle) with many nematocyst, on the ectodermal lobe; a stomach with various glandular processes; a proboscis (manubrium) with a terminal muscular and free opening (mouth) and closing mechanism. These four parts are easily distinguishable and are rarely indistinguishable. The tentacles that extend from the stem [**basigaster**] are often diversely classified as to their developmental origin - sometimes they are considered part of the siphon while on the other hand, they are recognised as an independent anatomical part. In any case, they occur with the siphon, generally as an extremely long contractile thread and in most cases have lateral branches on which numerous nematocyst occur, and known as the tentilla (Nesselknöpfe).

The palpons resemble the siphons in form but lack the oral part, and their tentacles similarly extend from the basigaster: (tentacle) which is simple, short and small, having neither lateral branches or nematocyst. That part which performs the protective function of siphons, palpons and gonophores is the bract a transparent gelatinous mass that is either leaf or wedge-shaped. From some part of the stem a branch enters in and runs toward the lower part, terminating in a blind sac-like end - occasionally clusters of nematocysts are observed on the bracteal surface.

It is readily understandable form the morphological standpoint that the siphons, palpons and bracts [**NO**] just mentioned are of polyp form. However, it is quite debatable whether or not they are, in the true sense, polyps. Some investigators [**Hkl!**] claim that the siphon and the palpon are the result of the separation of the umbrella from the medusa leaving the stalk or regeneration of tentacles at the margin of the umbrella into new sets of tentacles and the bracts result from a partial regeneration of the umbrella. In addition to these anatomical parts Haeckel has identified [**suspected!**] a small terminal canal, often identified as palpons in the past, to be a cyston or anal vesicle. He has further defined, upon investigation, the aurophores occurring in siphonophores to be a nectophore resulting from a special variation [**Rot**]. But later Chun has stated that its formation is a product of a partial transformation of the pneumatophore.

In any case, the above mentioned parts are not all present in every species and they are not always attached to one stalk. Sometimes a group of several individual parts is separated from the rest. In all the siphons and the gonophores are present but occasionally the tentacles are absent in which such parts may be thought to have been lost in the collection (of the animals). However, the mode of their attachment to the stalk varies with each species and the morphological structures of siphonophores are complex, thus the author has felt the necessity to summarise the question at this time.
(Continued in the next issue.)

明治四十一年

動物學雜誌

第二十卷

みに於て見たり、前者は後者より數少なく其中に第七圖の如く圓錐狀突起の短きものを見たり、體の全長は五六—八一ミクロン Fabre-D. によれば〇、〇五—〇、〇六ミメ、横徑は四〇—五四ミクロンあり、分裂を始めんとするものにあつては一體に更に長くあり、予の測りし一例は八七ミクロンありたり Fabre-D. 氏によれば〇、〇九—〇、一一〇ミメなりと云ふ。

體の表面は平滑にして（ある箇體にては甚だ幽に間隙狹く縱走せる線紋らしきものを見る）纖毛帶の他には纖毛なし、纖毛帶の構造は前種と同樣なり。

口收縮胞、肛門前種と同樣なり。

大核は兩端圓き棒狀にして前種のものより短く且つ直なり。

横分裂をなしつゝあるもの多數にありたり、又前面にて接合するものも少からず。

Didinium 屬にて今日まで發見せられたるは右の二種のみ、此屬は體形と纖毛帶の外は裸なる點等より一見浸滴蟲類の中にてツリガネ蟲等を含める Peritricha に屬するが如くに思はるゝを以て其中に入れし人ありたれども精細に觀察する時は口の構造に於て非常なる差違あり又た其纖毛帶の纖毛も Peritricha の adoralzone とは異りたる性質のものにして、之はやはり Holotricha に入るべきものなり、つまり全體一樣に生へたる纖毛が纖毛帶を殘してなくなりたるものと見なすべきものなり。

●管水母に就て

（明治四十一年三月二日受領）

川村多實二

一　管水母研究の略史

管水母は採集の容易ならざることゝ保存の困難なることより研究に不便なること言ふ迄もない、殊に種々の技術尚未だ幼稚で、フオルマリン等の用法も知られなかつた昔時にあつては、其研究の困難であつたことは想像するに餘りある事である、然るにそれにも係らず多數の學者は、卓越せる手腕と精緻なる識見とを以て、此等の困難を排して諸方面の闡明に勉め或は外洋に觀察して有

益なる報告を齎し、或は散逸せる事實を綜合して明快なる解說を與へたことは、吾人が感嘆措く能はざる所であつて、同時に又甲論乙駁時には左に走り時には右に偏しつゝ歩を進め行く科學の發達史に於て、一の興味深き徑路を管水母研究の上に辿り得ることは、吾人が最も愉快とする所である。

