

COELENTERATES IN THE PUBLIC-
ATIONS OF J. E. GUNNERUS
A CONTRIBUTION TO THE HISTORY OF NORWEGIAN ZOOLOGY

(WITH ONE PLATE AND FIVE FIGURES IN THE TEXT)

BY

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DET KGL. NORSKE VIDENSKABERS SELSKABS SKRIFTER 1917. NR. 4

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During the years 1761—68 the bishop JOHAN ERNST GUNNERUS exhibited an intense activity in the sphere of zoological research, the results of which appeared in a series of publications, now mostly overlooked, although many of them deserve the denomination of classic investigations. Of course, the technical facilities of those past times were greatly inferior to those of our century; nevertheless many of his papers, especially those dealing with somewhat larger organisms, might even today serve as patterns, owing to the accuracy of design and description. This is clearly illustrated from my words in a recent paper on Stylasteridae¹⁾ where we find in the report of *Stylaster gemmascens*, the declaration that «his drawings are the best which have ever been given of the species».

I do not here intend to give an exhaustive review of the animals, the descriptions of which have been drawn up by GUNNERUS; this would be a far too comprehensive work in this place, and would probably exceed the powers of any single zoologist of our time. The production of GUNNERUS embraces a great many zoological groups, now dealt with by almost as many specialists, and although we may say that the specialisation of our recent zoologists results from the enormous development of zoological science in the past century, we are nevertheless compelled to acknowledge that it is also partly due to the fact that wide-ranging capacities comparable with GUNNERUS are seldom met with. Among later Norwegian zoologists, we may be allowed to say that we can only compare him with such great spirits as MICHAEL SARS and G. O. SARS. I shall therefore here confine myself to the treatment of the coelenterates described in the papers of GUNNERUS, and try to give a report on that part of his production which deals with this group.

The following papers of GUNNERUS treat of coelenterates:

1. Om en Søevext allevegne ligesom besat med Frøehuse, Gorgonia resedæformis. Det Trondhjemske Selskabs Skrifter. Anden Deel. Kiøbenhavn 1763.
2. Om et Sø-Træ, henhørende til Gorgonias Linnæi, og som kan kaldes Gorgonia Flabelliformis. Det Trondhjemske Selskabs Skrifter. Tredie Deel. Kiøbenhavn 1765.

¹⁾ Stylasteridae. The Danish Ingolf-Expedition, vol. V, 5 p. 12.

3. Beskrifning På trenne Norrska Sjö-Kräk, Sjö-Pungar kallade. Kungl. Vetenskaps Akademiens Handlingar För År 1767 [Acta] Vol. XXVIII. Stockholm 1767.
4. Om nogle Norske Coraller. Det Trondhjemske Selskabs Skrifter. Fierde Deel. Kiøbenhavn 1768.
5. Om Grund-Vedden eller Hav-Granen, Alcyonio arboreo Linn. Det Trondhjemske Selskabs Skrifter. Fierde Deel. Kiøbenhavn 1768.
6. Actinia polymorpha. En Søe-Pung. Det Kongelige Norske Videnskabers Selskabs Skrifter. Femte Deel. Kiøbenhavn 1774.

In the first named paper, GUNNERUS describes and figures an octocoral, which he names *Gorgonia resedæformis*. Of his excellent drawings one is here reproduced as fig. A. No doubt can prevail as to the identity of this species. The specimens described by GUNNERUS were sent to him from several localities along the west coast of Norway. It is the same species, which PALLAS¹⁾ named *Gorgonia reseda*, and which has mostly been mentioned as *Gorgonia* or *Primnoa lepadifera*, the specific name later on introduced by LINNÉ²⁾.

The interpretation of the species as a *Gorgonia*, i. e. as an octocoral, was not at first adopted by LINNÉ. GUNNERUS sent him a specimen, and LINNÉ, in a letter, gives as his opinion that the animal in question is a colony of barnacles: «*Gorgonia resedæformem dudum a Te accepi tam splendido specimine et absoluto, ut inter zoophyta simile non vidi nec umquam videbo. Zoophyton si quodquod aliud vere stupendum, cum gemmæ ejus sunt Lepades s. Balani*»³⁾). Later investigations have, nevertheless, shown that GUNNERUS was right in placing the species in the group *Gorgonia* of that time, which in our time comprises most of the *Gorgonaria*. It is also now commonly acknowledged that we ought to maintain the specific name given by GUNNERUS, and that the species described in this paper must be named *Primnoa resedæformis* (GUNNERUS).

