

siderably shorter. At Cloverdale, the eclipse was observed with great accuracy, but shortly before totality some cirrus clouds passed over, all tinged with the most brilliant colours of the rainbow.

"Venus appeared during the early stages of the eclipse, while Mercury and the other planets were plainly in view during every phase that was photographed.

"At Willow, the temperature dropped 7°, but the fluctuations of the barometer were quite imperceptible. The velocity of the wind diminished at first, but afterwards increased."

Prof. Todd secured a number of fine photographs of the corona, showing, according to Reuter's telegram, rays extending 10° or 12° from the sun.

At Winnemucca, the United States Signal Service observers made drawings of the streamers of the corona, and also took successful photographs. They saw the edge of the moon projected against the corona for some time after the total phase had passed.

At Lick Observatory, the eclipse was successfully observed, and a number of photographs were taken.

At Norman, California, the fourth contact was observed, but the first was lost in clouds. The moon's limb was not seen projected on the corona either after or before totality, although careful search was made. The telescope was used for making drawings of the corona adjacent to the sun's poles, and the sketches show very complex filaments. The negatives taken are excellent, and show the corona very similar to that seen in 1878. Long streamers were readily traced through 4°.

The party of observation at Bartlett Springs report that the corona was beautifully distinct, and that they saw remarkable changes in the length of the coronal lines. They obtained nine photographs of all contacts, studied the structure of the inner corona, and made measures of light intensity during totality.

Four long streamers were seen proceeding from the prominences, and the chromosphere was strong for a full quadrant distance of the west side of the sun. The northern and southern limbs of the sun showed a great number of fine radiating filaments.

At Chicago, a beautiful view of the corona was obtained. Two long streamers pointed nearly west, and two shorter ones were almost opposite. At the beginning of totality intense red flames burst out on the sun's western side, covering a space of 90°. The inner corona presented a beautiful spectacle in the telescope. Its radiating filamentary structure, with both curved and straight lines, was distinctly seen.

At Healdsburg, although only nineteen-twentieths of the sun's surface were obscured, Venus, Mars, Jupiter, Mercury, and the principal fixed stars were visible. The corona also appeared with long rays of light parallel to the sun's equator.

Mr. Swift, Director of the Warner Observatory, stationed at Nelson, California, reports that, as far as it afforded an opportune search for an intra-Mercurial planet, the eclipse was a failure, owing to clouds and haze.

At Anaheim, no photographs were secured, but it is claimed that an intra-Mercurial planet was seen during the period of greatest obscuration.

At Winnemucca, Nevada, one observer discovered a comet near the sun. No appreciable change of temperature was noticed at this station. Accurate observations were also made of the shadow bands. The corona was similar in general appearance to that of 1878. The streamers extended to a distance of from three to four diameters, and the red protuberances were strongly marked.

At Grass Valley, during the period of totality, the stars and large planets were seen with the naked eye, and the corona and protuberances offered a grand spectacle. The thermometer fell 7° between the moment of first contact and totality. At Virginia City, Nevada

Territory, the thermometer fell 10° during the progress of the eclipse.

At Blackfoot, Idaho, all four contacts were observed. A short time before totality the moon's limb was seen projected against the corona. The mercury fell 13°.

From the above accounts it is quite clear that new information touching many important points has been secured. This is most fortunate, for the eclipse occurred at a well-marked minimum of solar spots; indeed, it was as marked as that of 1878, when again the eclipse swept over the American continent and was most fully observed.

There seems no doubt that the expansion of the sun's surroundings in the plane of its equator, dwelt upon strongly by Newcomb in his account of the eclipse of 1878, has been re-observed. We read that this ring was seen to extend some 2,000,000 miles on either side of the sun, and to put on the appearance of two forked wings of light. Not only in 1878 was this ring-like extension well marked, but, in consequence of the extreme quietude of the sun's atmosphere at the time, the exquisite structure of the atmosphere over each pole was one of the most striking features of the eclipse. The appearance was produced by the structure of the coronas bending gracefully over from the sun's axis prolonged, that nearest the pole bending least. This or something very like it has evidently been again seen, and the photographs which have been taken by Mr. Pickering's and other parties will evidently give a good account of them.

