HOOPER (J.)

INTRODUCTION

TO

ALGOLOGY;

WITH A

CATALOGUE

OF

AMERICAN ALGÆ, OR SEA-WEEDS,

ACCORDING TO

THE LATEST CLASSIFICATION

OF

PROF. HARVEY.

BY JOHN HOOPER.

SURGEON GEN'LS OFFICE
B.82
LIBRARY.

BROOKLYN:
PUBLISHED BY JOHN HOOPER.

October 1, 1850.

INTRODUCTION

TO

ALGOLOGY;

WITH A

CATALOGUE

OF

AMERICAN ALGÆ, OR SEA-WEEDS,

ACCORDING TO

THE LATEST CLASSIFICATION

OF

PROF. HARVEY.

BY JOHN HOOPER.

SURGEON GEN'LS OFFICE
LIBRARY

BROOKLYN:
PUBLISHED BY JOHN HOOPER.

OCTOBER 1, 1850.

INSCRIBED TO MRS. DIETZ.

MADAM,—

In this humble attempt to awaken an interest in this subject, and to register, as far as I am acquainted, a catalogue of genuine American Algæ, I am actuated only by a motive to advance a science, the study of which had afforded me so much pleasure, and in which, I feel assured, you take much interest.

I was induced to inscribe it to you, Madam, because it is a branch of Natural History free and open to be perused by females as by men—a branch which men have not entirely appropriated to themselves; likewise, because ladies in Great Britain have been so successful as to make some of the most important discoveries, and aided in rendering assistance in raising Algology to the proper rank it now maintains as a CLASS in Natural History. Ladies have also excelled in this country in the beautiful display of specimens in their albums, and deserve much credit not only for preserving many species from oblivion, but also for awakening thereby an interest in this subject of those who could not otherwise have been enlisted. England boast proudly and justly of her Mrs. Griffiths, Miss Cutler, and Miss Hutchins. Give us time, opportunity, and encouragement, and why should not the names of Mrs. Dietz, Mrs. Fisher, and Miss French be as proudly hailed by Americans for the efforts they will make to place this neglected science on the same exalted eminence it has attained in Europe.

Most respectfully,

JOHN HOOPER.

INTRODUCTION TO ALGOLOGY.

SONG OF THE SEA-WEED.

I am born in crystal bower,
Where the despot hath no power
To trail and turn the oozy fern,
Or trample down the fair sea flower.
I am born where human skill
Cannot bend me to its will;
None can delve about my root,
And nurse me for my bloom and fruit:
I am left to spread and grow
In my rifted bed below,
Till I break my slender hold
As the porpoise tumbleth o'er me,
And on I go—now high—now low—
With the ocean-world before me.

Eliza Cook.

In selecting this branch of Natural History as the theme for this little treatise, I am not actuated by the belief that it is of more importance, or that its study is more fascinating and calculated to elicit a livelier interest, than any other; for I am impressed that every branch of Natural History is equally important, equally interesting; and that every thing appertaining to the book of nature possesses within itself a fascinating power, which, when understood, cannot fail to awaken the purest admiration in the human mind;—but I am induced to take this subject as a page in God's book hitherto overlooked and neglected in this country—a page which, I know, requires only to be opened to be duly appreciated by those who can look *in* nature, and there see nature's God.

I am aware that this class, Algæ, is in the lowest scale of vegetable organism; that its habitat being the mighty deep, it is further from our view; that we therefore do not come every day in contact with it; that its beauties and its uses are mostly hidden from us.

These things I know well; but who, I inquire, is he that will presume that the smallest, the lowest of God's works, are so insignificant, so uninteresting, as to merit our contempt, or even our neglect? What is it, I ask, which renders us so superior to the brute creation,—what, but our glorious intellectuality?—that generous endowment which enables us to understand and appreciate the works of the Creator. The low link it forms in the chain of the creation cannot render it unimportant, for nothing is low which God has made, nor uninteresting; for in these very humble links we can frequently the more plainly trace the affinities and analogies of link with link, of individuality to generality; and thus testing the beautiful harmony and unity which pervade the whole. Snap asunder these lower links, these neglected objects, and what becomes of the chain? Where will be its unity? The works of the Creator are a whole: every individual being a link in that unity, every one is therefore necessary for its harmony, and none are so exalted as to be independent of the others; nor are there any so debased as not to claim kindred and affinity with all and with each. As to their remoteness from our every-day contact, I know that there are, "far in the sunless retreats of the ocean, fair flowers no mortal eye may see." I know, too, that "the works of God are many and wondrous, and they seek them out who delighteth therein." And who is he that will acknowledge he does not delight therein? It is true that the learned scholar, in order to impress upon the minds of his pupils, directs their astonished intellect to the starry firmament, to prove to them the *infinity of creation*. We feel no less the reverential admiration excited by the contemplation of the mighty worlds, ever revolving, never tiring, and which perpetually proclaim, "The hand that made us is Divine;" but we do maintain that these lesser objects,—these earthly things,—however minute to our simple minds, as loudly proclaim the Divine power that formed them, the perfection and *infinity of creation*, as do those vastly distant bodies which our minds can comprehend only through analogy and hypothesis, whilst these earthly particles can be taken in the very hollow of one's hand, and there demonstrated. Is there any who doubt? Let such a one take a look through a good microscope, and behold the courses of the *orbs* of sap in their circulation; or at the motion of the *particles* of blood through the animal system, even in its lowest organism,—and his head will bow in humility in contemplating the beauty, harmony,

and unity—the infinite perfectability of these despised or neglected objects. Of our Algæ, take one of its lowest forms,—some of the *Conferva*. Its means of fructification appear so different from the generality of vegetable bodies, that it astonishes the investigator, who may thereby have been led into the error that they are a compound of vegetable and animal bodies. The germ of vegetation is contained within the frond, free from spore or confinement of any kind, and moves up and down the filament in which it is enclosed, as by volition. When at maturity, one of the cells bursts, and emits the active little body in the form of gelatine, to which is attached a small hair-like protuberance, by which the germ is propelled actively through the water, as by volition, until it meets with some favorite location or body to which it attaches itself, grows, and becomes similar to its parent plant. Even observing and experienced naturalists have been deceived by these appearances, and Professor Agardh stated that they were first plants, then animals, and then again plants. Take the lowest of animal formations,—the *Medusæ*, for instance. It emits gelatinous substances to which are attached cilia, by which they are propelled through the water as by volition, until they find some favorite object to which they become attached and grow like a stalked plant. When they have attained a certain stage, they form on the apex saucer-like bodies, which, as they mature, fall off, and each saucer becomes a young *Medusæ*, like its parent. Naturalists have likewise been mistaken by these appearances, and have declared that the Medusæ is first animal, then vegetable, and again animal. Here is analogy and affinity illustrated more forcibly than are met with in more highly organized bodies of creation.

