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COLOURED FIGURES OF MARINE PLANTS, FOUND ON THE SOUTHERN COAST OF ENGLAND, ILLUSTRATED WITH DESCRIPTIONS AND OBSERVATIONS: ACCOMPANIED WITH A FIGURE OF THE ARABIS STRICTA FROM ST VINCENT'S ROCK TO WHICH IS APPENDED

AN INQUIRY INTO THE MODE OF PROPAGATION PECULIAR TO SEA PLANTS

By THOMAS YLILY, Esq. DCL FELLOW OF THE LINNEAN SOCIETY

PLANTARUM MARITIMARUM IN ORIS ANCLÆ AUSTRALIBUS SPONTE CRESCENTIUM, ICONES PICTÆ; DESCRIPTIONIBUS ET OBSERVATIONIBUS ILLUSTRÆ

ARABIS STRICTA, RUPE S. VINCENTII, AD VIVUM COLORATA

DISQUISITIO DE PLANTARUM MARITIMARUM PROPAGATIONI

LONDINI AEDIBVS B.: ET J. WHITE, PRAEVIA ET POST I. EDWARDS HALL MALL. BATHONIÆ S. HAZARD J. BARRATT
AN INQUIRY INTO THE PROPAGATION OF SEA PLANTS.

IT is an object of regret that the marine plants, all of which are well deserving our notice, either for the beauty or singularity of their structure, should have been less attended to than the other branches of that extensive class, under which Linneus has arranged all those vegetable productions, which originate from latent sources of propagation.

If we except the history of the fucuses written by Gmelin, who, with much ingenuity and experimental knowledge, has endeavoured to elucidate the mystical principle by which their propagation is effected, and the general observations of Gartner on this head, with respect to the cryptogamous class, it may be difficult to point out the work from whence any material information is to be derived, respecting the Economy of Nature, in the origin and mode of increase peculiar to this numerous branch of the algae. For while we have cause to lament that the remarks which casually occur upon this particular subject in the celebrated work of Bailer, are so few, very few, and confined only to two or three species, we may find as little reason to be satisfied with the ingenious, but speculative and unfounded theory, which Reaumur has given us in the Acta Gallica, upon the floreance of the focus.

It must be allowed that the descriptions, which we sometimes meet with in various botanical works, with respect to the fructification of the marine plants, appear rather to be founded on the analogy supposed to exist between vegetables in general, than on any actual observations resulting from a series of experimental discoveries. To this it may be added that much information cannot reasonably be expected from the cursory remarks of those, who pay short and casual visits to the sea-shore, when the want of feasible opportunities to attend repeatedly to the gradual changes which their plants may undergo, must render doubtful the observations, and oftentimes frustrate the attempts of the most ingenious investigators.

1 The following, which I have been so pleased to call the marine tribe of Mollusca and Helices, by the memorable work of Delamain, were enticed into this region by the interest of Linnæus, and have been introduced by the acumen of men of undistinguishable minds. Delion, which has been only studied by the learned Helvola, has been explored by Holländer—The British Rattle, with their fructifications, by Barlow, and the marine tribe of Fucuses have been described in the following elegant work of Balfour, Balde, and, &c.

The works of all these authors have been happily collected and characterised by a learned and accomplished gentleman, who has had a perfect understanding of them, and has published them in a posthumous work of the inhabitants of the seas, Public Vol. 1: p. 459.

The opinion was to have been at first entertained by Walker in the description of the blue Spermum, which grows on the coast of China. "Vesicular fructification, however rare, is not to be accounted for at the expense of the more perfect species of Helices," says he, "for ferment intermittent, tempus in tempus, Comm. Helvola, p. 365."

But if all the marine tribe of the Echinides and Helices have been thus far characterized, it would be incomplete to finish the subject, without mentioning the C. plana, &c. (p. 90—91). And in the five years, the C. plana, in particular, has been extremely abundant in the margin of the Channel.
It ought not to be matter of surprize, that so small a share of information should have been communicated to the Public, by Linneus, with respect to the extensive genera of succulents and conserves. It must rather excite our astonishment, that, in the immense Chaos of the vegetable World, which became harmonized and reduced to order by his arduous and unexampled assiduity, even the minutest parts should have been brought forward, and separated under such judicious and well-adapted distinctions, that the progress of investigation and arrangement, whatever theory may prevail as to the mode of propagation peculiar to each, must be unquestionably facilitated and promoted.

An appeal from any part of a system, which from its distinguished excellence has justly superceded all others, must appear under an unfavourable aspect. Yet it is to be observed, that the principle itself on which Linneus has established his system, did not by any means appear clearly ascertained to its illustrious author, as far as relates to that particular part of vegetable history which comes under our present consideration, although from the definitions of the generic characters, which he has given of the sea plants, as well as from data laid down in sundry parts of his works, he shows how strongly inclined he was to extend his hypothesis, even to those undefined parts of vegetation, which either from their extreme simplicity or minuteness, have vindicated the propriety of their being fixed under an anomalous arrangement, with respect to the sexual system.

We may not probably find in the whole circle of Natural History, a work more adapted to convey instruction, or which carries with it a fairer claim to preeminence, than the Philosophia Botanica of this author; not merely as being the ground-work of the system it is meant to establish, or for the precision and beautiful mode of arrangement, which appears in every part of it, but as affording satisfactory proofs of the importance of that science, which is so evidently calculated to display the wonderful Economy of Creative Wisdom. It may in some measure counterbalance the regret which must naturally arise in the inquisitive mind, from the very fanciful and copious manner in which this work is composed, to find that many of the most important aphorisms contained in it, have given rise to several interesting and philosophical disquisitions, published under the auspices and approbation of Linneus himself, in a well-known work, entitled Amoenitates Academicae. Among these, one treat in particular may be considered as a curious and satisfactory illustration of those data on which the sexual system more immediately depends. Here we find exemplified the protecting influence of Nature, adapted to all the varied exigencies of Her extensive families. Among the influences of this admirable Economy, we do not meet with one more singularly impressive than that which occurs in the submerged aquatic plants. Several of these at the critical period of their florescence, and at no other time, are observed to emerge just above the surface of the water, that the fertilizing effluvia, unabated by the lighter medium of the atmosphere, may without interruption attain its defined station, which end being accomplished, they soon after subside in plants of this description, produced in tranquil waters, such extraordinary provision for the

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1 Mr. Dillenius, in his Flora Antiqua, has detailed a much greater number of marine plants, to a Linnaeus has given us from all the various parts of the World. See sp. 117. Lin. 2d fol.

2 Improved Plants and propagation
propagation of their several species is found to be expedient; and, on the other hand, the powers of Nature, according to the doctrine laid down in the system,* continue to act by general and unvarying laws. it must necessarily occasion some difficulty to account for the propagation of that numerous tribe of plants, which though permanently fixed, and frequently at considerable depths in the ocean, find an element congenial to their mode of increase.

But here our inquiries are no longer supported by that analogy, which accompanies the known laws and progressive state of vegetation. Upon the first examination of a marine plant, it must appear, that the comparison, which has been made between the lacteal vessels in animals, and the fibres of roots in terrestrial plants, does not in any degree extend to the former. The roots of the fucus, so far from preparing and distributing the alimentary juices by absorbent vessels, seem by their durable and impervious texture, only calculated to secure to themselves a station. We find them attached to the smoothest stones and other bodies, utterly incapable of affording any kind of nutrition. From the evident properties of their roots, as well as from their general structure, these plants do not seem to possess a series of vessels, by which the fluids are propelled. It is true, this defect is in many species amply compensated for, by numerous pores variously interpenetrated throughout the surface of the fronds. To ascertain this fact, it has been ingeniously remarked, that if a dried specimen be immersed in water, it will soon acquire its former tone and state; but if the experiment be only partially applied, then that part, which is kept free from moisture, will continue hard and lifeless. A conclusive argument that the succules, as far as the experiment has been made, do not possess any vessels, by which the fluids may be distributed, agreeably to the more ordinary processes of Nature.

It may in this place not be improper to examine the theory laid down by a celebrated French Naturalist, in the early part of the present century, relative to the florestence, which has been ascribed to these plants in common with all others, and made a leading principle of the sexual system. Rameur, the author alluded to, imagined he had discovered in the Fucus vesiculosus, and in the Fucus serratus, both flowers and seeds; the former of these, indiscriminately occupying the surface of the fronds. He describes each flower, as a tuft of extremely minute threads or filaments, the longest of them not being a line in length; but after the most accurate investigation, he acknowledges he was not able to discover the succules at the extremities of their threads, to necessary to establish the function of the filaments, and of course was prevented from determining their precise character. In order to get over this difficulty, he confidently maintains the probability of the succules having fallen off, at the time when the filaments first detached themselves; and further observes, that those flowers only, which are situated at the extremities of the leaves, are instrumental in promoting the grains or seeds contained therein. The aperture, through which these threads appear, he considers as the

*Observations on the Vegetable systems of Linnaeus, and the project of a new one, John Hill, Philos. Trans. 1797.
calyx In several other species, he observed the small vessels or capsules contained in the swollen and distended tummuts of the leaves, but not the smallest appearance of those threads or supposed floral parts. In others again, these last were very visible, without the former for instance, the Fucus nodosus and Fucus canaliculatus exhibited very distinctly their feed-vessels, but were entirely destitute of the filaments. Our author therefore takes it for granted, that the plants were not examined at the time of their flowering—Again, in the Fucus palmatus, he found the surface in a manner covered with those minute clusters of hairs or flowers, observable in the Fucus veliculatus but, after the most acute inspection, he was not able to trace any resemblance to seeds or capsules.

Baillie and Gmelin have already shown that the theory of Reaumur is evidently exposed to the following objections.

First That as the fine capillary filaments were always destitute of the anthers, they could not be considered as the flowers.

Secondly That as the surface of the fronds was, in some species, perfectly entire, without having the smallest appearance of those filaments, and yet abounded with the granulated vessels or seeds; while others again discovered not the least signs of any grains or capsules, and yet were overspread on every part with the fillets of flowers—it should follow, that the parts in question, are, with respect to the system, entirely independent of each other.