In his next paper on corals, GUNNERUS describes another octocoral, which he names *Gorgonia flabelliformis*. The figures given by GUNNERUS are also here convincing; we can, no doubt, identify the species with *Paramuricea placomus* (LINNÉ). GUNNERUS is himself in doubt, whether the species in question is identical with the *Gorgonia placomus* of LINNÉ'S *Systema naturæ* ed. 10. But he

¹⁾ Elenchus Zoophytorum p. 204.

²⁾ *Systema naturæ*, ed. XII, vol. II, p. 1289.

³⁾ DAHL, O.: Biskop Gunnerus' virksomhed, fornemmelig som botaniker etc. Tillæg II. Uddrag af Gunnerus' brevvæksling, særlig til belysning af hans videnskabelige sysler. Det kgl. norske Videnskabers Selskabs Skrifter 1898, p. 42.

finds that the description of LINNÉ is rather deficient, and therefore provisionally names it anew as *Gorgonia flabelliformis*. This mode of proceeding speaks in favour of GUNNERUS. There is often occasion to regret that recent systematical and geographical zoologists carelessly identify specimens with deficiently described

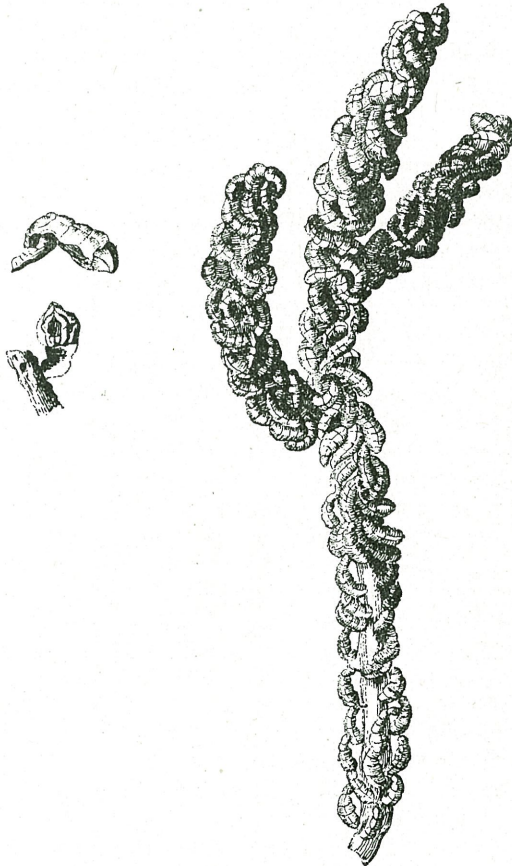


Fig. A. Three of the original drawings of *Primnoa (Gorgonia) resedæformis*.
GUNNERUS 1763, tab IX, fig. 2.

species, often from biogeographically different regions, instead of giving careful descriptions of their specimens; in this respect GUNNERUS is here far ahead even of many recent zoologists; his description is careful and his dates in no way contribute to the biogeographical and systematical confusion. In this respect we

could wish that later investigators of corals had taken GUNNERUS for their model. — In his paper «Om nogle Norske Coraller» GUNNERUS himself amends his identification, and names the species *Gorgonia placomus*. This identification must be considered as correct.

The next paper in which GUNNERUS deals with a coelenterate was published in the Kongl. Vetenskaps Academiens Handlingar För År 1767. This paper must be noted as very important, comprising the original descriptions of the holothurians *Cucumaria frondosa* (GUNNERUS) and *Stichopus tremulus* (GUNNERUS). The third species here described is a seanemone, identified by GUNNERUS as *Actinia senilis* LINNÉ. The modern systematic arrangement of the seanemones is based upon anatomical details, and it is in most cases impossible from drawings of external features alone to identify the species. From the description we learn that the species in question has tentacles with terminal pores; its general colour is light reddish. GUNNERUS points out that STRØM has mentioned the species in his work «Søndmørs Beskrivelse»; the seanemone in question is thus found on the west coast of Norway. Although the details given are by no means sufficient, we may by aid of the accompanying figures, infer that the *Actinia senilis* of GUNNERUS probably is an *Urticina*.