管水母が學者の研究誌上に顯はれたのは十八世紀の初めで、チー、イー、ルンフイウス(G. E. Rumphius 一七〇五)氏及びゼー、スローン(J. Sloane 一七〇七)氏がカツヲノエボシ(Physalia)を記載したるのに始まつて居る、之れより七十年を經てピー、フオルスカル(P. Forskål 一七七五)氏地中海に管水母を發見し、五屬を記載した、十九世紀に入つてボスク(Bosc 一八〇二)ボリー、ド、サンバンサン(Bory de St. Vincent 一八〇四)、ペロン及びルソー(Péron et Lesueur 一八〇〇—一八〇七)、チレシウス(Tilesius 一八一一)、シヤミツソー及び、アイゼンハルト(Chamisso et Eysenhardt 一八二一)、ルソン(Lesson 一八二六)デル、シヤヂユ(Delle Chiaje 一八二三—二九)、クオイ及ガイマルド(Quoy et Gaimard 一八二七—三三)、並びにエシユシヨルツ(Escholtz 一八二九)の諸氏の研究報告がある、此等の人々の研究は後の研究の基礎となつたもので、特に太平洋の管水母に關する吾人の智識は諸氏に負ふ所最も多く、之れより後の研究は主として地中海太平洋の種類に就て爲されたものである、而して諸氏の仕事の中に就てもエシユシヨルツ氏の著 System der Acalephae は、氏以前の種類を精密に記載したものであつて、實に驚嘆に値する精緻を以て永久に價ある根底をAcalephaの分類に据付けたもの、同時に混沌たる有樣であつた此古い時代の終末を告げたものといつても溢美でない、Siphonophoraeの名は實に此書に於て創められたのである。

一八三〇年代と四〇年代にはブレンヴイユ(Blainville 一八三四)、ブラント(Brandt 一八三五)、ミルネエドワード(Milne Edward 一八四一)、ウイル(Will 一八四四)、並びにエム、サース(M. Sars 一八四六)氏等の報告があつて、之れによつて管水母は多くの新屬新種を得た。

次の十年間は頗る注目すべき時代で、水螅體と水母體との世代交番が發見せられ、管水母に於ても亦有性代と無性代との交番あることが發見せられて、光輝ある一時期を管水母研究史上に作つた時でロイカルト（Leuckart 一八五三、五四）、ケリケル（Kölliker 一八五三）、ゲーゲンバウル（Gegenbaur 一八五—四五九）、フォグト（Vogt 一八五四）、ハックスレー（Huxley 一八五一—五九）等の諸氏が與つて力あるのである、即ち從來別の動物だと思はれた或種類が同一の動物の異なつた世代であることが發見せられた時代で、管水母は個體であるか群體であるかといふ趣味ある問題の持ち上つたのも此時代である。

次に劃すべき一時期は一八六〇年以後一八八八年チャレンヂャー報告の管水母が出た迄の間で、特に發生學形態學の方面に於て著しい進歩を爲したのであるが、諸種の成體と幼蟲との研究、内外兩胚葉より規則正しく芽の出ること、神經系統の發見、刺細胞の構造、生殖細胞の研究等が主なるものである、此等はケーフエルスタイン及びエーレルス（Keferstein et Ehlers 一八六一）氏の子ープルスの管水母研究に始まつて、クラウス（Claus 一八六〇—七八）氏の綿密なる形態構造の研究、ヘッケル（Haeckel 一八六九）氏の人工受精によつての發生の研究、次でエー、アガシー（A. Agassiz 一八六五、一八六六）ピー、イー、ミユラー（F. E. Müller 一八七一）、メチユニコフ（Metschnikoff 一八七四）、スツーダー（Studer 一八七八）、フユークス（Fewkes 一八七九—八九）、クーン（Chun 一八八一—八七）、ブドー（Bedot 一八八四—八六）諸氏の豐富なる報告又は立派な仕事がありウアイスマン（Weismann 一八八三）氏の有名な生殖細胞の研究があつて、後に偉大なるヘッケル氏のチャレンジャー報告が表はれたのである、此報告は實にチャレンジャーが採集したものゝみに止まらないで、氏が其前二十年間にカナリー島セイロン島で觀察した太西洋印度洋の管水母を記述し且舊來の種類を網羅した分類系統である、就中チャレンヂャー號が深海で獲た珍奇なる Auronetae の一部類が此系統に來り加はつたのは特筆大書すべきことである。