But a more striking and convincing proof of this being the fact, and which it was hardly possible could have escaped the observation of Reaumur, is, that those filaments, contrary to the very nature and property of the state of florescence, are distinctly seen on the surface of the plant, in its earliest and most tender state, when it is so extremely small as hardly to have assumed its natural form. They are also equally visible, when the distended tummuts are in a final state of decay; and during the successive periods, these small filaments do not undergo any visible kind of change——Since then, they are destitute of those parts, which constitute the essential properties of the flower, since they are so evidently repugnant to every principle of analogy; some other use, in conformity to the structure of the plant, must be assigned to them. And from the experiment noticed above, and originally made by Reaumur, they may, with much more probability, be considered other sensory ducts, or vessels designed for conveying nourishment to the fronds, and thus Nature may compensate for the want of that supply, which land plants by means of their porous vessels, extract from the soil in which they are immovably fixed, while the roots of the forme, form calculated merely to counteract the fluctuating state, to which they are incessantly exposed.

Hence we may observe the Wisdom of Providence in alluding to the different kinds of vegetables, properties adapted to their different situations. And while we observe the great diversity in the form, size, and situation of these, in the vegetable productions of the land, we cannot fail to remark the general uniformity, in point of situation, as well as similarity of form and size, in the organs of pro-
pagation throughout this extensive part of the algae. In many of the fucuses, the seeds or capsules are found fixed in the substance of the leaf or frons. And in others of a more filiform structure, as also, in many of the confervas, they are imbedded in the dilated fumus, the pinnulas on the sides, and at the extremities of the frons, or in small axillary globules formed at the balf of the finer branchlets.'

In as much then as relates to the production, situation, and habit of these minute grains or seeds, the fucus and conferva do not seem to differ.

It is not unusual to observe in the same specimen, by the assistance of a microscope, many of the opaque grains distinctly formed and conglomerated together, beneath the surface of the frons, while in other branches, a faint cloudy appearance is the only sign, which marks an approaching tendency to the same state of maturity. If any florescence preceded the fructification of these plants, it might be sought for in similar infusions, yet not the smallest appearance, which could in reality justify this generally received hypothesis, is to be found.

It is worthy of notice, that Reaumur had not been able to discover these floral parts, on more than five or six species, throughout the very numerous genus of the fucus; and yet, circumscribed as his theory undoubtedly is, and unfounded as it appears to be, the generic character of those plants has long been established upon it. It was not probable, that Linnaeus should have neglected to avail himself of a discovery, so favourable to his system, and under the sanction of that respectable author.  

C From

6 As for instance, Fucus propinquis — at min — vastissimae — plantulas — Conferva polyphylla, &c. &c.

The principle on which the fucus is founded remains the same, whether the frutification and its fructification within the fructification of some species, or in the globular small axillary and dilated pinnulas of others.

7 First of all, Holmiae — Conservae, pl. vi. conf. — Confervae &c. The globules, in which such grains are laid, appear under reflection to be formed by a distention of the small, atheriniform of the plants.

8 Fucus nutans. C 17, 17, 3, 1, 11

Macho fruticis

Vellecularia, oblonga, in asperis satis ab arboribus

Linn. Gen. Pl. Holmiae 1763

Fucus nutans, Linnaeus vel satis similis, Fucus nutans

Linn. Holmiae, pl. vi. conf. — Confervae &c.

In the course of the Syl. Nut. not having published, the generic character of the fucus nutans, to be established upon probable grounds.

Fucus Nutans, Linnaeus vel satis similis, Fucus nutans

Syl. Nut. 1st ed. 1741

The whole contents of this paper, which form a letter of this work, have been taken from Linnaeus's Historiae Plantarum, from which we have taken the passage, and which we have imitated, without the least pleasure, in composing this paper. nourished above a prominent

9 The hypothesis may have derived additional weight from reference, which has been made in favour of it, by two learned authorities, as Bailer, to the well-known use of Marsup. Historiae Plantarum, 1724, p. 160. to which we have made immediate allusion, and from the plant in perfect flower, accompanied with a view of the space of the various parts of the corymb of other, that we discovered opposite a prominent
From what has been advanced, it appears, that Nature, in the formation and structure of this branch of the algae, has deviated from her general mode of operation. As there are not any proofs produced of a state of florescence attending these plants, it is highly probable, that, in this instance, she may have recourse to a simple and self-efficient mode of propagation, independent of any external accessional aid, and totally different from the principle, on which the sexual system is founded. It may be proper to observe, that this opinion is sheltered under the authorities of Gmelin and Gartner; although the latter of these authors seems to extend his hypothesis, in too general and exclusive a manner, as will possibly be shown in the subsequent pages.

Gmelin, in the course of his remarks, observes, that it would not be less absurd to require, than difficult to attempt an explanation of the natural process, which takes place, in the original formation of the granulated vessels, discovered in the fucules. We must even be at a loss, when we approach towards the first principles of any efficient cause. The same inexplicable difficulties occur in the regenerating springs of animal life. All that can rationally be asserted, is, that from these and similar observations, it appears, that it hath pleased the Great Author of Nature, to produce the same effects by a more simple process in some instances, than in others; and that, in the various species now under consideration, it should seem to be ordained, that a self-efficient power, essentially existing in these plants, answers every purpose conducive to their propagation.

For a more particular elucidation of this subject, it may be proper to consult the work of Gmelin, who further observes, that in the plants now under consideration, a gradual process may be traced from thence, which are "unnatural," to others more simple, and which are perfectly "sexuals.""

To the full of their distinctions, Gartner attributes the frutification of the more perfect fucules, which he maintains are propagated by actual seeds. Under the latter division, the same author has decidedly fixed many of the fucules, and all the conservas, without exception.

...
It may be necessary briefly to notice the definitions, which Gärtner has given of vegetable propagation, in order more clearly to understand that part of his theory, which is applied to the extensive genus of conserva. He considers the source of vegetation, as dependent on a two-fold principle. One of these, by virtue of an inherent vital force, operates without any impregnation, in producing a distinct and perfect epitome of the mature plant, simply from the medullary substance. The other, by an operation of the organized parts, digests and separates proper secretions from the general mass, till at length by a more complex process, an entire new organized body is produced, and the exact rudiments of plants are formed in distinct and appropriate parts. This, is termed fructification, as producing seeds, the former, is considered as a simple prolific mode of increase, The author then applies these principles, to the different parts of the cryptogamous class.

"All the conserva, whether capillary or beaded (moniliformes), he maintains, are entirely destitute of seeds, and have not even the shadow of affinity to the sexual system. The moniliform or beaded conserva, & c, corallinodes and others, throw out from their greater joints, small lateral filaments of the same form and structure, which constitute the only source of propagation, by a process very simple in itself, as one or sometimes two of these joints (articulae), are by the mere intumescence of their internal substance, converted into a single globule, which after it hath separated from the original stalk, immediately adheres to the rock or body on which it happens to light, and from the upper part extends itself into a new joint, till at length it grows up, into the exact form and similitude of the profligerous parent plant.

These globules, Gärtner observes, have a very strong resemblance to the fructified parts of plants, in their texture as well as in their form and colour, yet upon examination, he affirms, they will be found to be simple gneiss, consisting of mere medullary substance, contained in a homogeneous bark or covering, from which circumstance, as well as from the confluence of those joints into a globule, our author maintains that they do not depend upon any other principle than the simple faculty of vegetation, for their mode of increase."
Some few structures upon the theory of Gärtner, as relative to the propagation of the conservas, will close these remarks.

A proper generic distinction between the fucus and conserva does not yet appear to be established, as the characters of both genera are sometimes blended together. The transverse diaphragms and joints, the tenuity and capillary structure, are the common obvious marks of distinction in the conservas. Yet we find some species of the latter described as not being jointed, while some of the fucuses are furnished with diaphragms. The genus ulva still adds to the confusion, by sometimes partaking of the properties peculiar to each of the former. The Ulva capillaris of Hudson, for instance, has been frequently found with spherical vesicles in great abundance at the extreme branches, in which may be discovered several pear-shaped grains or seeds, hardly differing in colour from the rest of the plant. From this circumstance it might rank with the fucus. The Ulva articulata, in its jointed appearance, approaches very nearly to the character of the conserva, while the Fucus fluitantes exhibits a series of diaphragms, which might justify its being added to the last-mentioned genus. The Fucus incurvus seems to unite the distinctions of both genera, for the pinnulas, in the recent plant, when held to the light, frequently discover a regular course of septa, which are not to be observed in the other parts of the fucus. The inflated leaves of the Fucus filiformis, which from their strong resemblance to pods, have furnished this plant with its trivial name, are subdivided by diaphragms that are even palpable.

It has frequently been remarked, that Nature proceeds, as by a regularly extended chain, from plants of the most simple and unorganized state, to others, which from being more complex in their structure, are therefore deemed more perfect. This favorite idea of a connecting series, seems to have been followed by a more apposite comparison of an ingenious author, who observing in how close and inseparable a manner the orders of Nature are sometimes blended together, illustrates the process by a metaphor, drawn from the interwoven meshes of a net, which are united together by a multiform connection. Without contending for the justness of the application to the plants in question, and which are reckoned among the primary and most simple of the Natural Orders, it is certain it is, that the conserva, ulva, and fucus, are not at present separated by fixed and permanent generic distinctions, and that they sometimes participate in properties peculiar to each.

Gärtner readily admits that the more perfect fucuses are produced from fucuses, and is confidently mantains, that the exclusive genus of conservas derive their propagation, from a totally-different source, and that, in several species of the latter, it is effected solely by the small lateral filaments, which from intuinsence assume the form of globules, and falling off spontaneously from the branches, become in their turn, the sources of a prolific increase.

There are, however, beyond a doubt, many conservas, which at particular seasons produce opaque granulated vesicles or seeds, contained within their very globules, probably, which the author mentions.
tions as being in themselves, the original and only source of increase. He has unfortunately fixed upon the Conserve corallinodes—a species, of all others, least favourable to his hypothesis. This conserva is of so simple a texture, that it has the appearance of a fine tubular transparent membrane, which at length acquires a beautiful crimson fluid. In this state, it is sometimes, but not frequently discovered with dark clusters or protuberances surrounding the joints (as noticed by Mr Lightfoot). These, when under a microscope, are found to contain a great number of dark purple ovate vessels, but whether the latter are seeds, or only pericarps containing more minute particles, does not appear.

If the plant at this time be placed between papers, it will soon discharge its interior crimson fluid, leaving only a jointed transparent film, the vessels at the joints excepted, which retain a degree of solidity and opacity, very different from the other part of the plant. Now as these granulated bodies are so very distinct from the internal substance of the conserva, it is highly probable, they are formed by that process and peculiar separation of the general mass, on which Gartner scientifically establishes the origin of seeds—in contradistinction to the simple increase of medullary substance, on which he has founded the principle of propagation by gems." In short, that by a secretion of the fluid, an entire new organized body is formed, or, in other words, the pericarps or seeds. If then, according to this author's mode of reasoning, the grains contained in the more perfect lucules are actual seeds, and the sources of increase—it should follow, from the infancy just given, and from others which might be produced, that the conserva also, derive their propagation from the same principle.