I have consulted Professor Dr. O. CARLGREN, the eminent Swedish investigator of actinians, on these questions. In a letter he writes as follows: «GUNNERI actinia af 1767 är otvifvelaktigt en *Urticina* (*Tealia*) och helt säkert för öfrigt identisk med *Madoniactis lofotensis* DANIELSSEN och den vid Bergen förekommande, som jag förelöpande kallat *Urticina crassiformis* forma *laevis* (se APPELLÖFS embryologiska afhandling öfver *Urticina*¹⁾; den har ej några sugvårtor. Angående artens benämning och begränsning, råder stor förbistring. Jag för min del anser den ej identisk med RAPP'S *A. coriacea* = vissa auktorers *Urticina* (*Tealia*) *crassicornis*, då denna har tydliga sugvårtor, bandade tentakler och är mera en grundvattensform med för öfrigt mer sydlig utbredning, utan den bör skiljas från denna; möjligen är den identisk med «*Rhodactinia*» *davisii* och en ras af denna. *Rh. davisii* föder lefvande ungar d. v. s. ungarne utvecklas till mycket långt framskridit stadium i gastrovascularhålan (se min uppsats i Biol. Centralbl.²⁾ om yngelvård), under det att den Bergenska formen enl. APPELLÖF ej är yngelbärande. Jag har emellertid provisoriskt kallat den för *Urticina* (*Tealia*) *lofotensis*, då den helt säkert er iden-

¹⁾ APPELLÖF, A.: Studien über Actinien-Entwicklung. Bergens Museums Aarbog 1900, p. 4.

²⁾ CARLGREN, O.: Die Brutpflege der Actiniarien. Biol. Centralbl., Bd. XXI, p. 468.

tisk med DANIELSSENS *M. Lofotensis*. För öfrigt är synonymiken öfver denna o. *Rhodactinia* synnerligen invecklad, då man (och äfven jag själf) sammanblandat *Rh. Davisii* med en annan form som ej är en *Urticina* utan tillhör ett annat slägte; men dessa hafva en saa stor likhet äfven i anatomiskt afseende med hvarandra att jag först efter et noggrannt studium af nässelkapslarne, som är betydligt olika hos respektiva former, kunnat klara upp förhållandena. Jag har för öfrigt ej fullt avslutat dessa undersökningar, men skall göra det med det snaraste.» [«The *Actinia* described by GUNNERUS in 1767 is no doubt an *Urticina* (*Tealia*), and certainly even identical with *Madoniactis lofotensis* DANIELSSEN, and with the species occurring near Bergen which I provisionally denominated *Urticina crassicornis* forma *laevis* (comp. APPELLÖF'S treatise on the embryology of *Urticina*); it has no suckers. The species, however it may be denominated, as well as its limitation, has caused much confusion. For my own part I do not consider the species identical with *Actinia coriacea* RAPP = *Urticina* (*Tealia*) *crassicornis* of some authors, as this species is provided with distinct suckers and striped tentacles, and moreover, is a shallow-water form of more southern distribution. The species in question therefore must be specifically separated from the last mentioned one, and may be looked upon as identical with, and even a race of «*Rhodactinia*» *davisii*. *Rhodactinia davisii* is viviparous, i. e., the young ones develop in the gastro-vascular cavity to a stage far advanced (comp. my treatise in the Biol. Centralbl. on care of the young) whereas, according to APPELLÖF, the Bergen form does not breed. However, I have provisionally named the species *Urticina* (*Tealia*) *lofotensis*, as it is surely identical with *Madoniactis lofotensis* DANIELSSEN. In fact the synonymy of the latter and the *Rhodactinia* is rather intricate, as *Rhodactinia davisii* has been confounded with another form, which is indeed no *Urticina*, but belonging to another genus. However, the likeness between them, even anatomically, is so great that, only on a thorough examination of the nematocysts, I was able to realize the relations, the nematocysts of the respective forms being rather different. I have not yet finished these investigations, but I expect I shall shortly bring them to a conclusion.»]