併し乍ら此ヘッケル氏の大系統出でゝも管水母の研究は

暫くも休眠することなく、新奇有益なる報告が續々踵を接して出でた、クーン氏はチャレンヂャー報告と同年にカナリー島の管水母の研究を發表し後一八九七年に至る間に氏の太西洋種類の分類系統を大成し、シュナイダー（C. Schneider, 一八九八）氏は別に全世界の管水母を包括する一新系統を公にして、各ヘッケル氏の系統に代へたことは著るしき事實である、此間研究は各方面に向つて益細微の域に入り、形態學ではクーン（一八九七）シュナイダー（一八九六）兩氏の解說、發生學ではウオルテレツキ（Wolterеck 一九〇六）氏のカツヲノカムムリの幼蟲の研究、組織學ではシュナイダー（一八九九、一九〇〇）氏の刺胞節及び刺細胞の研究、シエッピ（Schaeppi 一八九八）氏の神經系統の研究、我五島博士（一八九七）並びにリヒテル（W. Richter 一九〇七）氏の生殖體の研究、分布及び分類學ではクーン（一八九七）氏のプランクトンエキスペヂションの管水母レーメル（Römer 一九〇一）氏のフアウナアークチカの管水母、ブトー氏（一九〇三―〇五）氏のモナコ公の探險船の獲たる管水母、並びにファンヘッフエン（Vanhöffen 一九〇六）氏のノルヂッシエスプランクトンの管水母の記載と前に述べたクーン、シュナイダー兩氏の分類系統とが主要なるものである。

以上は平常管水母の記載に表はるゝ學者の名を擧げたのであるが、此外尚多數の研究者がある、かく澤山の仕事が爲されたにも係らず種々の方面に於て今尚詳ならざる點甚だ多く、管水母に關する吾人の智識は他の部門の動物に於けるそれと比較して頗る遜色あるを免れない、特に太平洋の種類に對する觀察の多くは今より五十年以前になされた者で、然も今日の分類系統が此等の研究に由來する所決して尠くないと云ふ事は、豫斷的に太平洋管水母の研究が未解決の問題や曖昧なる種類の判斷に資することがありはしないかとの感を抱かしむるのである。

二　體を構成する諸部分

ロイカルト氏が特別の體腔なる部分を缺いで居ることから腔腸動物と名つけた後生動物の一門に於て、常に二つの異なつた形が見らるゝ其一は通例他物に固着して圓柱狀棒狀或は梨形を取る所の水螅體で、其二は水中に游動

する柔軟な鐘狀の水母體である、此兩者の間には密接な關係があつて、水螅體より水母體を生じ水母體より水螅體を生じ所謂世代交番を行ひつゝあるのであるが、玆に我管水母に在つては此二樣の形が一幹の浮游體中に群集して表はれ來るのである、而して其各は孰れも出芽の法によつて幼蟲の體の諸部分に起るもので、別々の個體の樣であるが、各自一定の機能に應じて分化を遂げ獨立性を失つて居るから、其水螅體たると水母體たるとを問はず作用の上より之れを見ると、寧ろ單に機官に外ならない、之れが管水母が個體であるか群體であるかの議論を惹き起す所以のものである、此議論は暫く措いて今は形の上より水螅形と水母形とを區別するのが適當であらう、管水母の體を構成する各部分の內水母形を取るのも又は氣胞泳鐘並びに生殖體で、水螅形を取るものは營養體、感觸體並びに保護葉等である。

氣胞 (Pneumatophore, Schwimmblase, Airchamber, Float etc.) は體の上端にある瓦斯を包藏せる一個の囊で全く外界と通じないこともあれば、一つの氣孔によつて外氣と交通せることがある、此ものは全體を垂直に保たしむる用をなし、又動物の浮沈を加減するものである、中の瓦斯は特別なる瓦斯腺より分秘せらるゝものである。

氣胞體の下に接して通例多數の泳鐘又は游泳體 (Nectophores, Schwimmglocken, Nectocalyces, Nectozooids, Schwimmlöhlenstücke etc.) なるものがある、これは厚い寒天質を有し放射管環形管並びに縁膜を具ふるが、胃腔、口觸手及び感覺體を缺く所の水母で、形は左右相稱を示して居る、寒天質の內側に筋肉のよく發育した傘下層 (Subumbrella の假譯) があつて、其の收縮により腔中の水を押し出して全體を推し働かすのである。

生殖體 (Gonophores, Sexual-Medusoids, Gonozoids, etc.) 通例體の下部にあるもので、雄性か雌性かの孰れかで兩性 (ヘルマフロダイド) なることはない、而して或場合には雄性と雌性の生殖體が同一幹にあるが、他の場合には別の幹に分れて存することもある、生殖素即ち卵と精蟲とは多少明瞭に發達する水母の柄部に生ずるもので、水母は四條の放射管と之れを聯ぬる環形管を備ふるを常とする、生殖體は多くの