This opinion should seem more probable than that laid down by Gartner, because the origin of all these plants is imperceptibly small, since we find them growing upon the smoothest and most glossy surfaces of plants, and as frequently upon the finest capillary branches of lucules, full as minute as the conservas that are attached to them. In these fine branches, however, there must be some nidus or repository sufficiently capable of affording shelter and protection to the minute semnal atoms which escape from vessels similar to those before described. Neither is it easy to conceive in what manner the mode of propagation could succeed, according to Gartner's theory, for as the conservas are frequently of an equal size with those branches which support them, it is by no means probable, that the pointed globule of a conserva (if this may be the author's meaning) could so instantaneously attach itself to such a body, and with tenacity sufficient to resist the constant collision of winds.

That the globules consist of the medullary substance of the plant itself is readily admitted at the same time, it must be allowed, that all the conservas, which produce the granulated vessels or seeds, embedded in those globules bear a striking resemblance, in their mode of propagation, to the most perfect lucules, and not being apparently subject to the laws of flotation, attain their state of solidification in a manner exactly similar to that, which has been ascribed to the latter from an inherent felicitous principle, equivalent indeed, though entirely different to that, on which the sexual distinction is founded.

D
DE PLANTARUM MARITIMARUM PROPAGATIONE.

Naturalium rerum indagatoribus lucutit dux et opprobrio, maritimas plantas, non minus formā peculiares quam venustate extimas, in occulto plurimum adhuc latuisse, reliquas autem Cryptogamiae classis seres, quasi notatus digniores, in lucem aperiō produxi

Si Gmelinum, qui Lucorum historia ingeni acuē ac experimentorum copiā illustrāvit, et Gartnerum, qui plantarum fructus et semina investigāvit, ē numero excipiamus, Scriptorem hāud facile inveniēmus ullam, qui manum ad plantarum maritimarum propagacionem ē tenebris suscuerit. Filius admodum felicitātē admovent. Valteri etiam observationes perpetua admodum, obitūque occurrentes unam tantum alteramque speciem huius generis subjiciē tam relicuīunt et subtiles Reaumur de lucorum florescentiā contemplationes in Actis Galliae oblatas, medicum potius conjecturam, quam veritatis simplicitatem, fapun.

Notandum porro est, quōd plantarum maritimarum descriptiones, quas fructificationem, quas botanices libris interdum inuentantur, haudquaquam, ut par est, experimentis aequales repetant, simulātione autem inter vegetabilem ut dicuntur perficiunt, potius assumptū nantur. Nec multum equīdem spargō licet a perfunditur illorum observationibus, qui maritima loca rare adeunt, eīto reliquīunt quaibus felicitēt uētucque acuē solerītūsque indigantibus, vis unquam tardos harum plantarum ad fructificationem progeēīīs, et obscuras formas vicissitūndes observantīque præsent occasū.

Nil mirum est, quod celeberrīsimus ille omnium Botanices studiorum Linnaeus, vis quidem ex expertīvō de magnā lucorum et conferrīrum copiā proficīt omnes eum harum ordinum plantas enumerātī, et experimentis legitimus probātī admodum sumō difficiliō. Quoad autem non jux tradīrīātus est plantarum illām ingenuō, judicium acuē, mensūrātītum aestimātum, quibus indigentiam vēgetābilium nominātum in certis ordinibus definitōque classis compōlunt, mundiique ideō definitā, in quae cumque possit de propagatio plantarum invicīdebant opinioām communēs, diūmēs tandem et investigāri facultates non potui non eīlāro prōna.


2 Nunc autem, quod simpliciter est quod est only: "Vegetantur quia semina clasīs, ubi seminātī sunt, per Christum", sicut Petrum, perfectam indicantem quāri, non seminātīm classēs, sed quae semina. * Pet. 1:8


A systematem tam accuratè digestó, tam longè latèque recepto vel minimum deflectère, suspicione temeritatis et novitatis fidelitatem fuggere, in mentem tamen revocare par est, quod principia alta, quibus systema sexualis institutur quoad plantarum genus, de quo nunc agitur, auctori ipso laudatissimo hauz extra controversum posita esse videatur. Facile est tamen conceéctari tam ex libro Linnet de Generibus Plantarum, quam ex aliis ejusdem auctoris scriptis, quod doctrinam suam de efficacia sexuali ad unamquamque Regni vegetabilis partem extendit immo ad plantas feliciter de quibus nunc tractatur, quas ob existitatem partum propagationis intervientium sub nomine Cryptogamarum feposuerunt.

Inter varia auctorum opera, quæ Botanices rudimenta tyrannibus tradunt, et fontes scientiae aperunt, nec elaboratam magis nec utilius est, quam Philosophia Botanica opus Viri nuncquam fatis iuudicandi, quod non folum lucidissimo ordine constructum hujusce scientiae merito habeur basi et fundamentum, sed NUMINIS OPTIMI MAXIMI Sapientiam ante oculos manifestè profert et mirifica illustrat. Utileque brevè est hoc opus et lucidum, ab illo tamen quasi fonte et origine enata sunt varia opuscula, et utilitate summa et scientia repleta, inter AMOINITATIS ACADEMICAES ejusdem auctoris evulgata Horum unum praestitum principia sìa plenè adlucidèque expedit, est quibus pendet de plantarum sexibus doctrina. In hoc etiam quamplurima proferuntur exempla, quæ Naturæ Providentiam arguunt, quà multiplicæ in vitæ Familiæ protegentur quorum quidem, vix praecelius occurrit quàm quod observatur in Economia plantarum aquas aleæ submersae. Harum quàdam praestitit florès suös aperíendi, nequequam autem alio, tempore, leè super aquas, ut farina per aerem liberè volitans defícit, in aquas submersae emergentes oʃfidentur, denuòque submersae. Sì plantas aquas lenientè-suntibus habitantibus tanta Providentiae, ut genus suum propagent, adhibeat Curæ. Ille porrió communì quàdam et immutabili lege ut extrinsecum est, agat Naturæ operis haud exiguæ esse conflat, sì plantam plantarum, quæ, ino sub occano permanentè et funditus in iuxte nihilominùs incunabula generatione suæ maxime idonea et amica invenit, propagandi rationem investigare.

In hac enim investigatione mutua vegetabilium inter se similitudines nunc, haud amplissim præmonstrat iter. Mutum quàs plantam obtènt inspexit, nequequam inveniit, cum praecelra illa inter quàdem animalium et vegetabilium partes cognitio, inter terrerum felicet plantarum radicem fíbras, et latinæ animalium valia, luctum eorum radicibus, non sunt visius illis absorberibus lucum conquiret et disribuere, nihilam alpínum, vel eum quod durum ex fum et textuuram coniunctam, ad nihil prorsus nisi ad hæc radicem libi inter flores statuam videtur adaptati. Laxissimus cum lapillis aliquó corporibus lucum nutrimentum omnillo denegantibus, haertet aliud. Fecit eodem de quibus agitur, in vel radicem, vel aliarum partum structuram contemplat, valorum, quibus lucus propellitur, tem habere nullam videatur. Horum autem vices supplent innumerá quà plantarum cuti inter-

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1. Ossus specim. Vegetabilium florum et fructum similitudines, ubi hoc libro non adsunt, Thibodii Bot. Sci. 113
2. Hauriorum humor. Noa
3. Luctum florosum, edit Raimundus, &c. 37. Red
sparsa spumamenta vel port. Ad examen hoc facile vocatur, fuscata enim hujusce genus planta si in aqua tota immergatur, ad prifnam redibit formam et fatum, si verò pars tam timet inmaturat, reliqua maneat tarda prorsus et marci. Hinc liquido patebit, fuscus hujus nulla esse valia vel canales quibus per totam, ut plerumque sit, plantam succus distribuat.

Ut veritatem facilius assequamur, coniecturas inclytis cuiusdam philosophi de plantarum harum florescentia ad examen revocare fas fit, haec enim hdeo dederunt quidam recentiores, et ad simulantum sexus plantarum doctrinam, et metodon inde Linnaeum, hoc celebtrum via detecta, ut putantur, adducerunt Reaumurus, quibus loci designatur, hujusvis est in Quercus marina, atque in Iucuro ferrato, et flores et semina detecta, flores quidam fimbria superfluae sine ullo differentia occupantes unumqueque florem describit ut filiaculam filamentosum capillarium, quorum longitum, internum haud aquatatem formarum vero diligentia detectum, leibcum continet nec singulis filamentis his, nec capita cernere possit, quod tamen, si filimenta, vera efficit flamma, authores ornari certè deberebant. Hunc nodum dumero aggravabatur verisimilium esse hoc capta, quamquam in protrudebat filimenta decedebatur autum esset affirmata et portio flores tantum illius, quorum eximiae occupantes florones, inflatus efficit quibus femininæ sunt omnes apices promoveantur. Romane etiam ut quod etiam filimenta, calve erat duret. In quibusdam speciebus prætericio am illos humnos floribus nemoque turgitati et paulum diffusa, dum flores sic enim hae partes reputari nullius plantarum omnium habeant. In alius autem, haec pollices finitimius vis videtur ille in Ficus foliis canaliculatis et nodulis, globulis ca pomephilo fide exhibebant, fines illius florum filamentosus hingunt, aut Reaumurus, florescenti tempore in quibus odibus subjectabantur. In autem palmati contra fructibus, floribus flororum, vel et hujus specie flororum, taliaculam obseca erat, nihil autem vel feminibus vel capitis similis attentissimam inspiciendum erat.

A Basilio et Gmelino duorum observationum sunt Reaumurii hypothesi nupreliemion quodammodo obnovam esse.

Imprimis, Quod filimenta e pillaria temper inductae vel apudmas definiunt, utique quæ pro floribus hunc polluent.

Secundo, Quod, in quibusdam flororum speciebus, floribus superfluis, integrae prostrius et sine illis filamentis e ferta, quibus vero minutas annuas conjuncta sunt, in illis contra nulla illius florum unum prius formarum autem, ut volui, florescenti cooperat; hujus postum quam Reaumnus opinionemque sapernum operatur autem, in contrum parte, supraejectum nullum tali se fyllematus vinculo connectit, ut necquam ad aliæ partem pendere.