It must be noted, too, that the American astronomers have, as might have been expected, used large telescopes. We read of 13 inch and 8 inch refractors. Nothing so large as this has ever been employed before in eclipse expeditions, but then the parties this time have not been far from their base. In one of the telegrams it is stated that Mr. Pickering's party secured twenty spectrum photographs of the corona. This, perhaps, is the best news of all; and we read, too, that the less refrangible end of the spectrum has not been neglected.

Considering the short duration of totality, the results secured reflect the highest credit upon the organizers of the parties and upon the individual observers.

RECENT WORKS ON ALGÆ.¹

PROF. ASKENASY tells us, in a brief preface, that the Algæ collected during the voyage of the Scientific Expedition in the *Gazelle* were intrusted to him for examination, and that in the work he was assisted by Herr Moebius, by whom the greater part of the excellent figures in the plates were drawn. The remainder of the figures, with the exception of those in Plate I., were drawn by the editor, thus affording an apt illustration of the great advantage to naturalists of acquiring facility in drawing.

In the determination of the Algæ, Dr. Askenasy had the assistance of MM. Bornet and Hariot; the Characæ and Conjugatæ were described by Dr. Otto Nordstedt, by whom the well-drawn figures in Plate I. were executed. Herr Grunow described the Cystophyllum and Carpophyllum, and the difficult genus of Sargassum.

The only new plant among the Confervacæ is *Anadyomene reticulata*, Askenasy, from the Island of Dirk Hartog, in West Australia. The Characæ, now included among Algæ, are rather numerous; among them are two new species of Nitella.

¹ "Forschungsreise S.M.S. *Gazelle*," iv. Theil-Botanik. Algen; mit Unterstützung der Herren E. Bornet, A. Grunow, P. Hariot, M. Moebius, O. Nordstedt. Bearbeitet von Prof. Dr. E. Askenasy. Mit 12 Tafeln. (Berlin: Ernst Siegfried Mittler und Sohn, 1888.)

"Om structuren hos Champia och Lomentaria," med anledning af nyare tydingar. Af L. G. Agarch, Öfversigt af Kongl. Vetenskaps-Akademiens Förhandlingar, 1888, No. 2. (Stockholm.)

"Fresh-water Algæ collected by Dr. Berggren in New Zealand and Australia." By Otto Nordstedt. With 7 Plates. Communicated to the Royal Swedish Academy of Science, June 1857. (Stockholm, 1858.)

Dr. Askenasy prefaces his description of *Halimeda* by remarking that the structure of the genus has not been hitherto described. From this it would appear that Dr. Agardh's observations on *Halimeda*, contained in Part V. of his work, "Til Algernes Systematik" ("On the Classification of Algæ"), is still unknown at Berlin. It may be mentioned that, while the title is in Swedish, the work is in Latin.

The remarks of Dr. Askenasy are, however, not the less welcome, illustrated as they are by the figures in Plate IV. One new species, *H. macrophysa*, is described. It is to be regretted that so little is as yet known of the fructification of these plants.

One new species of *Caulerpa*, *C. delicatula*, allied to *C. Brownii*, is added to the sixty-seven species of this genus already known to science.

The *Ectocarpæ* are carefully worked up, and one new species from Kerguelen's Land, *E. Constantia*, has been added by Dr. Hariot.

Perhaps the most interesting part of the work is the result of Dr. Grunow's study of the genus *Sargassum*. Every algologist is aware how difficult it is to identify the specimens, often very fragmentary, of this plant, which lie before him for examination. Fortunate is the collector who obtains a whole plant of *Sargassum*, comprising root and lower leaves—which often differ materially from those in the upper part of the plant—branches bearing leaves only, and other branches bearing fruit and vesicles as well as leaves. It is owing to this fragmentary state of the plants that the published descriptions are frequently defective.