It is but within these few years that any naturalists have paid deserving attention to Algology in this country, contenting themselves with the position which the glorious Swede had given them among the *Cryptogamia;* namely, four genera—Fucus, Ceramium, Ulva, and Conferva. But since the days of Linnæus, the free uses of good microscopes have evolved much light upon the nature, habits, and characteristics of these plants, which have compelled a new classification, and they now stand in their properly elevated position, as a class in Natural History; and this class, *Algology*, contains many well-defined orders, every one composed of many established genera. My small catalogue already numbers seventeen orders of American species.

Algology on the continent of Europe has lately been studied with much zeal, and many talented naturalists have signalized themselves by the discoveries they have made and the improvements in the classification which they have effected. The names of Lamouroux, Lyngbye, Agandh, Turner, Velley, Berkeley, Greville, Montagne, Harvey, and Mrs. Griffiths, are an array of talent sufficient to extract light from darkness, truth from error, and intelligence from the mighty depths of the ocean. But in our country, until the last few years, darkness has reigned supreme upon this subject, and the flowers of the sea have remained uncalled, except by Borealis, until Professor Bailey, of West Point, lent his investigating talent to the subject, and thereby awakened a little knot of followers, who will be untiring in their labors, from its becoming a labor of love. To Mr. Bailey I am indebted for nearly all I know of the subject, for it was by his kind assistance I learnt the A, B, C in this fascinating book. It was through his generous encouragement that I waded on from lesson to lesson, until my book has attained a respectable size, and to me has become the interesting companion of my leisure. For the advancement of this science we are much indebted to many ladies, who have effected much by the beautiful display which their skilfull ingenuity has made of specimens, which has awakened an interest in the subject of persons who otherwise could never have been enlisted. Dr. Harvey, of Dublin, has likewise been amongst us taking notes and observations, and is now engaged upon a work on this science, which will form a foundation-stone whereon the American Algologist may build with safety. The coming in of the new year may be hailed with hopes by the American Algologist, when the *Nerius Borealis Americana* shall appear, for hitherto we have had nought but European authority, and we have consequently been at sea without rudder or compass to guide us from the great darkness wherein we have been involved.*

---

* In Professor Hitchcock's report of the flowerless plants of Massachusetts, in 1835, he only names eleven species; and in 1838 Dr. Torrey sent to the elder Agardh about the same number; and this was all that had been effected in our Marine Algæ until Professor Bailey withdrew the veil of darkness from Neptune's garden, and prepared for his followers so plenteous a harvest. And Mr. Bailey, in 1848, when he published his list of American Algæ, only had met with 172 species, foretelling truly that many new species would be added thereunto. But, even now, but little, very little, has been done on this side the Atlantic. We need workers in this harvest field, for truly the fruit bends to the hand of the collector. It is true Massachusetts Bay, and a few other portions of our Eastern coast, have yielded to

In the mean time, let us keep stirring; let us collect material; let us register our observations, that we may be well prepared to fill up satisfactorily the spaces which Mr. Harvey will leave for us to do. Let every one desirous of advancing a knowledge of the marine botany of our country, so as to place it upon as respectable a footing as it has acquired in Europe, investigate the shores of their locality—observe, collect, make notes, communicate, exchange with others, and a few years will place American Algology side by side with that of Europe.

What should act as a further stimulus to our exertions is the almost unexplored field open before us, where we cannot fail to reap a plenteous harvest. Unlike England, where every rock, pool, and boulder have been scraped, and the depths of ocean been dredged in search for their habitat, habits, and characteristics; many, very many parts of our coasts lie altogether untouched for such an object; and even what has been done remains yet to be critically re-examined, and many truly American species will be detected to have been confounded with European, in consequence of dependance upon dried and imperfect specimens which alone may have been compared

Those beautiful albums of sea-weed, so ingeniously prepared by ladies for presents, &c., should be sought for and encouraged even by the scientific, for they not only create a love and taste for their collection, and thereby secure pleasurable, cheerful, and consequently healthful exercise to those engaged in it, but it snatches and preserves from oblivion many rare and beautiful specimens which might escape the researches of the merely scientific.

It is not my intention nor desire to urge a classification of our Algæ, impressed as I am of the magnitude of the undertaking, especially with the crude material we have yet prepared; but let each and every one of us work diligently; let us collect the material from which the structure must be raised; let each one store up his observations in his note book; let him encourage his neighbor by imparting what he has learnt; let him collect every species, as opportunity presents,—and we shall not lack a master-

---

the albums of the ladies many of its floral treasures; but very few others than the showiest specimens have been sought for and preserved, and until very lately New York Bay remained unbroken ground, and Long Island Sound still sighs with neglect. For a few days this summer I explored its shores at Greenport, and almost every species I found were new to me.

hand who will therewith be enabled to form a classification of American Algæ, equal to the standard of any in Europe. Sweden has her Agardh, France her Montagne, Ireland is justly proud of her Harvey, Scotland of her Landsborough, Wales of her Ralfs, and England of her Griffiths and her Greville; and should this country, whose shores are lashed by the Atlantic and the Pacific—whose territory extends from the torrid to the frigid zone—whose inland lakes are equal to so many seas,—lack a genius to do justice to this branch of science? We hear a sound from West Point, and echo answers, No! We have our Bailey. Let us, then, gather round Professor Bailey; let us supply him with the products of our collections, of our notes and observations, and I feel assured he will do this subject and this country ample justice in the emanation he will present to us; and we shall then stand side by side of the other nations, and our marine plants will be known and acknowledged by all scientific bodies.