Quod autem plenius hoc et minias cernit, Reaumurus vis ignorant, in quo certo florannum, foht aut illa filimenta florocentum minus et minus tam longis abbreviat, ut in superflum planta certam, termini et simulium formam nondum prevente videtur. Apparent etiam haud obtusarum in fronte veloci.

5. See p. 125.
dis superficie, dum fastigia ejusdem cum suis percarpus jam senescere coeperunt et marcescere, et in hoc
toto tempore intervallo nulam quamcunque que cernitur, mutationem subeunt. Quandoquidem igitur
filamenta hae illis carent partibus, que flori ipsi essentiales sunt, quandoquidem nullce cum alius
planus similudinis luxue fociantur, ad usum quemnam alium plantarum harum structurae conveni-tem desinata suisse confitent. Experimento nuper defuncto, ea ductus esse secretorum, vel vasa fuccum
nutritum frondis transmutant, censenda sunt. Hae quidem ratione compensetur illius nutrimentis de-
siderent, quod terrestris plantarum radiibus suis porosis sio quo fixe permanent, nunquam non den-
vant maritimarum interea radibus, fluatio violentia, ne pelentur plantae, sed folium opponentibus.

Hunc apparat Providentiae Naturae Sapientia, quae unicuique generi partes suas et situs flatuit vege-
tationis apartimos. Dum in feminibus plantarum terrestrum, formas magnitudinis et situs diversitatem
comemplanatur, non possit non respicere similudinem organorum propagationis intervencionem,
quod formam, situm, et magnitudinem, plantas maritimas pervadantem. In fuscis plerisque, femina
aut capitula sua frondis subtilissimae intervenunt. Et in quibusdam horum, structurae potius filiforms,
et in coniferis plures, aut difficilis plerumque pinnularum fastigus, aut ramusculorum vehiculis
axillariis commentatur.

Quod igitur grana carpomorpha, quod situm, habitum, et originem respicit, conservas non mult-
tum a fucis diffarce affirmetur.

In uno codicemque spectimine lacpe cernuntur corpuscula haec granulata frondis dilatate parti simil
conglomorata, dum in alius tamulis, nebulae quaedam leviusculae sola ulla eujufdam ad maturita-
tem progreddiis signa produnt praeorosa. Si florecetenta utla fructificaitionem harum plantarum ante-
fructeat, in illic et tabulis spectabilis dudum eam inventam suse credibile est nihil vero receptae huc
hypothetici colorum daturum adhuc est repertum.

Observandum est, quod Reaumurs hae filamenta capillaria non habet in paucus, quoniam ne-
pe aut eis locorum speciebus cornere potest. His pauculis tantum et tam dubis exemplis, charakter
generis locorum numerolitum videntur mut. Nil mirum est, quod Linnaeus hae dig-
natum

1 TUCUS * floris a 4, 1914, 1 g, 16, 14

2 TUCUS IN Flammis

3 TUCUS IN Flammis

4 TUCUS IN Flammis

5 TUCUS IN Flammis

6 TUCUS IN Flammis

7 TUCUS IN Flammis
nullim autori numinis idem, fententiam, quae honorem dabat methodo saepe acceperat utrò et soveret."

Cùm hæc contemplamur, clarus fortasse patebit, quòd duma harum struēurae algarum molaretur Natura, paululimum desiderat ab uffatà suâ operandi ratione, et quòd nullos prolatis de floreceptâ harum plantarum teffitonum, versiimilium duceretur in his propagandi modum simplicem esse et ibi ipis vi mìtia restrictum, ab ullo exteriori adjumento nequaquam pendântem, et à principiis quibus fœvum diffìnitio affuerit, prorsùs alienum. Notatú dignum videatur, quòd opinio hæc Gmelinis et Gartneri auctoritate commendata se prodât, quanquam auctòrum horum postremus hypothèsin fâmam latè nimirum et temere extendisse videtur.

Abfurdum est, ut ant Gmelinis ipse, splendens, aequà ac difficilè profìerre granorum ultorum fœs le prodentum primâ. formationis explicattonem Semper enim necesse est a fœs decidamus, cùm ad primarias rerum causás expediendas nos accingamus. Hac eadem et de vita animalium et vegetabilium ubique conitant. Padoris est eique eae prudenter inra hos limites nofitiæplius filtrèt —"Neque plus novi," inquit, "quam quod ejusmodi observationibus edoceor, simpliciores methodo volúfici hic CREATORTUM eundem finem adiequì, volúfici numinand per fìla grana sae ver ãe fúcunda h e vi infta, nec aliena indigena, prædica, fucorum procreationis proficicere.

Si materiam hanc subiectam contemplam velimus fulus explicavit, Gmelinis opus cùsiius evolvementum est Ille enim Natura nota progressum, quem quidem hiece algarum generibus converyre affirmat in quibus plantus predentem descendendum est ab illo, quæ UNISEXUALIS, ad illas, quæ prioribus simpliciores prorsùs ANUXALISS ouentúnt.

Horum primum ad fucorum fructificationem tribuit Gartnerius, quos id inter affirmat versus feminibus propagante. Sub postremis, fœs plurimos, et omnibus omnino conservatur fœcas an numercavit

In ultimis, Sub. Sub repertis correctis, clarissimas observationes solent in hanc procentum

"Hoc est ad auctores praeposito, quorum mòdum expediendas nos accingamus. Sub Nato Lat. Gmelin"

Specie, nec verò tribulum aut Sua Constant Hæc propra, in hanc declarat, in hanc ultram fœcas an numéricavit, in usum addit. Sub Nato Lat. Gmelin, &c.

9 Hac illic Rumanus aput cohors irrepert e saepe locutus est, quòd seius se in hanc trahem et ex omni parte. Emphaticus est de hæc quæ Gmelin et alius tradimus. Hoc est, quod diximus habere, et quod hæc quæ diximus, non habebimus. Sub Nato Lat. Gmelin, &c.

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Si stam hypothecos sue partem, quae hoc plantarum genus trahat, animo velhmis comprehenderes necesse forfan sit definitiones, quibus vegetabilius propagationem incluisset Gartnerus, in implicere Vegetationis originem duplici ex fonte derivatam esse affirmat. In altero, "Materies vegetabilius folis adjuta vasta viribus, fecundum iniquum cajuslibet plante crescendi schemata, in novas formas mutatur, atque sua sponte adultarum forma nova product exempla" In altero, "tenures fluidoresque ejus partes, ministro proprionor organorum, a reliqua massa fermentum arque in elaborantur ut ex harum demum congrua miscela, mutataque inter se actione, novum prorsus emergat corpus organisicum, verum in diffinitis conceptu existentur plantarum finitus" Hinc posteroerem maelen di modum, triumphationem appellat, quia femina hinc habuit originem priorem illum, Gernaniationem, et unam propagationem proliferam rationem duct. Hec principa pollea ad diversa cryptogamiae elatis generas ab auctore nostro adaptantur

"Conferam annos," aut ille, "tam capillares, quam moniliformes, sexu et feminibus in perpetuum definitur. Prores, et sponte lobulo, nequidquid mutatus articulis sui regenerantur. Conserve autem moniliformes ut corollino—et varia aliud admodum innominata, promunt ex punctis majorum fascium articulorum brevi quaedam filamenta lateralia, quae et ipsa ex parvis articulis conflata sunt, et ex quibus folis, carumdem propagationes organa, habet simplici formantur methodo, ut nunc unum, nunc duo foli prosum, laterium illorum articulis, per merum substantias suas canosa humanorum, in unum globulum sololum convertantur, qui pollea sponte decuit, et dum ex alera parte scopus agglutinatur, ex altera novum tradit articulum, atque hic setitem in plantam convallit matre sua proflus similem." Ingens est, ut Gartnerus, horum globulorum cum vero quodam huic vel seme similodus, quod daturum formam et colorum 'his tamen non oblitans, quilibet liberter ex inter simplices gemmas lucem conscribit, qui vel internam globulorum imatus lucit labrum, utpon ex mea medulla atque cortice compagnostic vel qui eorumque imprimitis transcias uestitum, quippe qui, ex confusa sepe duorum articulorum in unum globulum medulla, exactus, nonnum vegetations, nequidquam vero succiduntem opus esse potest."**

Quedam in Gernani hypothesim de conservaturum propagatione observationes, libellum hunc ac imm plurum

Genus laco um et conferamus idem a diffinito inter defiderata adhibebatur utpotest sic differuntium utique genus aliquot characteres nonnullum afferent et positionem inducit vix product Lianverla carnulaca, articu, et tenuitas fabricae hirtorum obviam conteris diffinitions characterem
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Si Gmelinum, qui fucorum historiam ingenii acumen aequè ac experimentorum copiâ illustravit, et Geitnerum, qui plantarum fructus et semina invarigavit, è numero excepimus, Scriptorem haud facilè inveniemos eum, qui manum ad plantarum maritimarum propagationem tenebisse eum operandam felicitatem admodum. Bafien etiam observationes perpaucæ admodum, obstœque occurrence unam tandem alteram specte here generi subjiciam respiciunt et subules Reaumuri de fucorum florescentiæ contemplationes in Actis Gallicis oblatæ, infelicem potius conjecturam, quam veritas implicitatem, sapient

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Nil mutum est, qui celeberrimus idem omnium Botanices studiorum Linnaeus, vix quidem eum expertissim de magnà fucorum et conservarum copiâ proferret omnium hominum ordinem plantarum cælum, et experimentis sullatim profecte admodum sui fecit difficile. Quibus autem non parum admiraturus est praecellariss illas ingenii viatas, judicium uestrum, mentale captum, quibus indigentem vegetabilia mollem in certis ordinibus distincte classis compositor, venia certe adeo diffusa, ut quæcunque posse de propagatione plantarum invalehant opinionem comunt, deprehendi tem cœptis et religiandis facultate non postrum, non est promota.
A systemate tam accuratè digessit, tam longè latèque recepto vel minimum defleélere, suffusionem temeritatis et novitatis fluidi forte à fuggi, in mentem tamem revocare par est, quòd principia sta, quibus systema sexualis innatus quod plantarum genus, de quo nunc agitur auctori ipso laudatìssimo haud extra controversym posita est videantur. Facile est tamem coniectari tam ex libro Linnei de Generibus Plantarum, quam ex aliis ejusdem auctoris scriptis, quòd doctrinam suam de efficacitá sexuali ad unanamquam Regni vegetabilis partem extendit voluunt immò ad plantas sicut et de quibus nunc tractetur, quas ob exilitatem partum propagationis intervintium sub nomine Cryptogamiarum fepsoferat."