Dr. Grunow has done much to elucidate the life-history of the genus *Sargassum* by his discovery that some species are monœcious, and others diœcious. In describing *S. Carphophyllum* (see "Voyage of the *Novara*," p. 56), Dr. Grunow mentions the occurrence on the same plant of two kinds of fruit—namely, short receptacles which correspond with those described by Dr. Agardh, and also linear receptacles three-quarters of an inch long. He, however, makes, in this work, no further observations on the subject.

In the present work he merely mentions that the plant is monœcious. It will be seen from the descriptions of the other species in the text that Dr. Grunow has been able to prosecute successfully his researches on the fruit of the *Sargassa*. In most cases it is indicated in the text whether the species are monœcious or diœcious. It seems to be ascertained that the smaller kind of fruit contains spores; while the antheridia are contained in receptacles nearly twice the size of the former. There also exists much diversity in the form of the receptacles belonging to the same species. The spore-bearing receptacles are sometimes forked or spiny, while those bearing antheridia are simple, smooth, and cylindrical. The list of *Sargassa* in the present work contains twenty-eight species and varieties. In the case of the varieties Dr. Grunow is careful to mention in what respects they differ from the original species.

As to *S. bacciferum*, it is mentioned in the text that its history is still insufficiently known. The editor refers to the pelagic specimens, called "gulf-weed," which float for a time without root or fruit, and subsequently decay; but he does not seem to be aware the *S. bacciferum* was found by Mr. Moseley,¹ during the voyage of the *Challenger*, growing plentifully and full of fruit on rocks in Harrington Sound, Bermudas. The *S. bacciferum*, var. *foliifera*, also bears fruit.

It may be remarked that while there is a general impression that no parasitic Algæ are found growing on gulf-weed, Dr. Askenasy met with a specimen among the Algæ brought home by the *Gazelle* on which were growing

a *Rivularia* and a *Calothrix*, and that other epiphytic Algæ were found on the same species by Martens.

Among the Rhodophyceæ of this collection, there is one new genus, *Epsisporium centroceratis*, Moebius. It is from West Australia, and is classed with the Cryptonemiaceæ. The new species are four in number—namely, *Hildebrandtia Lecanellieri*, Hariot; *Chaukausia Naumannii*, Askenasy; *Rhabdonia decumbens*, Grunow; and *Sarcomenia intermedia*, Grunow. Among the rarer species are *Corynospora Wüllerstorffiana*, Grunow; *Ptilota Eatoni*, Dickie; and *Marchesettia spongioides*, Hauck. A plentiful harvest was obtained of the beautiful and very rare Nitophylla and Delesseriæ of the Southern Ocean.

The attention of algologists will be drawn to the minute and careful analytical descriptions of many species of the Florideæ. Great pains have been bestowed by Dr. Askenasy on the description of some species of *Galaxaura*: the more delicate parts of these plants, he observes, have not been described. Fruit is rare, and but imperfectly known in this genus. It may be observed that Dr. Askenasy's classification of *Galaxaura* differs from that of Agardh ("Til Algernes Systematik," Part vii., Florideæ). By the former it is placed among the Chætangiaceæ; the latter retains it among the Helminthochladiæ.

Dr. Askenasy gives an elaborate description of that singular production of Nature, *Marchesettia spongioides*, Hauck. He mentions it as "this plant or organism," for it seems to be between a Sponge and an Alga. It was known imperfectly to Semper and Esper. Dr. Hauck, who had found it among the Sponges in the Museum at Trieste, announced that it was an Alga, which belonged to the Florideæ, and to the group of the Areschougieæ ("Su un nuovo caso di simbiosi," *Atti del Museo Civ. di Stor. Nat. di Trieste*, 1884). In external appearance this "organism" resembles a branched Sponge; the Alga being entirely inclosed within it. Dr. Askenasy has devoted one whole plate (Plate XII.) to illustrate the *Marchesettia*. The fructification is at the end of the branches. Tetraspores were seen by Dr. Hauck and by Dr. Askenasy, but it is not mentioned whether they were cruciate or zonate. Dr. Agardh observed cystocarps, which he thought approximated to those of *Rissoella*.