To the unpractised collector it may not be amiss to give a few short directions for collecting and preserving specimens. If the Green Series be your pursuit, you will find them chiefly from high to half tide mark, or in fresh water. If the Olive series, they may be mostly found from half to low tide mark; and the Red Series will be found the most plentiful from low tide mark. But there are abundant exceptions to these general rules. Rocky shores are the most prolific in specimens. In collecting, several bottles should be provided for receiving your fine and delicate specimens, for, if mixed in a mass, or with coarse species, they will be much injured, if not spoiled.

In the display of specimens, great care should be taken to do it to advantage, for it is very agreeable to behold their beauties to the best advantage; and although some naturalists assume to despise such display, I find that even they always prefer specimens so prepared by others. Two dishes of water are necessary for this operation—the one to wash, the other to disentangle them in, and likewise to display them in proper form. Good white paper should be selected, and cut in sizes to suit the collector. One of these papers must be placed under the plant in the dish of water, and when the plant is arranged by aid of a point, which should not be too sharp, the paper should then be carefully withdrawn from the water. If a fine and gelatinous specimen, the ramuli will be washed together, and much disfigured in consequence. To rectify

this evil, one side of the paper must be gently dipped again in the water, only touching the disarranged ramuli, and so on all round the plant, until properly adjusted. After thus far progress has been made, pieces of common muslin should be laid gently over the plant, to absorb the moisture and coloring matter which might escape; then placed in a book or under other slight pressure until nearly or quite dry. Then withdraw your muslin, and place the plants under considerable pressure. This done, your specimens are ready for your cabinet or your album. The time required for this operation is but little, as practice will give speed and suggest facilities. Never forget to write date and location upon your specimen, as it may save you future difficulty in your study.

The form and structure of Algæ are very varied,—some being so simple and minute as to be composed of one cell or sac, sufficient to contain the germ for propagation. Others, as the *Macrocystis luxurians*, are so extensive and compoundly ramified, as to cover a vast area in circumference, and to exceed the highest forest tree in altitude. Captain Marryatt, in his *Naval Officer*, page 153, says—

"There is a remarkable peculiarity on the Island of Tristan D'Acunha. Its shores, to a very considerable extent out to sea, are surrounded with the plant called *Fucus Maximus*, mentioned by Capt. Cook; it grows to the depth of 60 fathoms, and reaches in one long stem to the surface, when it continues to run along to the enormous length of three or four hundred feet, with alternate branches at every foot of its length.

"Thus, in the stormy ocean, grows a plant higher and of greater length than any vegetable production on the surface of the earth, not excepting the Bannian tree, which, as its branches touch the earth, takes fresh root, and may be said to form a separate tree.

"These marine plants resist the most powerful attacks of the mightiest elements combined;—the winds and the waves in vain combine their forces against them: uniting their foliage on the bosom of the waters, they laugh at the hurricane and defy its power. The leaves are alternate, and when the wind ruffles the water, they flap over one against the other, with a mournful sound.

"The branches or tendrils of these plants are so strong and buoyant, that when several of them happen to unite, a boat cannot pass through them. I tried with my feet what pressure they would bear, and I was convinced that, with a pair of snow shoes, a man might walk over them."

Some are so robust, as the *Lessonia*, &c., as to be mistaken for wood, when cast in quantities upon the shore; so that ships have been laden with them for fuel: others so slender, as the *Conferva*, as to comprise a simple filament of single cells. Some are so local in their habits, as to be found only in certain latitudes; others so cosmopolite, as to extend wherever the ocean flows. Some are confined to the close limits of a tide pool; others, as *Sargassum bacciferum*, are wanderers upon the mighty deep, and without a local habitation. But this class of plants, however simple or compound in their structure, are invariably of cellular tissue, and inhabitants of the water.

In the character of their fructification they are very varied, but differ altogether from every other class in Botany. The three different series, the Olive, Red, and Green, vary so much from each other in this respect, as to form three natural divisions in Algology. Yet, still the affinity is maintained so as to bind them together in one class; but the difference is so great, as not to be admitted within the compass of any order in any of the other series.

Unimportant as this class in Botany may appear here, in Europe it has not been so considered, as the laborious works of many learned authors can testify. I need only enumerate Dillenius, Hudson, Stackhouse, Dr. Walker, Dr. Neill, Turner, Dr. Montagne, Milne Edwards, Mr. Ralfs, Sir W. Hooker, Lamaroux, Agardh, J Agardh, Capt. Carmichael, Dr. Greville, Dr. Landsborough, and Dr. Harvey—names of sufficient force to proclaim its importance. Yet, with all the evidences and arguments these authors have adduced, few things are more common than the question, "Of what use is this study?" If the replies already written in answer to this inquiry be insufficient, it appears that nothing can convince such minds. If knowledge for the sake of knowledge itself—if by an augmented knowledge we are exalted above the mere animal—if an intimacy with the natural objects by which we are surrounded—if an insight into the living book of God, be of no importance, then, indeed, are arguments vain, and to such the beauties of God will remain a sealed book, and they may "lay up the talents" which God has vouchsafed them "in a napkin." But there are a few—and that knowledge is refreshing—who delight to search out, and ponder over, and take pleasure in investigating the infinite harmony and unity of every created thing, and love to trace such through the affinity and analogy of every object, even the simplest, with the

next kindred object, and reverence the Almighty Architect who hath reared a structure for our dwelling-place so diversified and so unique—so wondrous, and yet so necessary. The green, slimy-looking substance on the stagnant pond is looked upon too commonly with loathing, believing, as many do, that it is corruption emanating from feculent water. Poor thoughtless ones! Had they but common inquisitiveness upon such matters—did they not deem these portions of creation too contemptible for their inquiry, they would have ascertained that the green slime was a beautiful Alga, pleasing to the eye, and, by its act of vegetating, freeing that stagnant pool of its impurities, which might otherwise spread around pestilence and death. Surely this little fact is worth knowing.

But let us advert to more comprehensible arguments: let us speak of dollars and cents. From what bodies in nature is kelp extracted? Algæ. From whence is iodine chiefly obtained? Algæ. What constitutes the sea-board farmer's second most important crop? Algæ.

SONG OF THE SEA-WEED.