Inter varia auctorum opera, quæ Botanices rudimenta tyriomibus tradunt, et fonts scientiae aperunt, nec elaboratam magis nec utilius est, quam Philosophia Botanica operis Viri quaquam fatis laudandii, quod non Jolomius Lucidissimo or dine constructum hujuscemque scientiae merito habetur basin et fundamen, sed Numinis Optimis MAXIMI Sapientiam ante oculos manifestè profert et miracè illustrat. Utecumque breve est hoc opus et succinctum, ab illo tamè quasi fonte et origine enata sunt varia opuscula, et utilissae summæ et scientiae aperient, inter AMENITATIBOACEDRALES ejusdem auctoris evulgata Horum unum præfertum principia sta plenè dilucidèque explicat, ò quibus pendet de plantarum eorum doctrina. In hoc cum quæplurima praferuntur exempla, quæ Naturæ Providentiam arguunt, quàtusque multiplices fuer Famiæ protegentur. Quorum quidem, vic praecérius occurrit quàm quod observari loeet in CEconomia plantarum aquæ sub seriarum Harum quædam praebint flores suos aperendi, nequequam autem alio, tempore, òe superfuit aquas, ut fatina per aerem liberè voltantes definatam suam obtinent sedem, emergentes submergentur. S plantæ aquæ kinter-fluentes habitantibus tanta Providentiae, ut genus suum propagent, adhibeatur Cura, fi porro communi quàdam et immutabilis legem ut exspectandum est, agat Natura operis haud exiguet eflè constabili, illarum plantarum, quàs, ino sub oceano permanenter et funditus inmixæ, nihilominus inuum bulae generationis sua maxime idonea at amica inveniunt, propagendi rationem investigare.

In hac enim inquisitione mutuus vegetabilium inter se similitudinis nexus, haud amplius praeconflant inter Marinim quævis plantis obter inspecta, nequaquam inuentenda est praebere illa inter quàdam animalium et vegetabilium partes cognato, inter terrærum sicut plantarum radicem floras, et lactea animalis clara. Horum cuinem radices, non Jolomius valis ullos absqueventibus succum coercuisse et dilibantur, nullius alpinus, verum quam ob duos suum incun et textum coniectari, ad nihil promisum nil ad ille manum libri inter flatus rationem, videtur adaptata. La visceralis quam lapillus alpinus corporibus succum nutrimentum omnino denegantibus, herent affixe. Fuci equidem de quibus agitur, haec ad lucum, vel illarum partum sicut plantarum contemplantium, velorum, quibus succus propellitur, sicut habet nullam videtur. Horum autem vicis supplantinum innumerum quæ plantarum cuti inter...

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Cf. A. Cryptogam. 1  Spandivia Plantarum
specula spura nostra est. Ad examen hoc faciē vocatur, ficcare enim hujuscem generis planta h in aqua tota immergatur, ad primeam reditam formam et flatum, si vero pars tamquam immittatur, reliqua manet: angustius prostrēs et marcescē — Hinc liquidō patebit, fustis hisce nulla esse vasa vel canales quibus per totam, ut plerumque hie, plantam fucus distributar

Ut veritatem factiāsi affequarem, conjecturas incerti cuiusdam philosophi de plantarum harum florēscentā ad examen invocare fas sit, hic enim fidem deducere quidam recentiores, et ad firmandam sexūs plantarum doctrinām, et methoduminde Linnaeōam, hac celebrā viri detexta, ut putantur, adductān. Reaumūrus, qui hic loci designator, fuit vitæc in Quercu marina, aitque in Fucō fērōtis, et flores et flavae detexta, flores quædēm frondis superficieiā minus item floras occupantes unumqueque florem designat ut foliolum foliamentorum capitulum, quorum longitudinem, lineam haud aquabā summā vérō diligentēa examināt, si libēras contextūn nec falsoa filamina habis, nec capsulae cernere posse, quæ tamen, si filamenti, vero effūsít flamma, anhērens ornāt currō debēât. Hinc nodum dūmōre aggerēsus, verum illisūm est hoc capita, quorum quāmque protrudebant hialma, decessī autem est affirmāre et post hōmis tūnum illās, quae extrās occupantes frondes, nihilum est, quibus fumen et fīcorum āspes promoveantur formam eùm ex quo le tradit filamentos calecērātum est. In quibusdam speciebus fructiculātōnem affīns fumes frondis melīs tūnībus et paulīnī difficīlis, dum flores, hic enim pasēs reputāri nonnullīs placēt omnīm āstitbant. In aliā contra, hāc polītēa partēs āspes superficieiās sēvēnae erant: In Fuci foliētis una

fīliōlātis, et nodōsī, globulī carpomorphiī fēcēs exsertiābant, lineās florum filamentos hōgignāt, ut Reaumūrus, florēscendī tempore nāquam ocūlis fūrībantur. Fuci palmātus contra superficieiās, filiōlārum, vel ut fībi vidērunt flōrum, foliolum obiectā erat nihil autem vel fāminibus vel cap虬ēsūmās attentūsīmās inspexiōne cernērān ērat

A Baierco et Gmelino dūdum oblicvātum fuit Reaumūr hypositoryn reprehensūm quodammodo obnovām ēit.

Imprimēs Quōd filimenta capitānās temper anhērens vel apīrēbas defiitut, nonquam pro fūrenbus habēre possit.

Secundo Quōd in quibusdam fūcorum superficēibus, frondis superficieiās, integā prorsūs et āspes superficieiās evelent, quamvis sē quālībus cumūtāe insiitūtāe, in alīs autem nulla ullūs ornamenta pro le frōnciā, flōrum únum, nē voluīt, foliōrum cooptātāe—hāce formātum Reaumūrus opinātum ipse quem autem Reaumūrus opinātum quippe quāsūm operātum, munimus flores plantarum partes fuprādēmātās, nullīn autem le yllemūsīm vinculo connectī, una nequequām in aliārā pendēnt

Quōd autem plēnum hoc et multōs cernēnt, Reaumūrus vis ignōtum, ad pro certo flattamātum, foliōtum ille flōrum et flores contrā mmāāc et rationem ām longē iūdē, unā superficieiā plantarum cautās, tēmen, et ad integra partēs formae nōn autem prō incertis videbunt. Apparent ēam ānīi habēre omnes in fōno
dis superficie, dum fauces ejusdem cum suis pecoribus jam fenescere coeperint et marcescere; et in hoc
toto temporis intervallo nullam quamcunque que cernatur, mutationem fubeant. Quandoquidem igitur
filamenta haec siles carent paribus, quos floris essentiales sunt, quandoquidem nullae cum alius
plantis similitudinem necu s favec tur, ad um quemnam alium plantarum harum structura comven-
tem designata fusce conflat Experientio nuper descripto, ea dutus esse secreta, vel vaia fuccum
nutritum frondis transmittente, censenda sunt. Hae quidem ratione compositur ilia us nutrimentum de-
siderant, quod territres plantae radicibus suis porosis e folio quo fixe permanent, nonquam non der-
vant maritmarum interea radieibus, fluuiam violentae, ne jeftentur plantae, ies folium opponenti-
bus

Hinc apparebat Providentis Natura Sapientia, quae uniuersique generis partes suas et fitus flatut vegeta-
tionem aptantur. Dum in seminibus plantarum terestrium, forma magnitudinis et fitus diversitatem
complamur, non possumus non reiperiecem similaeus organorum propagationi interveniuntm, quoad
formam, situm, et magnitudinem, plantas maritimas prevescentem In lucis plerique, femina
aut capitula in frondium subplantit inferuntur Et in quibusdam horum, structura potius fidaliformis,
et in conservis plurimum, aut diffensis pleumque plu nimarum fauces, aut ramosculorum vesiculis
axillaris continentur

Quod igitur grana carinomorpha, quoad situm, habitum, et or guem respectt, conservas non mul-
tum a fusc ditate affirmetur.

In una eodemque specimine fiepe cernatur corpfula haec granulata frondis dilatatc parti simul
conglomerata, dum in alius plantis, nebulae quedam levulicula sola ullius ejusipsum ad maturita-
tem progressa ligna product praecursora. Si florescentia utilia frutificationem horum plantarum ante-
sit, huic et talibus speciminebus dutum cam inventam fusce credibile est nihil vero recepta huic
hypotechiologorum datum adhibitur repertum

Observeoamum est, quod Reaumurius haec filamenta capillaria non nul in plantis, quaque vatemm
peut ut luxurious speciebus cernere posset Hinc paucis tantum et tam dubis exemplis, charater
genres flororum numerobellum videntur mi. Nil mirum est, quod Linneus hunc dig-
nissimo
nisl mo autori nimium fidens, sententiam, quae honorem dabat methodo fuisse acipieret ulterius et soveret.²

Cùm haec contemplatum, clarus fortasse patebat, quòd dum hærum struætum algærum molætæ Natura, paululumō deflexerat ab utilitate sua operandŏratione, et quòd nullis prolatis de florescentiæ hærum plantarum testimoniis, verum transitum duceretur in his propagando modum simplicem esse et fibi ipsius vitius refert. Nihil, ab ullo exteriori adjumento nequaquam pendentem, et hæ principiis quibus se luxum difinuerit atteritur, prorsus alienum. Notatque dignum videatur, quod opinio hec Gmelini et Gärtneri auturitate commendata, quærum autorum horum postremus hypothecin tum latè nimes et temperè extendit videatur.


CREATOREM cundem finem adiequu, voluntas nilrum per sola grana in fe secundum hæce uita, nec alia indigente, præsdita, lucorum procreationi passoexe.

Si materiam hanc subiectam contemplari velimus, hæc explicatam, Gmelini opus curiosius evolvendum est. Ille enim Natura noti progressum, quem quidem hærum generibus convenire affirmat in quibus plantis prodessetiam descendam ab illis quæ UNILUXALES, ad illas, quæ prioribus simpliciores pronos ANNUALES orientur.

Horum primis," perfectorum lucorun finitione explicationem tribuit Gärtnerus, quos fidem affixit versus feminibus propagati Sub postrum, lucos plurimos, et omnes omnino conçervare illum atnum ræum.