On the inside of the "organism," and among the branches of the Alga, Dr. Askenasy found, in the specimens brought home by the *Gazelle* Expedition, and preserved in spirit, a slimy substance, like that which constitutes the life of a sponge, and he is decidedly of opinion that *Marchesettia spongioides* is, to use his own words, "eine symbiose zwischen einer Floridee und einer Spongie darstellt" (p. 41). *Marchesettia* is a native of Madagascar, Singapore, the Philippines, and New Caledonia.

The external resemblance of the *Marchesettia* to a species of *Thamnoclonium* of the section *Dictyophoræ* is so great that Dr. Agardh gave to the latter the name of *Th. Marchesettiioides*. The plants, when in fructification, may, however, be always easily distinguished, the fruit of the *Thamnoclonium* being contained in leaflets, which spring from the sides of the plant.

This is a very useful work to algologists; but its utility would have been increased by the addition of an index. It may also be observed that the size of the type might have been enlarged with benefit to the eyes of students.

The subject of Dr. Agardh's essay is the structure of *Champia* and *Lomentaria*. He observes that within the space of little more than a year, four special essays—two by N. Wille, one by F. Debray, and another by R. P. Bigelow—have been published with a view to demonstrate the structure of these well-known plants, and that these publications give an entirely erroneous representation of the entire development of these Algæ. He therefore thought it expedient for him, who had published ten years ago a very different description, to state his opinion on

¹ See extract from Mr. Moseley's letter, dated June 27, 1873, in Dr. Dickie's paper on the marine Algæ of St. Thomas and Bermuda, *Journal of the Linnean Society*, vol. xiv.

these new works and his own views on the subject. This he has done in the present essay.

The descriptions referred to by Dr. Agardh appeared in his work entitled, "Florideernes-Morphologi" (published in the Transactions of the Royal Swedish Academy in 1879); but as this work was written in Swedish, it has probably not met with so many readers as it deserves. With a view to make this work more accessible, Dr. Agardh issued, in 1880, a Latin translation of it.

After stating the views of the essayists, and commenting on them, he quotes the concluding words of Mr. Bigelow, the most recent of them: "We have to leave our subject for the present in an unsettled and therefore rather unsatisfactory condition."

Dr. Agardh then quotes from his Swedish work the description of the structure of Lomentaria and Champia, showing that in the young state the interior is never hollow, but is interlaced with delicate coloured filaments, which disappear in the older parts of the plants. He also mentions that some Florideæ, which are apparently hollow, such as Chrysomenia, Dumontia, &c., are in part filled with a gaseous fluid, which probably assists such plants as have thin walls in preserving an erect position.

Dr. Otto Nordstedt is already well known to British algologists by the specimens of fresh-water Algæ which he has issued in conjunction with Prof. Witrock, of Stockholm. The work he now sends us proves that he is a good draftsman and linguist, as well as algologist. It is on the fresh-water Algæ of New Zealand, and is written in very good English, and carefully got up in every respect. The author mentions that the Desmids have received his greatest attention, and that comparatively little attention has been bestowed on the Phycchromaceæ; a few only have been taken from brackish water.

Dr. Nordstedt mentions that he has not met with any new genus of fresh-water Algæ, or with any genus not represented in Europe, with the exception of *Phymatodocis*, which, he tells us, occurs also in North and South America, and in Australia.