The Vraic! the Vraic! oh, the Vraic shall be
  The theme of our chanting mirth;
For we come to gather the grass of the sea,
  To quicken the grains of the earth.
This grass it groweth where no man moweth,
  All thick and rich and strong,
And it meeteth our hand on the desolate strand,
  Ready for rake and prong.
So gather and carry, for often we need
The nurturing help of the good Sea-weed.

The Vraic! the Vraic! come, take a farewell
  Of your bounding and billowy home;
No more will ye dive in the fathomless cell,
  Or leap in the sparkling foam;
Far from the Petrel, the Gannet, and Grebe,
  Thou shalt be scattered abroad,
And carefully strewn on the mountain glebe,
  To add to the harvest hoard.
The land must be tilled, the tiller must feed,
And the corn will be helped by the good Sea-weed.

The Vraic! the Vraic! pile it on the fire;
  Let it crackle and smoke in the wind,
And a smouldering heap of treasure we'll keep
  In the ashes it leaveth behind.

On to the furrow, on to the field—
Dust to dust is the claim;
'Tis what the prince and the pilgrim yield,
And the Sea-weed giveth the same.
The land must be tilled, the tiller must feed,
But he'll mingle at last with the good Sea-weed.

Then I think that a knowledge of these things is of some pecuniary importance. But we need not pause here in our relation, for many are the articles of luxury made from these same Algæ. But if we are not so arrogant that we measure the usefulness of God's creation by the dollars it will place in our pockets, we shall direct our attention to the services it supplies to all the other parts of the great unity. We shall not be forgetful of its agency in diffusing oxygen and other chemical bodies through the water, rendering them thereby healthful and sweet. We should think of the shelter and food they afford to the myriads of animated creatures with which the same God who formed us has peopled the very depths of the sea; and we should then humbly acknowledge that God is great, and the works of his hands are necessary, good, and well to be known.

And, moreover, there is another and still greater advantage derived from the study of natural objects. It secures to the collector a cheerful and healthful exercise, which cannot fail to yield its reward. But the Rev. Dr. Landsborough hath written words upon this subject which I cannot equal, wherefore his paragraph shall answer my purpose.

"The naturalist knows nothing of *tedium vitæ*—that vampire *ennui* which renders life a burden to thousands. To him every hour is precious. He may have little leisure for his favorite pursuit; but even those scraps of time which occur in the busiest life, and which many allow to be lost, he gathers up as precious fragments. Habits of observation, of patient research, of accurate discrimination, and orderly arrangement, are gradually acquired. Wherever he is—on the wild moor or on the shore of the sea—he *learns* to see thousands of beautiful, wonderful things, which the untrained, uninitiated eye never observes. Is he healthy? His rural rambles are conducive to the continuance of health. Is he in the pursuit of health? *Health flees from the man who sets out in direct pursuit of it.* But let him have an interest in the wonders of nature—in the works of God's hand;—meditating on them, he for-

gets his ailments, and health, which he ceases to pursue, by the blessing of God often comes, as it were, of its own accord. His mind is soothed and refreshed, and the salutary influence is felt by the enfeebled body."

There is a pleasure in the pathless woods,
  There is a rapture on the lonely shore,
There is society where none intrudes,
  By the deep sea, and music in its roar.

BYRON.

I've tracked the paths of dark wild wood,
  No foot-fall there but my own;
I've lingered beside the moaning flood,
  But I never felt alone.
There were lovely things for my soul to meet,
  Rare work for my eye to trace;
I held communion close and sweet
  With my Maker—face to face.

ELIZA COOK.

To any person who can snatch an hour or so occasionally to wander on the sea shore in pursuit of Algæ, there are many advantages. He not only becomes better acquainted with the habits and characteristics of the objects of his favorite study, and enriches his cabinet with new and rare specimens, but it compels him to become familiar with a vast variety of other natural objects. He observes numerous species of aquatic birds, and knows more of their real history than many a parlor student, who has won a passing fame by writing hard names, of compound Greek and Latin, upon Ornithology in his study. He cannot fail to meet with beautiful shells, and observe the habits of the various molluscous animals to which they belong—a knowledge gained, to which many, possessing splendid cabinets of shells, are strangers. The Algologist has seen with his own eyes the living Scallop glide through the waters, by swiftly opening and shutting his shell continuously. Some Choncologists have only read of such. The Algologist, in his sea-side rambles, meets with the Heart Urchin and the Star-fish, and perceives at once their affinity. He meets, too, with a multitude of Polypes, from the simple Coryne and the beautiful Actiniæ to the compound Helianthoida. He will observe the Crustacea shed his shell,—a fact doubted by some cloister naturalists, but known to every lover of Algology who collects his own specimens. The beautiful Jelly

Fish, and their strange metamorphoses, are familiar to his investigations; and even the rare Cuttle Fish, with his shell-less body, is no stranger to his observations. But, above all, he learns the secret haunts and natural abiding-places of the much-loved objects of his pursuits. He verily hears the song of the Sea-weed.

SONG OF THE SEA-WEED.

Now I have taken my course to the shore,
Where yellow sand covers the crystal and amber;
Serenely I dwell with the rosy-mouthed shell,
Where limpets are thick and the tiny crabs clamber.

A young child is roving, and soon he espies
My rich curling threads as they mount in the spray;
He steps mid the green stones, and eagerly cries,
"Oh! that beautiful Sea-weed, I'll bear it away."

All earnestly gazing, he stretches to reach,
But a swift-spreading wave has rolled over the beach;
It hath carried me back from the sun-lighted strand,
And the young child beholds me far, far from the land.

He runs through the ebb-surf, but vain the endeavor—
I am gone, my fair boy, I am gone, and forever;
Thou wilt covet full many bright things, but take heed
They elude not your grasp, like the pretty Sea-weed.

ELIZA COOK.