[Translation in Latin:]

1. In editione S. H. nostrae, ex duplici genere unum et diversum probo est. ¹

2. DARENS, ut hæa explicationis rubrica aeterno praebatur pugna praebatur in quibus plantis et genus pluribus mutuo ducere, hæc aeternæ Plantæ, quæ accepta a seculo seculo iterum iterum, sed etiam finitimam, plantarum et animalium nomina, quæ autem in usu diligenter solam autem plantarum et animalium harmoniam habent, præterea etiam cujusmodi praebent, quæ etiam nonnullas aeternas et animalium plantarum et animalium harmoniam habent, etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam etiam et
Si hanc hypothecos fuisse parant, quae hucus plantarum genus tradat, animo velimur comprehendere, necesse forsan sit definitiones, quibus vegetabilem propagationem inclusit Gärtnerus," inspiceret Vegetationis origine duplci ex tonte derivatam esse affirmat. In altero, "Materies vegetabilis folis adjuta vtna variis, secundum iniquinum cujuslibet plantae crescendi schema, in novas formas mutatur, atque fusa ipse adulterarum formarum novarum producta exempla" In altero, "tenuentes flundorefque eis partes, minime proprio organorum, a reliqua fassa feceruntur atque ut elaborantur ut ex hircum demum congrut eula, qua, itaque inter se actione, novum prorsus emergat corpus organicum, verique in diffuitatis consequculis tacentur plantarum natura." Hunc posteriorem nascent di moium, praetulit, qua semina hiue trahunt originem pro tempore illum, Geminatitum, in unum propagantes prorsum rationem ducent. Hac principi potest ad diversa cryptogamine classis genera ubi audire nostro adimitur.

"Conferre omnes," aut ille, "tam capillares, quam moniliformes, sexu et feminibus in perpetuum definita sunt. Prades, et ipse solutus, nec quidquam mutatis articulis fuis regem inant. Confer ex ante moniliformes ut conditumse et variis, aliar adubat uncinat, promovit, ex junctum inscriptum in hircum articulum; brevis quamdam fila nata lateralia, quae est ipse ex parvis articulis condita, et ex quibus folia carundem propagations organa, hac simplica formante methodo, ut mirum unum, nunc duo lab proximi, laterale ilium articulique, pel meram sinu triste fata caniva multitudinem, in unicum globulm solvendum convertantur, posse ipse ipse decidit, et dum ex altera parte scopulat agittatur, ex altera novum trudit articulum, et quos fenis in plantam concidita mutat fuis prorsus similares." In genere, aut Gärtnerus, horum globulorum cum vero quaestum fructum vel feminim multitudine, quod dabitur formam et colorum, "hi tam non oblitans, quibus habeat et inter simplices gemmas locum concedit, vel interim globulorum mutatus fuerat fructus, ut ipse ex meta medulla atque cortice compaginatam, vel qui corundem imprimatur spectaculis omnes quippe, quae confusae cepius duorum articulorum in unum globulm medullae, excitant, omnis vegetalium, nec quidquam vero accidantia opus esse potest."
rem videntur imponere Quasdam tamem confervarum articulis est latitas notant botanici, dum funorum nonnullos septem instructos, cernimus. Genus ulva tenebras hasce neque quam digerat, quod lecitet naturam et diffinitiones suas cum utroque genere participat. Ulva capillaris et Hudsoni vehiclem extremos sus ramulos haud rarē instructa est, in quibus semina pyriformia aut capsulae, colore luce haud alia plantae parte diffimila, asperianturn. Hinc in funorum genere adscribi posse. Ulva articulata, confervarum fabricae apromā propinqua est dum Ficus Filum diaphragmatum seriem exhibet, quod illum ad hoc genis proximus annumerandum designat Ficus quidem inebrius in sē videtum diffinitiones utrisque generis cont inscripere nunne ex in recenti plantā opposito lumine examinante, septorum feries frequentēr producit, quae in alius frondis partibus nuncquam videnda sunt. In folis Fuci filoquō inflatis, diaphragmata eamque tacitu perturbi posseunt.

Complures dudum animadverterunt Naturam ad simplicioribus plantarum elementis, ad implicatrix et perfectionem carumendam structuram, arista quasi eamēa predentem progressam esse. Eandum vero sententiam accuraturum foran ingenio lectorum aptūm illustrat, quis Regni Naturālis tomordia vix et ne vix quidem lecemi notans, non in calce et semem continuata esse sed in rete cohærente Naturae opera, affirmat. Ne plantas hæc modo metuam, quæ naturalium ordinum prime et simpliores essentia sunt ad pro certo Naturaliam, nempe ut ulva, Fuci, et conservā, in praesentia haud intes sermon fisicī nostrum decernantur, et ut quibusdam characteris proprietatibus uniusque conveniuntibus omninum praeceptant.

Garnerius, ullam esse confervarum generi per semina propagationem, quæ quidem funorum nonnullis quodammodo attribuunt, omnino negat aliaeque porro quasdam harum plantarum species lateribus folium filamentus propagari, quæ per intermeścentiam subplantae haec in globulos convexit, et à ramulis sponte decidentia, sunt tandem vice suæ prolītia, "et dum ex altera parte scopulus agglutinatur, ex altera, nonum triduum articulum". Generis tamens illius num submerged permulta plantarum praeculudit, quæ globulos minuutos copiōde producit in quibus (quantulumque sint) pluma opaca granulæ vel semina quibusdam annis temporibus, asperianturn Converan ille coalllomendem exemplum hypothecia maxime repugnans, malis avisbus repōnunt hæc enim conferva fabricae est

et quod ibi lectoribus per simpliciores artifices deductum est, pro debarbaria dicto esse. Hec foliis numere luscia præviae quam tamen in omne habitatione, naturam ascribigantur, frumentum quinque annos autem quis plantas hæc modo metuam. Luce capturis Hautour, loci ac Mi Bass, in Ulva. Ficus intimus, cernimus, quod in calce et semem continuata esse sed in rete cohærente Naturae opera, affirmat.
tam simplicius ut pellucido tubulo similem se exhibeat, liquore tandem coccineo rubentem. Hyusce
planta in se habentis, circa articulos (ut aut reful'limè Lightfootius) verrucularum subfiictarum
congeries rarò admodum spectatur. Hae verrucule microcopio subjecus, atro-purpurea femina vel
grana conoideam amplecti videbuntur. Si planta in hoc statu alba circum implicatur chartà, liquorem
suum coccineum fuscum est, relièta solùm in chartam pellucidà quidam cuticulà, granula
circa articulos exceptus, opactatem haec et soliditatem alius plantarum partibus prorsàs dissimiles,
reinentibus. Quandoque infus tesserae granulae ad internà conservae subflantia tam latè difcedunt,
verò simile est ea, ex misces fluidorum vel secretionem, a quà femmnum oryinem pendere cenèt
Gartnerus, formata esse et nequaquam ex materìâ medullâ, quae sola, ut latitu causae pro gem·
inum usu. Quandoque gra.nula mutum cum subficiunt, tarn late difcedunt, verò genèt cùm ea, ex
miscel fluidorum vel secretionem, a qua ferrunum origine pendere cenèt Gartnerus, formata e fse et
reliquum suo chartà implicatur. Granulae circumference circum articulorum congeries raro admodum
sunt; haec vere verae copiosae sunt sub externally, atro-purpurâ semina vel grana conoida amplecti
videntur. Si planta manu albà cunctum implicatur chartà, liquorem suum coccineum fuscum est,
reliquum in chartam pellucidà quidam cuticulà, granulae circa articulos exceptus, opactatem
haec et soliditatem alius plantarum partibus prorsàs dissimiles, reinentibus. Quandoque infus
picta granula conoida amplecti videbuntur. Si planta manu alba implicatur chartà, liquorem
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circa articulos exceptus, opactatem haec et soliditatem alius plantarum partibus prorsàs dissimiles,
reinentibus. Quandoque infus tesserae granulae ad internà conservae subflantia tam latè difcedunt,
**FUCUS** veliculofolus.


**FUCUS.** fronde plana costata integra veliculosa: tuberculīs fēminīferīs apicibus tumidis, inclusīs.


*Fucor. p. 60.—Fl. Scot. 904.*

Fucus veliculofolus jam nācens e basi glutinosā fāxis et consīdīr firmūtē adnāxēs adūtor, folio simplici et perexīgō contraffēs. Maturesemīs pars frondis foliaceae estūs vi haud rātō obstrātūr, dum nervus mediam longitudinem percurrens flītem solūdum et subcylīndicum plerumquē emulatūr, nudūs omniūs a bāsi flātā sēquipedālis et utlra. Frons intēra modo dichotomī multīm pergīt augētērē, ramīs numerōsīs superūsē consērta, et veliculīs aērīfīs ut flūtūs immatērē instructūa mōx apices substantiā tenaci et glutinosī diffusī terminantūr, dum plurīna tubercula intreīndīm superficiēs infixa apparent* *Maturā atēte glutinosā substantia mucīfla eēs incipit, et armāto oculo filamentos capitārisūbīs fines ordinē reticulāti implicāri videntur. Nunc per externem apices eēm puncturē sec foreamīn aliqua perrumpēnt, et nunc etiam magis conītcenda sunt tubercula, fortasse ob glutinosī humidīs jām in mucecum transīntūs dissolutīonēm. Punētūura quēvis superiori unus alēcūs tuberculi parte subtendītūr, et procūndiūbī tradūtīus habeatur per quem semina transmutantur.

Fuci maturātīs jam et penē marefere intēpsō apice, capitāria illā et reticulāta filaments pulvere quodam alēperī invictumbarīt, plantarum sarea haud abīminī. Ut causā hūtīs pēmovis inquirīgurī, granula in tuberculo inclusa tēntī quodam instrumento sub microscopio cautō submovēbantur, cūm unum horūm explōvōrum fiatūm frangēbatur, velāltī pulvērōnina copūculīs diffugēant, illōrum adintestinal quae ad *Lycopersicum dumīlī* lunt.* Extra ma objectum tenēritis, facultatem nobīs ultima investigāndi invidē nec dedit hoc experimentum intentum pro certo affrentī atēmos hominem hominibus hūsim analogīs, utpoteque granulōrum purīfcarēntūs et dissolutīonēm originem haum duelīrī forōn potiūent. Nunc tamen quod priori favēt opinīōn tacendum est, necpē pulvērēm ad *Lycopersicum bovīla* dipōlum, hāud ullīs calculīs supputandum, ab accūssīm ingenī viro, Līghtfooto felicite, illīs planītā semina effic dūci. Si igitur minūta illa granula, tubercula nudulantia, quā in quibūs in fucorum (specibus admodūm perpastīc lunt) capūsula demūn, atōmīque illa ipla, seminālisībus repleta, evadent, raro forōn magis in propūtō effiīt, cur ha planta tenōnultīs alētica alterius marginibus aquae durissima lavillīmīque corporibus accēscērant.