With regard to the localities in New Zealand where fresh-water Algæ are found, no one is better acquainted with them than Dr. Berggren, who had made an interesting collection, subsequently examined by Dr. Nordstedt, and included in the present work on these plants. Dr. Berggren's remarks, as recorded by Dr. Nordstedt, will be read with interest. He says:—

"The fresh-water Algæ in New Zealand do not, from several causes, occur so frequently as in the regions of the corresponding latitudes of the northern hemisphere. The ground, which is generally sloping, gives a rapid course to rivers and brooks, and the surface occupied by stagnant water, swamps, and bogs is not very extensive. The comparatively small number of water- and bog-plants growing sociably together (such as *Potamogeton* and others), which in the stagnant waters and marshy spots of Europe are favourable to the existence of the fresh-water Algæ, is of great consequence. The usually dry summer generally causes the draining of those lowland spots, which in the wet season (the winter) are swamps. Therefore the Algæ are more frequent in the damp and moss-grown localities of the mountainous regions in the Northern as well as in the Southern Island. In the rivulets from hot springs in the hot lake district in the Northern Island, the Algæ are especially Phycchromaceæ, but likewise Confervaceæ and Zygnemaceæ, to be found growing in great abundance."

Dr. Nordstedt mentions that from his examination of Dr. Berggren's collection, it appears that the swampy ground on the Canterbury Alps and the highlands round the Taupo Lake are the best localities, especially for Desmids.

The description of the New Zealand Algæ is supple-

mented by lists of a few fresh-water Algæ from Australia and the Hawaiian Islands. Then follow a list of the principal works consulted, and an index. The work is illustrated by seven plates, the figures of which are all drawn—and well drawn—by the author.

MARY P. MERRIFIELD.

THE JOURNAL OF MORPHOLOGY.¹

THE year 1887 marked an epoch in the advance of natural science in America, as that in which the above-named journal made its appearance. The first number was not published until some months after the advertised time, but, once in circulation, it became clear to all that the delay was warranted by the eminently satisfactory result obtained. The journal was defined in the preliminary advertisement as one "devoted principally to embryological, anatomical, and histological subjects," it being stated that "only original articles, which deal thoroughly with the subject in hand, will be admitted to its pages." The three parts before us present in the aggregate 593 pages crown octavo, with thirty plates, and woodcuts interspersed with the text. Seventeen papers have in all appeared, and of these, seven or eight are devoted to embryology, with a total of 361 pages, and four or five to anatomy and histology, with that of 182 pages. One is purely experimental, and deals with the mental powers of spiders (37 pages), and another is largely palæontological (12 pages), while the three which remain (61 pages in all) are largely controversial. The illustrations are throughout most excellent, but it is surprising to what an extent the work in this department has been done in Germany, especially as it has resulted in "a great loss of time and inconvenience in supervision." We are assured, however, that "there is no remedy except in the employment of an expert lithographer, to work under our immediate direction." We sincerely hope the editors may soon see their way to the employment of such an one, for surely he is to be found in the United States.

It will be seen from the foregoing that while, in the early issues, all branches of animal biology have been represented, there is a marked preponderance of embryological literature; and, taking into account the share which the discursive papers contribute towards this subject, there would appear to be a predisposition in favour of the same. The study of embryology is one which lends itself, by virtue of its constitution, to the production of hypotheses and broad generalizations; and, in knowledge of the extent to which previous workers have often availed themselves of this, we are led to inquire how far the predisposition in question may be due to this cause. Certain of our American brethren are notorious for their power of accumulating superfluous detail. Publications could be cited in which the "padding" is inversely proportionate to the actual work done, and we would fain desire that the authors should work more and write less; indeed, the senior editor has acknowledged this. He writes: "Concentration is our need"; and further, "The inaccessibility of our literature—scattered as it is among the publications of so many societies and institutions, and mixed up with a mass of heterogeneous matter that has no value for a zoologist—is notorious." All this being so, it is not surprising that the editors have decided to issue the numbers only "as often as the requisite material is furnished."

In estimating the usefulness of a private journal such as this, especially when so largely devoted to the interests of a subject lending itself to broad generalization, we cannot refrain from deploring the tendency, elsewhere manifest, towards the introduction of a bias in favour of

¹ *The Journal of Morphology*, edited by C. O. Whitman, with the cooperation of E. P. Alls, Jun. (Boston: Ginn and Co.)