In his course of studies, the Algologist has displayed before his eyes the very link which unites the vegetable and the animal kingdoms; as also the link which joins that of the vegetable and mineral world. In the first instance, that link is contained in the *Diatomaceæ;* in the second, *Corallineæ*. In making this statement, I have been asked to show this *link;* to place my finger upon it. I cannot do so; but does it, therefore, not exist? Not at all. I have read somewhere a similar demand answered by the following proposition:—*Twilight* contains the *link* which *divides day* from *night*. *Twilight* contains the *link* which *unites light* and *darkness*. Please to lay your finger upon that *very* link. It cannot be done. Does, therefore, that link not exist in twilight? Neither can I place my finger upon the link which unites the animal and the vegetable kingdoms. But, still, it there exists. The Infusorial animal is contained in Diatomaceæ: so, too, is the Alga contained in Diatomaceæ. Still I cannot show the exact link any more than it can be shown to me the exact link which unites light and dark-

ness in twilight. But surely the powers of the Almighty must not be meted by our limited perceptions. Mystery only commences where our knowledge terminates; for where our knowledge extends there is no mystery, but harmony and unity. Affinity and analogy pervade all the works of God.

> Why does one clime and one soil endue
> The blushing poppy with an orange hue,
> Yet leave the lily pale, and tinge the violet blue?
>
> PRIOR.

The color of Algæ is as varied and as beautiful as our land-flowering plants; for although the Alga bears no visible flower, yet its Maker has diffused through its frond, filaments, ramuli, and alb, every hue which the imagination can picture;—the sombre black weeds of the rocks, as the *Fuci;* the dingy olive of the deep sea, as the *Laminarii;* the shining grass green, as the *Ulvi;* the deep blood red, as in the *Rhodymenia;* the deep pink, as in the *Callithamnioni;* the delicate rosy pink, as in the *Griffithsiai;* the varied purple, as in the *Porphyri;* and the changeable iridicient hues of the *Iridæa.*

> "Who can paint
> Like Nature? Can imagination boast,
> Amid her gay creation, hues like these?
> What *hand* can *mix them with that matchless skill,*
> And *lay them on so delicately fine,*
> And *lose them in each other,* as appears
> In every bud that blooms."

THERE being no legitimate work published upon our American Algæ, I have no other resource, in giving a catalogue of our native species, than to adopt Professor Harvey's system, arranged for the British Algæ. In doing so, I shall feel somewhat at a loss when I meet with American genera which are not found in Great Britain; and must, therefore, introduce those where I may think they have the greatest affinity. I have many, also, which are new or undetermined: these I intend adding in a miscellaneous addenda; hoping, at some future time, when Dr. Harvey's much-desired work appears, to be able to give them their proper station in the American classification.

CLASSIFICATION OF AMERICAN ALGÆ,

ACCORDING TO PROF. HARVEY'S MOST RECENT WORKS.

Series I.

MELANOSPERMEÆ, or OLIVE-COLORED ALGÆ.

All the Melanosperms are marine, of olive color. Spores olive, either external or in proper receptacles. The Melanosperms comprize six orders, namely—

1. Fucaceæ.
2. Sporochnaceæ.
3. Laminariaceæ.
4. Dictyotaceæ.
5. Chordariaceæ.
6. Ectocarpaceæ.

Order I.—FUCACEÆ.

Frond inarticulate; leathery or membranaceous. Spores immersed in the frond. The Fucaceæ contains five genera, namely—

I. Sargassum.
II. Halidrys.
III. Cystoseria.
IV. Fucus.
V. Himanthalia.

I. Sargassum. Agardh.

Distinct, stalked, nerved leaves, and simple stalked air-vessels. Conceptacles spherical, containing spores and tufted antheridia, communicating through numerous pores to axillary clusters in small linear receptacles.

S. *vulgare*, Agardh; Greenport, L. I.
S. *bacciferum*, Turner; New York and Massachusetts Bays.
S. *Montagnei*, Bailey; Long Island Sound.

II. Halidrys, or Sea Oak. Lynbye.

Frond compressed, pinnated with branches. Air vessels stalked, lanceolate, leafless. Receptacles stalked, terminal.

H. *Siliquosa*, Lynbye.; Stonington.

III. Cystoseira. Ag.—*Name, a chain of bladders.*

Frond much branched and bushy. Branches very slender, and containing chains of air-vessels immersed in the substance of the plant. Receptacles terminal.

C. *ericoides*, Goodwin and Woodward; Florida.

IV. Fucus. Linn.

Frond dichotomous. Air-vessels innate and usually in pairs. Mid-ribbed. Spores lateral or terminal.

F. *vesiculosus*, Linn.; Common.
F. *nodosus*, Lamouroux.
F. *serratus*, Lamouroux; Newburyport.
F. *Mackaii*, Turner; New York Bay.

V. Himanthalia. Lyngb.—*Name, Sea-thong.*

Frond top-shaped. Receptacles very long, much forked from the centre, strap-shaped.

H. *lorea*, Lyngb.; Massachusetts.

Order II.—SPOROCHNACEÆ. Harvey.

Inarticulate, olive-colored. Spores attached to jointed filaments, free or joined in masses. Contains two American genera, namely—

I. Desmarestia. II. Arthrocladia.

I. Desmarestia. Lamour.—*Name from a French naturalist.*

Frond filiform or flat; solid; distichously branched.

D *aculeata*, Lam.; Rhode Island, Lynn, &c.
D. *veridis*, Müll.; New York Bay and Sound.
D. *Sp.?* or new; Long Island Sound.

II. Arthrocladia. Duby.—*Name, a jointed branch.*

Frond traversed by a jointed tube. Filiform, nodose, the nodes producing tufts of jointed filaments. Rare.

A. *villosa*, Hudson; Wilmington, N. C.

Order III.—LAMINARIACEÆ.

Inarticulate. Spores superficial, in patches, or covering the whole surface. Usually strong fibrous roots. Contains three genera, namely—

I. Alaria. Greville.—*Name, a wing.*
II. Laminaria. Lamour.—*Name, a thin plate.*
III. Chorda. Stackhouse.—*Name, a cord.*

I. Alaria. Grev.

Leaf membranaceous, with a hard midrib. The stem pinnated with ribless leaflets, which form the receptacles.

A. *esculenta*, Lamour; Massachusetts Bay.

II. Laminaria. Lam.

Foot stalk expanding into a broadish leaf. Leaf ribless. Spores embedded in the leaf.

L. *saccharina*, Lamour.; Long Island Sound, &c.
L. *longicruris*, Har; Stonington.
L. *fascia*, Müll.; New York Bay, &c.