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Nervus vitæ viribus præcipue intrusus est, namque ab illo, foliaceâ abruptâ parte, nova frons statum incipit pullulare. Multàm varit hæc species Gmelinus rectissime observavit characterem specificum consitère in bullis fusis et in verrucis fructiferis terminalibus; causâque merè accidentales esse, cur illa modo inflatam, modo divaricatam, vel aliter conficiendam se præbeat.

Color olivaceo-vel-luteo-viret.
Fucus vesiculosus.

Bladder Fucus or Sea Oak.

**Specific Char.** Frond *flat ribbed entire vesicular: with tubercles containing seeds, included in distended summits.*


This fucus, in its earliest state, consists of a single leaf, and grows on the surfaces of rocks and shells. Its base appears like a thin glutinous sub stance, strongly adhesive to the body on which it is fixed. In the further stages of its growth, the foliaceous part is frequently worn away by the force of the surge, and the middle rib or nerve acquires all the appearance of a solid stem, being entirely bare and nearly cylindrical, for the space of half a foot or more above the base. The frond in the mean time continues increas ing in a dichotomous mode of growth, to a considerable extent, furnished with numerous branches. It has also air-bladders for the purpose of buoyancy, and at length terminates with distended summits, containing a tough gelatinous mass, around which a number of callous globular tubercles are fixed to the interior side (as represented in the largest horizontal section), each of which is furnished with many seeds. When the plant arrives at maturity, the mass becomes mucilaginous, and by the help of glases appears to be enveloped with fine capillary vessels, irregularly reticulated. At this period, several small punctures or perforations are frequently visible on the surface of the summit, and the tubercles now have a more prominent appearance. This latter circumstance is in some measure owing to the dissolved state of the gelatinous sub stance. Each punct ure is subtended by the upper part of its respective tubercle, and is no doubt the channel, through which the sources of propagation are dispersed.

A specimen of this fucus in its last stage of maturity and approaching to decay, being examined, the capillary vessels in the summit were found to be perforated with a substance not unlike the sap of a plant. In order to discover the cause of this appearance, a single tubercle detached from the summit, was placed under the microscope, and cautiously pressed with a fine instrument, when out of the minutest grains contained within it was seen to explode, and with an elastic force seemed to discharge a pulverized subs tance, somewhat similar to the particles which proceed from a Lycopodi um. The extreme minuteness of the objects defeated all attempts to prosecute the experiment. And we are not authorized upon an accidental appearance to assert that the particles in question were analogous to

* The word *capillary* has been frequently introduced in the present treatise, and, as there is no subject on which it is more improperly applied, we have ventured here to enrich the vocabulary of the language, which Fucus has added to it. We find it explain'd, in the shorthand word which Professor Mead directs the student to write under the character of *OLIANE*—a kind of roots or hairs, which pro the branch and seed of many plants, with great utility. In the contruction of the specific characters into English, the term *frond* is applied only under the frondes: the other word used without.
feeds: since they might possibly be ascribed to the decayed and putrefactive state of those granulated bodies. And yet in favour of the former opinion, it may not appear improper to observe, that the powder proceeding from the _Lycopodium bovista_, and which exceeds all calculation, is, according to the late ingenious Mr. Lightfoot, considered as the feeds of that plant. If then these minute grains, which in some species of marine plants are but few in number, should prove at last not to be the actual seeds, but only percarps containing the seminal atoms, we may be enabled more readily to account for the promiscuous growth of those plants on the finest edges of each other, as well as on the smoothest surfaces of hard extraneous bodies. The central nerve seems imbued with an active vital principle, from whence, upon any fracture, new leaves shoot forth. There are several varieties of this species. One of them is represented in the figure, to which the _Conerva succicola_ is attached. They have been considered by some as distinct species, under the trivial names—_F. divaricatus_, _F. inflatus_, &c. Gmelin very properly brings them back to one specific character.

Colour varies from an olive to a muddy verdant green.
FUCUS terratus.

FUCUS. fronde plana dichotoma costata ferrato-dentata, tuberculis fimbriatis ad apices terminata.


Cùm ha utraque plantæ ad magnitudinem crescant haud exiguam, satùs ut ramorum peram partem tantummodò, quàm diminuam utraque figuram integrâ re ferre cùm tabulis nostræ præcipua sit in tentio, propagationis hujusce generis modum in quâm plúsminus obseruam, illústrare

Gmelinus, (in Hist. Fucor.) de Fucu ferrato ha loquitur *Vesiculas aëriseras nullas habet, nullo unquam tempore Tubercula seminália nunc cichris ad frondunm extremitatis congregatùs sunt, nunc per omnem earn superficem nudantibus tabulis obseruante, utraque nuda, absque vesiculis, lana repleta.* Fucus ceranodes èí in codem ferè flau ut ro tamen cum vesiculofo conlocata vidimus———Fucorum déique ordo Vesiculósos continem, definitione ludit anepiti, qua modo ad tubercula sifìa, ut in Fucu ferrato, modo ad apices tumidos et bipartitos, ut in I. canaliculato, modo ad vesiculas propriè ré dicías, ut in F. vesiculoso, frondem inflantes, attinet.


**FUCUS ferratus.**

**Serrated Fucus or Sea Wrack.**

**Specific Char.** FUCUS frond flat dichotomous ribbed ferrate-toothed, with tubercles at the summits containing seeds.


The serratures on the margin of this fucus render it very distinct. In its origin and mode of growth, it hardly differs from the F. vesiculosis. The nerve in the centre of the frond, from the fume caulis frequently acquires the stem-like form, observable in the latter, but does not however appear to possess its prolific tendency, when the foliaceous part is broken off. The summits in their ripened state are tough, solid, and not inflated, neither do they contain any woolly substance. The tubercles or pericarps are nearly of an ovate form, and at first seem feebly attached to the sides of the summit, 8 although in maturity several of them are found closely united to minute perforations in the exterior surface of the fucus. These vesicles consist of a callous substance, not much darker than that in which they are imbedded, and contain several round grains, which are neither so opaque, or so numerous as those before described. The middle nerve in this, as well as in the Fucus vesiculosis, appeared to terminate precisely at the part where the fructifications commenced, but it reached the extremity of the barren summit.—The colour varies through several shades of olive and yellowish-brown.

As many of the above plants grow to a very extensive size, it was judged better to delineate a part of their respective branches, than a reduced figure of each, especially as the design of this plate is merely to illustrate the mode of propagation, observable in many of this genus.

Gmelin, in his description of this fucus, observes, that it is at all times dilute of vesicles or air-bladders, and that the tubercles containing the seeds are imbedded in the surface of the plant, and not in bladders — the Fucus erinaceus is membranaceous, and never has been found with distended summits — yet both these, are placed in the order which contains the *virescent* Lucernae. The character of this division seems to rest on an ambiguous definition, which at one time relates to the tubercles only, as in the 1. ferratus; at another time to the distended summits, as in the F. canaliculatus; and again to the vesicles or air-bladders properly so called, and which occur in the frond of the 1. vesiculosis.
Fucus canaliculatus.

Fucus. fronde dichotoma integerrima canaliculata linearis: tuberculis feminis, apicibus tumidis, inclusis.


Fucus canaliculatus.

Furrowed Fucus.


The distinguishing character of this fucum is a channel or furrow, palling through every branch on one side, in a longitudinal direction. The frond is from two to six inches in extent, and has a compact coriaceous base, from whence several branches suddenly originate, each one producing leaves, in a dichotomous series, which in their turn also are subdivided, and frequently terminate with bifid summits. The plant has in general a fassiquate appearance.

The fructification is fixed in the interior part of the swollen bunium, consisting of rough clavae globular tubercles. In some of these, when perfectly mature, an appearance like a puncture, closely fitted to the perforation in the surface of the frond, may sometimes be observed, which seems designed to facilitate the dispersion of the seeds.

Each tubercle contains several grains, either more or less in number. Of the latter, notwithstanding their minuteness, vary as to their form, which is sometimes more or less ovata. The colour of the grains is a bright chestnut, and on some flaves, a light olive green.

The fucum, when fresh from the sea, has a yellowish hue, which afterwards turns to a black.
**EXPLANATION OF THE FIGURES.**

Fig 1 The Fucus vesiculosus growing on a shell, with the nerve pervading the frond nearly slipped of its foliaceous part

2 Part of the frond in maturity, with distended funnels, in its natural size

3 Tranverse sections The first taken from a funnel in its premature flat, and natural size, the latter, from one approaching to maturity, with the tubercles fixed in the interior part

4 A small part of the summit magnified, representing the perforation through which the seeds are dispersed

5 A tubercle in its natural size, and scarcely larger than a grain of mustard The same also as it appeared when highly magnified

6 Part of the same containing the seeds or grains

7 A small part of the frond magnified, representing the fine hairs, which were considered as the male flowers by Reaumur

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- **EXPL. TAB.**

**Fig. 1** Fucus vesiculosus is conchae enascentes, et nervum, medium longitudinem percurrentem, parte foliaceae tuborbatum exhibens.

2 Pars frondis maturescens apicibus differentibus, naturali magnitudine.

3. Secliones transversales Harum una per apicem medium juniors, naturali magnitudine altera, etate paulo propefinitors, ad augmentum in hac conspecta tuberculi, corci apicis interior arcte adherentes

4 Apicis maturi abscissa de cute portto, perforationem magis auctam exhibens.

5. Tuberculum seorum, naturali magnitudine, et granum finum haud exuperans idem quam veluti sub microscopio probat.

6. Pars ejusdem, granula fusca presentans, maxime aucta.

7. Frondis portunculae penicillos referens, a Reaumuro masculos flores denominatos

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*a* Pars frondis Fucis ferratus naturali magnitudine

*b* Segmentum apicis transversum tuberculorum naturalis auctum

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A Pars frondis Fucis canaliculatis naturali magnitudine

B Apicis maturi sectio transversalis cum tuberculorum feminarum—aucta

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C. Tuberculum seorum, tum naturali magnitudine, tum maxime auctum.

D Semina tuberculorum inclusa.
**FUCUS purpureascens.**

FUCUS. fronde filiformi ramosissima, ramulis confertis: pericarpus subglobosis innatis.


In nonnullis specimins notitur folius, globuli vex cernendis erant, in albis, integris, in plurimos, gibbosos et parum prominentes. Horum tamen omnes sub microscopio aëri nihil videbantur nisi subdiaphanam et callosam substantiam continebre. Inspecet quibusdam specimenibus, Autumno incipit, opace invenebanur globuli quam plurimos granulitam ovalibus fusiformibus abundantes.