By far the largest paper, GUNNERUS has published concerning coelenterates, is his treatise «Om nogle Norske Coraller». In this paper the following species of coelenterates are mentioned: *Madrepora pertusa* LINNÉ, *Gorgonia placomus* LINNÉ, *Madrepora virginea*, *Millepora tarandicornis*, *Millepora muricata* LINNÉ, *Millepora Norwegica*, and *Isis hippuris* LINNÉ. In the last section of the paper named, GUNNERUS incidentally mentions some foreign coral species from his collections, viz. *Madrepora labyrinthiformis*

LINNÉ, *Madrepora astroites* LINNÉ, and *Millepora* or *Madrepora damicornis* L.

Madrepora pertusa is doubtless *Lophohelia prolifera* (PALLAS) as is also maintained by JUNGERSEN¹⁾. Among his localities GUN-



Fig. B. *Lophohelia prolifera* (*Madrepora pertusa*).
GUNNERUS 1768 tab IV, fig. 1.

NERUS also mentions Stadsbygden on the Trondhjemsfjord; this means the classic locality round Røberg, a locality later on more

¹⁾ Alcyonarian and Madreporarian Corals in the Museum of Bergen, collected by the Fram-Expedition 1898—1902 and by the «Michael Sars» 1900—1906. Bergens Museums Aarbog 1915—16 p. 37.

thoroughly studied by the late Director of the zoological department of our Museum, VILHELM STORM, by the Rev. A. M. NORMAN, and by many other Norwegian and foreign zoologists who have lived in Trondhjem or visited the Trondhjemsfjord for purposes of study. GUNNERUS also tells us that his finest specimens are from this locality, where they have been brought up from 80 fathoms depth or more by the fishermen when fishing for Norway haddock (*Sebastes norvegicus*). These details as to the depth from where GUNNERUS procured his specimens are of great interest. We might otherwise have thought of a fusion of *Lophohelia prolifera* and *Lophohelia (Amphelia) ramea* (PALLAS); but the latter species generally lives deeper, and in the Trondhjemsfjord is not normally met with in the upper 300 metres. On the other hand, the fishermen do not here fish for Norway haddock at so great depths as 300 metres or more. The figure given by GUNNERUS, and here reproduced in fig. B, is moreover, one of the best drawings ever given of *Lophohelia prolifera* and thus corroborates the identity of *Madrepora pertusa*.

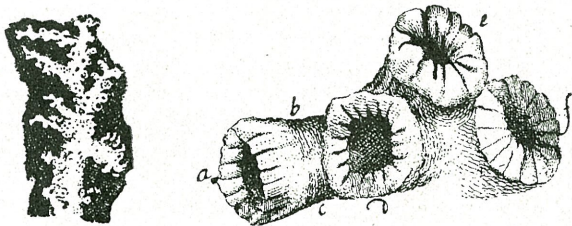


Fig. C. Two of the original figures of *Madrepora virginea* (= *Stylaster gemmascens*). GUNNERUS 1768 tab. VIII, figs. 2 and 4.

Gorgonia placomus is, as earlier pointed out, *Paramuricea placomus* (LINNÉ) of recent times.

Of his *Madrepora virginea* GUNNERUS has given excellent drawings, two of which are here reproduced as fig. C. There can exist no doubt as to the identity of this species; it is the hydrocoralline *Stylaster gemmascens* (ESPER) of recent papers. GUNNERUS erroneously identifies it with the *Madrepora virginea* of LINNÉ¹). LINNÉ'S species, however, inhabits the American and Mediterranean waters, and is no doubt specifically different from our northern species; to this may be added that LINNÉ'S species is evidently a coral. GUNNERUS' *Madrepora virginea* on the other

¹) Systema naturæ ed. X, vol. I p. 798.

hand inhabits the western coast of Norway, and is found at Søndmør, as is evident from the statements of GUNNERUS that it is mentioned by STRØM in his «Søndmørs Beskrivelse». It is rather common in the Trondhjemsfjord, and although GUNNERUS does not note its appearance here, we may be allowed to believe that some of his specimens are from this fjord, where the species is not infrequently met with by the fishermen when fishing for Norway haddock.