L. *trilaminata*, Har.; Stonington.
L. *digitata*, Lamour.; Seaconnet.

III. Chorda. Stack.

Frond cylindrical. Spores conical, covering the whole surface.
C. *filum*, Lamour.; Long Island Sound, &c.
C. *lomentaria*, Grev.; Seaconnet.

Order IV.—DICTYOTACEÆ.

Inarticulate. Spores superficial and in lines. Roots coated with woolly fibres. Containing nine American genera.

I. Padina. Adanson.
II. Zonaria.—*Name, a girdle or zone.*
III Dictyota. Lamour.—*Name, a net.*
IV. Dictyosiphon. Greville—*Name, a net and a tube.*
V. Punctaria. Greville—*Name, a dot.*
VI. Asperococcus. Lam.—*Name, rough seed.*
VII. Dictyosphæria.
VIII. Halodictyon.
IX. Litosiphon. Harvey.—*Name, a slender tube.*

I. Padina. Adanson.

Frond ribless, fan shaped, with concentric lines, edged with articulated filaments Spores bursting through the cuticle of the upper surface.
1. P. *pavonia*, Lamour; Florida.

II Zonaria.

Frond flat, fan-shaped, ribless. Cleft, concentric lines. Scattered sori, bursting through the cuticle of both sides.
1. Z. *Sp.?* or new; Key West.

III. Dictyota. Lamour.

Frond ribless, linear, dichotomous. Roots coated with woolly fibres. Fructification, in scattered lines, bursting through the cuticle on both sides.
D. *dichotoma*, Hudson; Florida.
D. *ciliata*, Ag.; Key West.
D. *linearis*; Key West
D. *Sp.?* or new; New York Bay.
D. *Sp.?* or new; Long Island Sound.

IV. Dictyosiphon. Grev.

Frond thread-like, tubular, branched. Spores naked, scattered over the surface.
D. *fœniculaceus*, Hudson; N. Y. Bay and L. I. Sound.

V. Punctaria. Grev.

Frond leaf-like, no midrib. Spores scattered over the whole surface in minute dots.

P. *tenuissima*, Grev.; New York Bay.
P. *latifolia*, Grev.; Long Island Sound.
P. *platiginea*, Roth; Stonington.

VI. Asperococcus. Lamour.

Frond unbranched, tubular, rarely compressed. Fruit scattered over the whole surface.
A. *sinuosus*; Massachusetts.
A *clavatus*; Florida.
A. *echinatus*, Mertens; Florida.

VII. Dictyosphæria.

D. *favulosa Decarsne*; Key West.
1 *Sp.?* or new; Florida.

VIII. Halodictyon.

1 *Sp.?* or new; Key West.

9. Litosiphon. Harvey.

L. *Laminariæ*, Lyngb.

Order V.—CHORDARIACEÆ.

Frond cylindrical, branching. Spores enclosed within the substance. Contains four genera, namely—

I. Chordaria, Agardh —*Name, a cord.*
II. Mesogloia, Ag.—*Name, vicid centre.*
III. Leathesia, Gray —*Name, Rev. G. R. Leathes.*
IV. Elachistea, Fries.—*Name, The least.*

I. Chordaria. Ag.

Axis cartilaginous and dense. Filaments branched.
C. *divaricata*, Agardh; New York Bay.
C. *flagelliformis*, Müll; Long Island Sound.
3 *Sp.?* or new; N. Y. Bay and L. I. Sound.

II. Mesogloia. Ag.

Frond filaform, gelatinous, much branched. Spores attached to the ramuli.
M. *virescens*, Carmichael; Key West.
M. *affinis*, Berkely; Key West.
M *zostericola*; Florida.
M. *Griffithsiana*, Greville; L. I. Sound.
M. *vermiculosa*, Ag.; L. I. Sound.
M. *multifida*; Greenport.

III. Leathesia. Gray.

Frond globose or shapeless.
L. *marina*, Ag.; L. I. Sound.

IV. Elachistea. Fries.

Frond parasitical, composed of tufts of free-jointed filaments, springing from a common base.

E. *tucicola*, Velley; L. I. Sound.
E. *flaccida*, Dillwin; L. I. Sound.
E. *curta*, Dillwin; Greenport.

Order VI.—ECTOCARPACEÆ.

Frond, articulated filaments. Spores external, and attached to ramuli, which is jointed. Contains three American genera, namely—

I. Sphacelaria, Lyngb.—*Name, gangrene.*
II. Cladostephus, Ag —*Name, branching crown.*
III. Ectocarpus, Lyngb.—*Name, external fruit.*

I. Sphacelaria. Lyngb.

Frond filamentous, rigid. Each articulation formed of numerous cells.

S. *cirrhosa*, Rothwell; Stonington.

II. Cladostephus. Ag.

Frond inarticulate, rigid. Short jointed ramuli, which are whorled.

C. *spongiosus*, Hudson; Massachusetts Bay.
C. *verticillatus*, Lyngb.; Rhode Island.

III. Ectocarpus.

Frond filamentous, flacid. Each joint formed of a single cell. Spores external.

E. *litoralis*, Lyngb; common.
E. *veridis*, Harvey; N. Y. Bay.
E. *tomentosus*, Hudson; L. I. Sound.
E. *fasiculatus*, Har.; Rhode Island.
E. *siliculosus*, Har.; N. Y. Bay.
5 *Sp.?* or new.

Miscellaneous Melonosperms.

Agarum Cribosum; Massachusetts Bay.
Acetubularia. *Sp.?* or new; Key West.
Caulerpa Wurdemannia; Key West.
C Coccinia, Harvey; Florida.
8 *Sp.?* or new; Key West.
Dasycladis Claviformis; Key West.
Cladoucæpitosa *Sp.?* or new; Key West.
Pencillus. *Sp.?* or new; Key West.
Flabbelaria. 2 *Sp?* or new; Key West.
11 other Melanosperms not determined.

Series II.

RHODOSPERMEÆ.