塲合には感觸體又は營養體の根部に生殖體叢（Gonotheca, Klinozooids, Geschlechtstrauben, Gonoblastidia, etc.）を形づくつて存在する、生殖體の水母の形を完全することゝ生殖素の成熟することゝは種類によつて相前後するもので、或塲合には生殖素早く發達を始めて水母體は之れを中に取り籠めて生することがある、生殖素成熟した時は大抵は獨立の水母體として分離し自由に水中を游泳するが、全く分離しないこともある、又或塲合には水母體が出來上つて分離して後に生殖素が發達し放出せらるゝこともある。

以上の三者が水母形であることは、其形の上からも推論せらるゝが、爭ふべからざる證左は芽から出來る際に所謂（Glockenkern（Bud-nucleus が表はれる事である、營養體（Siphons, Saetorialtubes, Polypites Gastrozooids, Magen, Hydranth etc.）は筋肉のよく發育した圓錐形紡錘狀又は倒棍棒狀の管で、通常四つの部分に分れて、細い柄部（Stalk）外胚葉に澤山の刺細胞を有する底部（Basigaster）内部に種々の腺狀突起を有する胃部（Stomach）並びに先端の筋肉を備へて開閉自由なる吻部（Proboscis）の四部を區別することが出來るが、稀に四部の境不明なることもある、柄部より出ずる觸手（Tentacle, Capturing filament, Senkfaden, Nematozooids, etc.）は營養體に屬するものであるとも言はれ、又別に獨立したものであると認められるが、常に營養體と隨伴して出づるもので通常甚だ長い糸狀體で收縮する性強く、大抵は側枝を有し且つ常に多數の刺細胞を有して居る、刺細胞は側枝に集まつて刺胞節（Battery, Nesselknopfe）を形成することが多い。

感觸體（Palpons, Tasters, Feelers, Arms, Fluid Receptacles, Dactylozooids, Hydrocysts, etc.）は形營養體に似たもので唯口を缺いで居る、其の觸手は同じく基底より出でゝ居るが、之れは細く短かく簡單で側枝もなければ刺細胞も有たない、營養體感觸體生殖體に對し保護の用をなすものは保護葉Hydrophylla, Bracts, Deckblätter, Scales, Phylozooids etc.）で透明な塞天質の塊とも云ふべき樹葉狀若しくは楔形の部分で、幹の中にある所の管の一分枝が入り來つて下面に近く走り、先端盲囊狀に終つて居る、時

に保護葉の表面には刺細胞の集團が點在することがある。

上記の營養體感觸體保護葉等が水螅形であることは其形の上から推定せられた所であるが、眞に水螅體と相同であるかは問題で或人は營養體感觸體は水母の傘部が退化して其柄部が殘り、傘の緣端にあつた觸手の一が位置を轉じて此觸手となつたもので、保護葉は傘の一部のみが殘つたものであるといつて居る、尙以上の諸部分の外にヘツケル氏は、從來感觸體と混同せられたもので末端に一小孔を開く所の Cyston 又は Anal vesicle といふものがあるとした、又一つの部類の管水母に見る Atrophore と稱せらるゝものがあつて、之れを研究したヘツケル氏は特に變化した泳鐘だとしたが、後にクーン氏は氣胞の一部が變形したものだといつて居る。

上記諸部分は孰れの種類に於ても完備するものでない。又常に一幹に附着すると限られたものでなく、時には幾個の群が其他の群と分離することがある、凡ての種類に出て來るものは營養體と生殖體で、觸手は僅かな例に於て缺けて居るが、之れは多分採集の際に脫離したのであらうとの想像もある、而して諸部分が幹の上に配置せらるゝ狀態は種類によりて異なつて、彼の管水母の種々雜多なる形態を作成するのであるから、玆に簡單に之れを述べる必要がある。（以下次號）

雜錄

●すぴろるびすの屬

E. Etsler 氏は *Spirorbis corrugatus* 及び *S. Pusillum* の二種に就て二の構造及び其變形して發育室となる狀態を研究したり其結果に據れば此等の環蟲類に於ける屬は元來鰓棘より變じ來りしものにして一個の囊狀體と之を支持する柄狀部とより成り其上皮細胞は硬き角被を汾泌し其角皮の或部に石灰質の沈澱を見る而して屬が發育室の用をなすに當りては卵は通常唱へられたる所の如く其內腔に含有せらるゝに非らずして實は硬き角被(Cuticle)と之を汾泌せる所の上皮との間に生ずる間隙內に位するなり而して卵の孵化期に當