Millepora tarandicornis is a bryozoan. In a previous paper concerning the coelenterates stated by GUNNERUS¹⁾, I have tried to determine *Millepora muricata* of GUNNERUS as most probably a form of Bryozoan. O. NORDGAARD now points out to me that this hypothesis is untenable, alleging that GUNNERUS in his description mentions that the branches are provided with closely set, obliquely upwards directed protuberances, each with a distal hole in which a starlike figure is discernible. GUNNERUS mentions those holes and figures by the term of «Stjerne-Rør» (star-tubes). The protuberances are especially well developed in the distal parts of the colony, whereas in the basal parts they are less prominent or even immersed. The back side of the colony is almost destitute of star-tubes. GUNNERUS refers to the drawing given by CLUSIUS²⁾. The particulars cited might suggest a colony of an *Eunephtya*. On the other hand, other of GUNNERUS' statements contradict this supposition. Where stars are wanting, or between the starlike openings, GUNNERUS has by the aid of his magnifying-glass observed everywhere on the surface of the colony small, longitudinal tubes with terminal openings devoid of starlike organisation. Moreover, he has counted in the stars 12 to 16 rays, a fact which can hardly agree with an octocoral. It is, therefore, at present impossible to settle the identity of GUNNERUS' *Millepora muricata* although everything suggests its being a coral or a hydrocoral. Although the specimen in question was sent to him by the Rev. I. S. BULL who resided at Griip, we cannot absolutely deny the possibility of its being an exotic species.

The species named *Millepora Norvegica* is a Stylasterid. The specimen described in the paper came from Nordmør, on the western coast of Norway. GUNNERUS points out that the colony exhibits a pronounced foreside with many pores, whereas the pores are more scantily distributed on the hinder side of the colony. He also gives excellent details as to the configuration of the single starlike pores, and, in consideration of these, expres-

¹⁾ Nesledyr (Coelenterater) i biskop Johan Ernst Gunnerus' avhandling (Johan Ernst Gunnerus 1718—1918, Mindeblade utgit av Det kgl. Norske Videnskabers Selskab). Trondhjem 1918, p. 102.

²⁾ Exoticorum libri decem. 1605, Liber VI, cap. 7, p. 123.

ses his doubts, as to whether the species should not rather be ranged with the genus *Madrepora* LINNÉ instead of with the genus *Millepora* LINNÉ. He has nevertheless placed it among the *Millepora*. There exists no doubt that the species in question is *Stylaster (Allopora) norvegica* (GUNNERUS) of our times (comp fig. D), and that the description given by GUNNERUS is the first



Fig. D. Drawing of *Millepora Norvegica* (= *Stylaster norvegica*).
GUNNERUS 1768, tab. IV, fig. 20.

we have of this characteristic species, which is a character organism of our warmer, north Atlantic regions.

The last northern coral which GUNNERUS describes in this paper, is named *Isis hippuris* LINNÉ. GUNNERUS had at his disposal

only the jointed axis of a Gorgonian referable to the family Isiidae, and informs us that he obtained his specimen from Smølen on the west coast of Norway. Together with this he figures a piece of a similar axis, which he had obtained from the Chinese seas. It is, of course, impossible to identify these fragments of Gorgonian axis as to species; but it is possible that the latter fragment really has been part of a real *Isis hippuris*. The Norwegian fragment, on the other hand, may be identified owing to the fact that we have only a single species of the family inhabiting our seas. The definitive name of this species has been the object of much discussion. The species cannot remain in the genus *Isis*, but must be referred to another genus, viz. *Isidella*. GRIEG¹⁾ retains the specific name, erroneously given by GUNNERUS, and names the species *Isidella hippuris* (GUNEERUS); in this manner of proceeding he is followed by JUNGENSEN in his last paper²⁾. KÜENTHAL³⁾, on the other hand, probably more in accordance with the international nomenclatory rules, discards the specific name *hippuris*, as being based upon an error of identity by GUNNERUS; he adopts the specific name *Isidella lofo-tensis* M. SARS.

Concerning the three foreign species, which are mentioned incidentally by GUNNERUS in his paper «Om nogle Norske Coraller», we cannot draw any conclusions as to their identity on the basis of his statements. We must on this occasion have recourse to his type specimens, which are, at all events partly in the possession of our museum. I shall later on mention these collections somewhat closer.

It may in this connection be of interest to glance at a letter to GUNNERUS from LINNÉ⁴⁾ In his letter LINNÉ adds following remarks to GUNNERUS' paper «Om nogle Norske Coraller»:

«*Madrepورا prolifera* t. 2 f. 1, 2 är satt i så klar dag, att aldrig någon kan mera fortaga sig på denne.

.....

Madrepورا aspera t. 8 f. 3, 2 torde blifwa varietet af *Madr. virginea*, som jag med första skall utransaka og conferera Hr. Biskopens sände specimina med mina.»