Plants in this series are rosy or purplish red. Fructification of two kinds, formed on separate individuals; 1st, spores external or immersed conceptacles, or dispersed in masses through the substance of the frond; 2d, tetraspores not contained in proper conceptacles, either external or immersed in the frond. Marine, except two. This series contains seven orders, namely—

1. Rhodomelaceæ.
2. Laurenciaceæ.
3. Corallinaceæ.
4. Delesseriaceæ.
5. Rhodymeniaceæ.
6. Cryptonemiaceæ.
7. Ceramiaceæ.

Order I.—RHODOMELACEÆ.

Frond cellular, jointed or areolated. Spores external. Tetraspores in rows, immersed in the ramuli or in proper receptacles. Contains five genera, namely—

I. Rhodomela, Ag.—*Name, red and black.*
II. Bostrychia, Mont.—*Name, curled hair.*
III. Rytiphlæa, Ag.—*Name, wrinkled bark.*
IV. Polysiphonia, Grev.—*Name, many siphons.*
V. Dasya, Ag.—*Name, hairy.*

Genus I.—Rhodomela. Ag.

Frond cylindrical, inarticulate, and opaque. Tetraspores contained in a pod-like receptacle.

R. *subfusca*, Woodward; New York Bay.
R. *gracilis*, Kirby; N. Y. Bay and L. I. Sound.
R. *Sp.?* or new; Greenport.

II.—Bostrychia. Mont.

Frond pinnatifid, cylindrical, dotted, not jointed. Tetraspores in pod-like receptacles.

B. *Montagnei;* Key West.
1 *Sp.?* or new; Key West.

III. Rytiphlæa. Ag.

Frond cylindrical, jointed; branches transversely striate. Tetraspores in pod-like receptacles.

2 *Sp.?* or new.

IV. Polysiphonia. Grev.

Frond cylindrical, composed of many siphons, jointed; branches longitudinally striate. Tetraspores in swollen ramuli.

P. *nigrescens*, Hudson, tubes 20; N. Y. Bay, &c.

P. *variegata*, Ag, tubes 6; N. Y. Bay, &c.
P. *Harveyi*, Bailey; Greenport, &c.
P. *Olneyi*, Harvey; Greenport.
P. *parasitica*, Hudson, tubes 8; Massachusetts Bay.
P. *subtillissima*, Montagne, West Point.
P. *fastigiata*, Rothwell, tubes 16; Greenport.
P. *urceolata*, Lin., tubes 4; Greenport.
P. *pulvinata*, Ag., tubes 4; N. Y. Bay.
P *formosa*, Von Suhr, tubes 4; N. Y. Bay.
P. *gracilis*, Greville, tubes 4; N. Y. Bay.
P. *violacea*; Boston.
P. *Gibbesii*, Harvey; Key West.
P. *breviarticulata*, Ag.; Key West.
P. *stricta*; New York Bay.
P. *Brodœi*, Grev.; Massachusetts Bay.
9 *Sp.*? or new.

V. Dasya. Agardh.

Frond cylindrical; stems inarticulate, but the ramuli jointed and single tubed.

D. *elegans*, Greville; N. Y. Bay, &c.
D *coccinia*, Hudson; Massachusetts Bay.
D. *pendicellata*; Rhode Island.
D. *Wurdemannia*, Bailey; Key West.
One Species? or new; Lynn.

Order II.—LAURENCIACEÆ.

Cylindrical or compressed, linear, areolated, inarticulated, branching fronds. Concepiacles external. Tetraspores immersed in the branches or ramuli. Contains three American genera, namely—

I. Laurencia. Lamour.—*Name, in honor of M. Laurencia.*
II. Chrysymenia. J. Ag.—*Name, a golden membrane.*
III. Chylocladia. Grev.—*Name, a juicy branch.*

Genus I.—Laurencia. L.

Frond solid, cylindrical, branched, pinnatified, ramuli obtuse. Spores in pear-shaped tufts. Tetraspores imbedded in ramuli.

L. *pinnatifida*, Gwillm; Stonington.
L. *dasyphylla*, Woodward; Greenport.
L. *tennuissima*, Goodwin; New Haven.
L. *Baileyi*, Montagne; N. Y. Bay.
L. *purpurascens*; Greenport.
L. *obtusa*, Lamour; Key West.
3 *Sp.*? or new.

II. Chrysymenia. J. Ag.

Frond hollow, filled with mucus, neither constricted, jointed, nor chambered. Spores angular. Tetraspores immersed in ramuli.

C. *divaricata*, Harvey; N. Y. Bay, &c.
C. *uvifera;* Key West.

III. Chylocladia. Greville.

Frond hollow, constricted, chambered, filled with watery juice. Spores spherical or conical. Tetraspores in small ramuli, and tripartite.

C. *parvula*, Agardh; N. Y Bay, &c.
C. *Mediterraneun;* Key West.
2 *Sp.* ? or new.

Order III.—CORALLINACEÆ.

Frond purplish when recent, rigid, jointed, mostly calcareous, carbonate of lime being deposited in the cells. Tetraspores tufted, contained in spherical conceptacles. Contains seven native genera.

I Corallina. Linn.
II. Jania. Lamour.
III. Halimeta.
IV. Amphiron.
V. Liagora.
VI. Helimedia.
VII. Digenia.

Genus I.—Corallina. Linn.

C. *officinalis*, Linn.; Greenport, &c.
C. *St. Anthony's beads;* Key West.

II. Jania.

J. 1 *Sp.?* or new; Florida.

III. Halimeta.

H. 1 *Sp.?* or new; Florida.

IV. Amphiron.

A. 1 *Sp.?* or new; Key West.

V. Liagora.

L. 2 *Sp.?* or new; Key West.

VI. Helimedia.

H. *opuntia;* Key West.

VII. Digenia.

D. *samplex;* Key West.

Order IV.—DELESSERIACEÆ.

Frond usually leafy, rarely filiform, areolated, inarticulated Conceptacles external or half immersed. Tetraspores scattered over the frond, or in proper fruit leaflets. Contains three genera, namely—

I. Delesseria, Lamour.—*Name, M. Delessert.*
II. Nitophyllum, Greville.—*Name, shining leaf.*
III. Plocamium, Lamour.—*Name, intertwined hair.*

Genus I.—Delesseria. Lam.

Frond leafy, definite in form with a percurrent midrib. Conceptacles scattered over the frond.