[*Madrepورا prolifera* is so clearly viewed, that nobody can any longer be mistaken as to this species. *Madrepورا aspera* ought to become a variety of *Madr. virginea*,

¹⁾ Tre nordiske alcyonarier. Bergens Museums Aarvog 1890 p. 3.

²⁾ l. c. Bergens Museums Aarvog 1915—16 p. 24.

³⁾ System und Stammesgeschichte der Isididae. Zoologischer Anzeiger Bd XLVI p. 118.

⁴⁾ DAHL, O., l. c. Det kgl. Norske Videnskabers Selskabs Skrifter 1900, p. 56.

which I shall look into in short time, and compare the specimen sent by your Right Rev. with my own.]

The opinion of LINNÉ as to *Madrepora pertusa* viz. that it is the same as his *Madrepora prolifera*, coincides with the above remarks. His observations as to *Madrepora virginea* on the other hand are more doubtful. GUNNERUS, in his report on *Millepora Norwegica*, states that his species is identical with *Millepora aspera* in the eleventh edition of LINNÉ'S *Systema naturæ*. I should

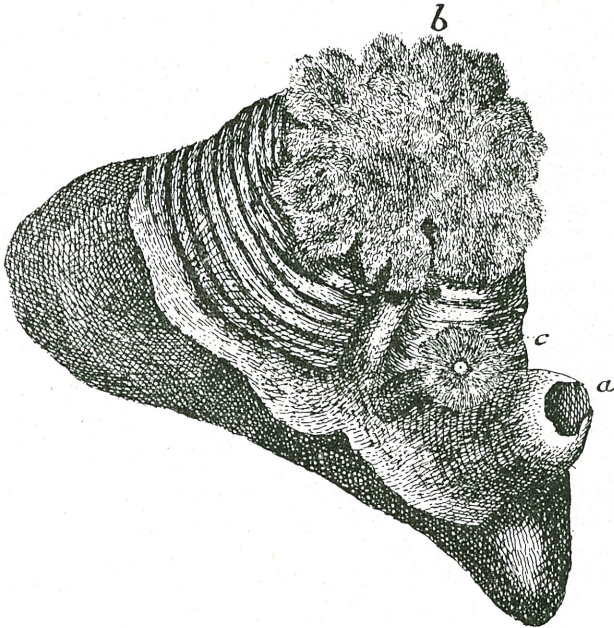


Fig. E. One of the original drawings of *Actinia polymorpha* (= *Metridium dianthus*). GUNNERUS 1774 tab. XII, fig. 2.

rather be inclined to range this species among the doubtful ones, which are to be suppressed owing to deficient diagnosis; at any rate, the specific name given by GUNNERUS has the priority. Only the reexamination of authentic type specimens can settle the question as to the identity of *Millepora aspera*. That *Millepora Norwegica* should be a variety of *Madrepora virginea* LINNÉ, is contradicted by the fact that LINNÉ'S species is a true coral from the Mediterranean and American waters¹⁾, whereas GUNNERUS'

¹⁾ Comp. LINNÉ, *Systema naturæ* ed. XII vol. I p. 1281.

Madrepora virginea is the north Atlantic hydrocoralline *Stylaster gemmascens* (ESPER). This hydrocoralline again is clearly specifically different from *Stylaster (Allopora) norvegica* GUNNERUS.

In his next paper on corals, GUNNERUS gives a detailed report of *Paragorgia arborea* (LINNÉ) under the name of *Alcyonium arboreum*. His remarks here are rather interesting, and especially his observations of the living polyps, which he finds are closely related to the polyps of *Alcyonium digitatum* LINNÉ.

In a posthumous paper, entitled «Actinia polymorpha. En Sœ-Pung», GUNNERUS left an exhaustive description, illustrated by drawings, of a sea-anemone, which cannot be confounded with any other species found in Norwegian waters. The drawing borrowed from GUNNERUS' paper, reproduced in fig. E, at once tells us that the *Actinia polymorpha* described by GUNNERUS, is *Metridium dianthus* (ELLIS), probably the actinian of commonest occurrence along the coast of Norway. MC. MURRICH¹⁾ maintains that *Actinia senilis* LINNÉ is identical with *Metridium dianthus*, and that accordingly the species should be named *Metridium senile* (LINNÉ). Most of LINNÉ's descriptions of *Actiniaria*, however, are not at all as clear or exhaustive as to assure an identification, and his *Actinia senilis* is rather questionable. And even waiving this fact, we find that GUNNERUS has quite another view of *Actinia senilis* LINNÉ (comp. above), according to which it would most likely be looked upon as identical with *Urticina (Tealia) lofotensis* (DANIELSSEN). On the other hand, *Metridium dianthus* must be missing in LINNÉ's works, and this is the reason why GUNNERUS describes his *Actinia polymorpha* as a new species. The treatise of ELLIS²⁾ containing the first certain description of *Metridium dianthus* must have escaped GUNNERUS; and no wonder when we consider the remoteness of the place where GUNNERUS carried on his zoological investigations, and the difficulties that remote situation threw in the way of intercourse.

Many of the coral and hydrocoralline specimens from the collections of GUNNERUS have been preserved in the museum at Trondhjem, especially those which doubtless are of greater value, namely the type specimens from the Norwegian waters. On the other hand we must regret that the original labels have been removed, and replaced by new ones, where many of the original dates, and sometimes even the original designations, have been omitted. Nevertheless, we are also today able to point out many

¹⁾ The Actiniaria of Passamaquoddy Bay, with a discussion of their synonymy. Trans. Roy. Soc. Canada (Ser. 3) 1910 Vol. 4, Sect. 4, Ottawa 1911.

²⁾ An Account of the Actinia sociata etc. Philos. Trans. 1767 LVII, London 1768, p. 436.

of his type specimens. I have on an earlier occasion, in a paper on northern Stylasteridae¹), given photographs of his type colonies of *Madrepora virginea* (i. e. *Stylaster gemmascens*) and *Millepora Norwegica* (i. e. *Stylaster norvegica*). Also his types of *Madrepora pertusa* exist in his posthumous collections, together with *Gorgonia resedæformis*, *Gorgonia placomus*, and *Alcyonium arbo-reum*. On the other hand, it is impossible to point out with absolute certainty the types of foreign corals, which are mentioned as *Madrepora labyrinthiformis*, *Madrepora astroites*, and *Millepora damicornis*. As to the latter I am almost certain that the specimen reproduced in plate I fig. 1 must be the type; it is the only specimen of this shape in his collections. *Madrepora astroites*, on the other hand, is probably one of the specimens shown in plate I figs. 2 and 3. The species first named, *Madrepora labyrinthiformis*, however, is not to be pointed out with any certainty; the specimens which might be referred to this group are not surely referable to the collections of GUNNERUS.

I do not venture to go deeper into the discussion of these species, and it would, moreover, not contribute so much to the elucidation of the scientific character of GUNNERUS as to render it worth while dwelling more upon this problem. —

It will be evident from the above that GUNNERUS in his investigations on coelenterates stands above most of the zoologists of his own time, and it is of interest to point out here that almost a century was suffered to elapse, before further progress in the exploration of our northern coelenterates was made. In many respects we may say that this progress was due rather to improved technical methods than to other circumstances. In many respects several of GUNNERUS' zoological papers give us evidence that he stands head and shoulders above his contemporaries.

In addition to the above remarks I may here give a list of the species mentioned with their synonyms in the papers of GUNNERUS:

Stylasteridae:

Stylaster (Eustylaster) gemmascens (ESPER).

1768 *Madrepora virginea*, GUNNERUS, Om nogle Norske Coraller p. 56, Tab. VIII fig. 2-4.

Nec 1758 *Madrepora virginea*, LINNÉ, Systema naturæ ed. X, vol. I pag. 798.

Stylaster (Allopora) norvegica (GUNNERUS).

1768 *Millepora Norwegica*, GUNNERUS, Om nogle Norske Coraller p. 64, Tab. II fig. 20-22.

¹) l. c. The Danish Ingolf-Expedition Vol. V, 5 Tab. I fig. 4, and Tab. II fig. 12.

Actiniaria:

Urticina (Tealia) lofotensis (DANIELSSEN).

1767 *Actinia senilis*, GUNNERUS, Beskrifning På trenne Norske Sjø-Kræk, Sjö-Pungar kallade p. 121, Tab. IV figs. 4-5.

Metridium dianthus (ELLIS).