D. *sanguinea*, Linn. Massachusetts Bay.
D. *sinuosa*, Goodwin and Woodward; Boston.
D. *Americana*, Greville; N. Y. Bay, &c.
D *Hypoglossum*, Woodward; Boston.
D. *Leprieurii*, Montagne; West Point.
D. *caloglossum*, Harvey; Newburyport.
D. *alata*, Hudson; Lynn.
D. *involvens*; Key West.
1 *Sp.*? or new; Key West.

II. Nitophyllum.

Frond membranaceous, veinless, rosy red. Conceptacles sessile on the frond. Tetraspores in scattered spots.

N. 1 *Sp.*? or new; Wilmington, N. C.

III. Plocamium. Lam.

Frond linear, compressed or flat, indistinctly nerved, much branched. Tubercles stalked, or sessile on the margin.

P. *coccineum*, Hudson; Lynn, Massachusetts.

Order V.—RHODYMENIACEÆ.

Frond leafy or filiform, inarticulate. Polygonal cells. Conceptacles external, or partially imbedded in the surface. Tetraspores collected in undefined cloudy spots. Contains four genera, namely—

I. Rhodymenia, Greville.—*Name, a red membrane.*
II. Sphærococcus, Stackhouse.—*Name, sphærical seed.*
III. Gracilaria.
IV. Hypnea.

Genus I.—RHODYMENIA. Grev.

R. *palmata*, Greville; Seaconnet Bay, &c.
R. *palmetta*, Esper.; Newburyport.
R. *cristata*, Lamour.; Massachusetts Bay.
R. *ciliata*, Lamour; Mass Bay.
R. *membranifolius*, Grev.; Rhode Island.

II. Sphærococcus. Stockhouse.

Frond two-edged, linear, much branched and cartillaginous. Fruit, spherical tubercles with thick pericarp.

S. *multiparlita*, Ag.; New York Bay.
S. *augustissima*, Ag.; New York Bay.
S. *Torreyii*, Ag.; New York Bay.

III. Gracilaria. Grev.

Frond slender, filiform, irregularly branched, central cells very large; cartilaginous Tubercle, fruit with thick pericarp. Tetraspores imbedded in the surface cells.

G. *multiparlita*, Clem.; New York Bay.
G. *dura*, Ag.; Key West.
G. *Helmintochorton*, J. Ag.; Key West.
3 *Sp.*? or new.

IV. Hypnea. Lamour.

Frond filiform, irregularly branched, cartilaginous. Tubercles spherical, sessile, or embedded in the ramuli. Tetraspores embedded in the surface.

H. *purpurascens*, Hudson; New York Bay.
H. *purpurea*; Mass. Bay.
H. *Wurdemannia*, Key West.
H. *musciformis*, Lamour; Key West.
H. *robusta*; Key West.
3 *Sp.*? or new.

Order VI.—CRYPTONEMIACEÆ.

Frond filiform, rarely expanded, gelatinous. Axis formed of horizontal radiating filaments. Conceptacles globose. Spores in swellings of the branches. Contains 13 genera.

I. Gelidium. Lamour.—*Name, gelatine.*
II. Gigartina. Lamour.—*Name, grapestone.*
III. Gymnogondrus. Lamour.—*Name, naked wort.*
IV. Chondrus. Lamour.—*Name, cartilage.*
V. Phyllophora. Greville.—*Name, to bear a leaf.*
VI. Polyides. Ag.—*Name, many forms.*
VII. Furcellaria. Lamour.—*Name, a little fork.*
VIII. Dumontia. Lamour.—*Name, M. Dumont.*
IX. Halymenia. Agandh.
X. Ginannia. Mont.—*Name, Count Ginanni.*
XI. Catenella. Grev.—*Name, a little chain.*
XII. Crouania. J. Ag.—*Name, Brothers Crouan.*
XIII. Rhabdonia. Harvey.

Genus I.—Gelidium. Lamour.

Frond solid, corneous, pinnated, and linear. Fruit in swollen ramuli.

G. *corneum*. *Variety crinale*. Hudson; New York Bay, &c.
G. *Sp.*? or new.

II. Gigartina. Lamour.

Cartilaginous, cylindrical filaments in gelatine. Fruit in external tubercles. Tetraspores massed in dense sori sunk in the frond.

G. *mamillosus*, Goodwin and Woodward; N. Y. Bay.

G. *purpurascens*, Lamour; Stonington.

G. 2 *Sp.?* or new.

III. Gymnogondrus. Lamour.

Filiform, dichotomous, horny, dense structure. Favellæ in spongy warts.

G. *plicata*, Lamour; N. Y. Bay and Sound.

IV. Chondrus. Lamour.

Cartilaginous flabelliform, cleft, dense. Tetraspores in sori, immersed.

C. *mammillosus*, Greville; L. I. Sound.

C. *Crispus*, Lamour; L. I. Sound.

C. *Brodæii*, Greville; Rhode Island.

C. *Norvigicus*, Lamour.; Mass. Bay.

V. Phyllophora. Grev.

Stalked, rigid, dense, bearing a nerveless leaf. Tubercles scattered over the leaf. Warts seated on the frond, composed of radiating filaments, which become spores. Tetraspores in sori on the leaflets.

P. *Brodieæ*, Greville; N. Y. Bay.

P. *rubens*, Lam.; Mass. Bay.

P. *Sp.?* or new. Apalachicola.

VI. Polyides.

Frond cylindrical, cartilaginous, solid. Fruit, spongy warts. Tetraspores cruciate, immersed in the filaments of the frond.

P. *rotundus*, Grev.; Rhode Island.

VII. Furcellaria. Lamour.

Frond cylindrical, cartilaginous, solid, and forked. Tetraspores deeply imbedded in swollen apices of the frond.

F. *fastigiata*, Hudson; Newburyport.

VIII. Dumontia. Lamour.

Frond tubular, filled with thin gelatine. Spores in the inner surface of the frond. Tetraspores among the surface cells.

D. *ramentacea*, Lamour; Stonington.

IX. Halymenia. Ag.

H. *florensia;* Florida.

H. *ligulata;* Florida.

H. *furcellata*, Agardh; Newport.