1764 *Actinia polymorpha*, GUNNERUS, *Actinia polymorpha*. En Sõe-Pung, p. 425, tab. XII.

Madreporaria:

Lophohelia prolifera (PALLÀS).

1768 *Madrepora pertusa*, GUNNERUS, Om nogle Norske Coraller p. 38, Tab. II figs. 1-2.

Alcyonaria:

Paragorgia arborea (LINNÉ).

Alcyonium arboreum, GUNNERUS, Om Grund-Vedden eller Havgranen, *Alcyonio arboreo* Linn. p. 87 Tab. XI.

Paramuricea placomus (LINNÉ).

1765 *Gorgonia flabelliformis*, GUNNERUS, Om et Sõe-Træ, henhørende til *Gorgonias* Linneï, og som kan kaldes *Gorgonia Flabelliformis* p. 1, Tab. II.

1768 *Gorgonia placomus*, GUNNERUS, Om nogle Norske Coraller p. 55.

Primnoa resedæformis (GUNNERUS).

1763 *Gorgonia recedæformis*, GUNNERUS, Om en Sõevert, alle vegne ligesom besat med Frøehuse p. 321, Tab. IV.

Isidella lofotensis M. SÀRS [*hippuris* (GUNNERUS)].

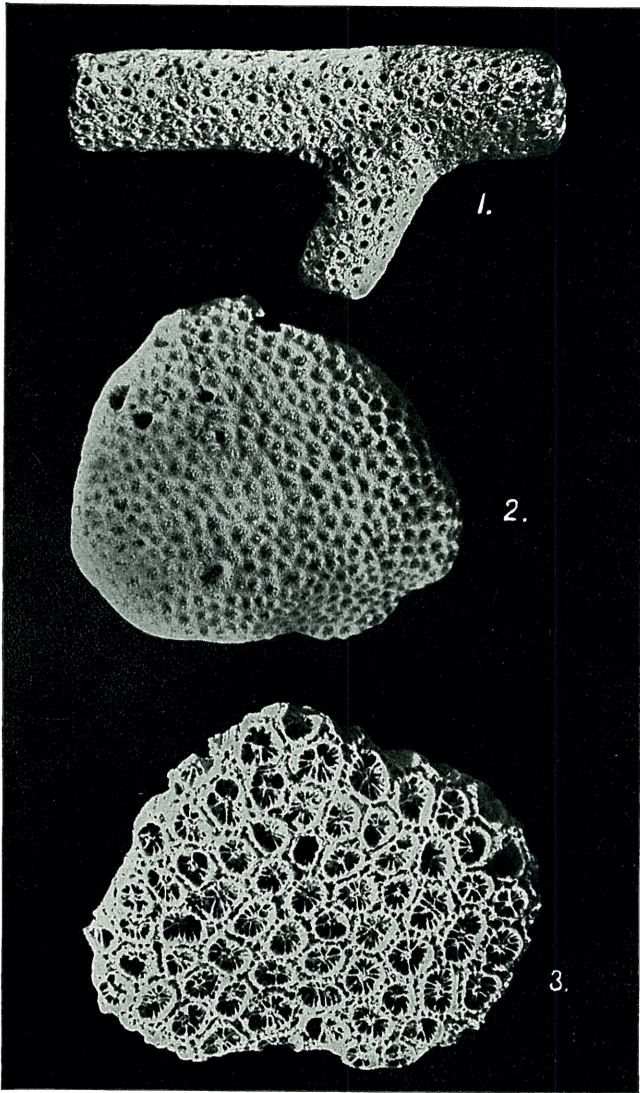
1768 *Isis hippuris* pars, GUNNERUS, Om nogle Norske Coraller p. 70, Tab. III fig. 8.

Nec 1758 *Isis hippuris*, LINNÉ, *Systema naturæ* ed. X, vol. I p. 799.

Isis hippuris LINNÉ.

? 1768 *Isis hippuris* pars, GUNNERUS, Om nogle Norske Coraller p. 70, Tab. III fig. 7.

Trøndhjem 28—12—1917.



Hj. Broch photo.

Explanation of the plate:

Fig. 1 Type specimen of *Millepora* vel *Madrepora damicornis* of GUNNERUS.

Fig. 2 and 3. Type specimens from the collections of GUNNERUS, one of them probably referable to the species noted by him as *Madrepora astroites*.

(All figures in natural size).