**FUCUS purpureascens.**

*Purplish Fucus.*

**Specific Char.** FUCUS frond filiformi greatly branched, branches crowded: feed-vessels somewhat globular, formed within the substance of the leaves.


The frond of this fucus is greatly branched, and measures from six to ten inches or more in length. The main stem terminates obliquely at the base, from whence it throws out several inverted radicles, as if for the purpose of clasping more firmly the object to which it is fixed. The branches, as well as the leaves, do not form to grow in any regular order. The latter are sometimes short and subulate, as represented in the figure; at other times, they are very slender and filiform. The plant, when fresh from the sea, has in general an olive-green colour: it may probably acquire its purple hue from accidental causes. Under their variable circumstances, it may easily be discovered by the small globular pericarps, which are formed in the very substance of the leaves themselves.

In the specimen here represented, some of these globules were scarcely apparent, while others were completely formed, and many appeared to be gibbous or prominent. They were found however to contain nothing more than a clear callosus substance. Upon examining some specimens of the same plant, it a later period, an innumerable quantity of dark coloured oval grains or seeds were discovered.
**Fucus concatenatus.**

**FUCUS.** from filiformi subdividitae ramis filiformis vesciculosa; vesciculis moniliformibus innatis.


*From sequepedalis et utraque basi tenacis et incaeratâ evolutis, nodis tribus vel quattuor nigris superne circumdata, unde rami virgulatores more linearum egermann, folios teret-subulatuis quaquerum ob-suit. Folia, plantâ maturecente, pro parte ratis ramuli evadunt, ramificatorum fenem invenieminunt. Horum fere omnes, de forma linearum, simili decidentes, in vesculos oblongos et fasciculaverunt disjunctaverunt, filiâs sembulantis, ab his tamen absquefoliis, ut suspenderent gelatiosam columnam convoluentem.—Granula plurima undeque sub ramorum cutis, verruculâs adnatar congregatâs conflatâs turgescunt. Hunc microscope aucta orbiculatâ minima apparet, minutâ in centro parte plerucedâ, praeestâ vero aspera paulum prominente. Tum sputum granulâs inclusâs diminutâs punctâs formâtis cepisse videbatur. Nonne hoc, ut in nonnullis auctis affirmare, transtus sit formam unde graea exuerint?—Adolescentes rami per quam tenues et filiformes nonnullam evadunt, maturecente, et in vesculos concatenatos abientes, filiâs perbrevibus et inermibus, extra, suffultus into, ex folio suberavat amplificatur.—Hunc Fucus concatenatum Lightfooti videtur e haedus ab similia at mibi serupulus restit, an idem cum ills sit, quem Linneas sub redem nomine descriptit. Quoad colorem, ex olivaceo-subfuscum, et demum nigrae.

**Fucus concatenatus.**

**Necklace Fucus.**

**Specific Char.** FUCUS. frond filiform, nearly dichotomous, much branched ves- sicul. vescicle necklace-form innate.

The frond extends to half a foot or more in length from a tough clubbed base, which frequently produces three or four hard obtuse excrescences, from the sides of which the branches originate in the form of linear-filaments, and which throw out in various directions short round subulate leaves. The latter, as the plant advances towards maturity, extend in proportion, forming secondary branches, which frequently produce others. These branches soon lose their former habit by becoming twisted and contracted nearly at right angles, in order to form a concatenation of oblong vesicles, having the appearance of pods or seed-vessels. They contain nothing more than a clear gelatinous substance.—A great number of seeds crowd together in each a minute, to resemble minute warts, appear in every direction beneath the surface of the branches, when magnified, they seem to be fixed in a similar form, leaving a small portion in the centre for the point of attachment. In maturity they become rather prominent, while the central space is reduced to a kind of puncture, which probably may be designated for the same purpose as those that have been already noted in the form of frutules.—The branches when young are somewhat very slender and filiform in their nature and dilated flats they are furnished with very stout and tender filaments, and when detached are found to be in part hollow.—This lineus and its description seem to agree with the F. concatenatus Lightfooti. Whether it may be the same which Linneas has described under that name, remains uncertain; in doubtful circumstances the colour of this lineus varies from a dark olive to a black

**Explanation of the Figures**

1. Intersection. Fucus, turned in a grooved. In profile, a transverse vescicula granulata exhibitur nulla. No part is a part of a vescicula branch.
FUCUS. fronde filiformi ramosa duplicato-pinnata, lacinius obtusus suboppositus:
semibus oblongo-ovatis laciniarum apicibus, infitis.

FUCUS. fronde cartilaginea filiformi compresa subduplicato-pinnata, lacinis ob-

Hujusce fucis fronds duplicato-pinnata est, et longitudine tri-vel-quincuncials Stipites incerto seré
ordine ad bati glutinosâ procedunt, ramus lateribus consertu, e quibus ramuli enascuntur, qui ubi, in
lacinis obtusis difficilis sunt. Haec laciniae acuë ac ramuli longitudine sed pedetentum contrahunt versus
fronds extremitates, et in alterno vel dichotomo se tradunt modo

Hac species non rarò similitior evadit, ad marginem FUCI Fili, vel ad alias plantas se adjun-
gens. Tum fronds fronds simplex est et unicus, falcuncialis, ramificulos protrudens laterales perpau-
cos sub-dichotomos

Plantarum magis luxuriantium frutes, ad crassitudinem hihi emportet ea eccentrum, ohyocolae colori-
rem admodum referentes. Cuticula vero qua ramulos vestit et lacinas amarissimae rubrae. Substan-
tia est tenera et recens plantarum quâdam elascì est prædita. Quamquam magnitudine incertì est,
dignoscatur tamen hoc fucus ex obtusis laciniarum apicibus, et falcìssimâ, ex odore fragranti quem
emittit, violarum adinflar.

Semina oblongo-ovata interiorem laciniarum medullae inixa apicim elt, quæ, plantâ maturecente,
formâ et colore suo, verruculès minuissimis sunt consimilis

---

**EXPL. TAB.**

| a | Pars frusta, è bati planta junctus, exornata. |
| b | Ladem aucta |
| c | Pars ramulis extrema cum lacinis, granula con-
git exhibens, magni aucta |
| d-e | Laciniarum sectiones, cum granulis subillanti-
ta medullarum indumentibus |
| f | Granulum unum de laciniâ decipitum, feori-
sum maximè auctum |

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FUCUS
**Fucus obtusus.**

**Obtuse Fucus.**

**Specific Char.** FUCUS. frond filiform branched doubly-pinnate, segments obtuse nearly opposite oblong-ovate grains or seeds fixed in the summits of the segments.


The frond of this fucus is doubly-pinnate, and from three to five inches in length. The stems proceed from a compact glutinous base, and are subdivided into lateral branches, which produce a third series, consisting of the obtuse segments. The latter, as well as the branchlets on which they grow, become gradually contracted in length, as they approach the summit of the frond and they both seem to observe rather an alternate or dichotomous mode of growth.

This fucus frequently grows in a more simple state upon the edge of the *Fucus filum,* or on other plants. The frond only consists of a small single stem, an inch and a half in length, with a few dichotomous lateral shoots.

In the more luxuriant plants, the stems are as large as common packthread, and resemble single filaments in colour, but the cuticle, which surrounds the secondary branches and the segments, has a beautiful pink colour. The interior substance of the plant is tender, and, when the fucus is fresh, it has a kind of elasticity. It may always be distinguished by the obtuse terminations of the segments, and frequently by a powerful perfume which it imparts, not unlike that of violets.

The fructification consists of oblong-ovate grains or seeds, fixed in the interior part of the segments. In a state of maturity, they appear like minute opaque warts upon the surface.

**Explanation of the Figure.**

1. The frond in its natural size
2. Part of the stem and base of a younger plant
3. The same magnified
4. The end of a branch with the segments, considerably magnified
5. Parts of the segments, with the grains or seeds embedded in the medullary substance, magnified
6. A single grain taken from one of the segments, greatly magnified
FUCUS. frons dichotomus ramosissimus teres uniformis fastigiatus. Sp. Pl. p. 1631

Fucus fastigiatus haud raro nonnullis est radicula ut plurimum implicatis exortur, qui, fluviales ad longitudinem trium unciarum omnino simplices, vel aperie obtuso bifidos producunt. Tum autem horum aliqui in ramos multiplices dichotomos, longitudine aequales et verè fastigatos affurgunt. Fions dis maturioris flipes ramarum pondere deprecibus ad radiculis tenuebus perispea divellitur. Frons nonnunquam more folioli fror evadet.

Fuci hujusce specieos quaH Herbario Linneano afferuntur, ob seccutem tum contrafilum vide mus, ut species ab his diversa exiliumaretur, sed cum alius ipsilignae plantae spectandibus accuratè collatam, Herbarii docilimmo folisflori videbatur, a fuso jam descripso, maritimas Angliae oras habi tante, necquaquam differre.


Apices, natura in atate depressi et paululum deliquentes, subplantam medullarem, in muceum maximam ex parte abeunt, effundunt. Per id tempus granula plurima oburna ossata in filamini lances distanti, nonnunquam apspicantur—An femma?—non vero "sub punctis perforatis latentia," apparent.

In uno codemque specimin, variarum segmenta pralongis 6 et acutioribus, unde nomines error manet Fucus furcellatus. At Cl Smithus, in re botanica judicium plurimum polles, inter hanc varietatem, et furcellatum Linnei lirico ornis di face prorsus ignotum, agnoscere voluit differentiam specificam.

Fucus, falciglatus.

Falciglated Fucus.


This fucus frequently grows from several implicated radicles, which produce small clubbed stems. These at first are simple, and attain the length of three inches or more, before they show much tendency to a dichotomous mode of growth, when some of them strike out into numerous branches, which, being nearly of an equal size and length, give the fucus its falciglate appearance. In this state, the stem becomes too ponderous for the radicles, and is generally found separated from them. The frond sometimes produces floriferous runners.

The specimen of this fucus preferred in the Linnean Herbarium is so much reduced in its dried state, that it might be mistaken for a distinct species, but upon comparing it carefully with other specimen of the same plant, in the presence of the learned and ingenious Professor of the Herbarium, it appeared evidently not to differ from the one found on our English coasts, and described above.

Wulffen, in the third Volume of Jacquin's Collectanea, has given a figure of a very minute fucus, which is remarkably well characterized under the same trivial name. He observes, that it is found growing on shells, fucuses, and other bodies, and that it is a mere pigmy in point of size, with respect to Cédra's plant, which is evidently the same as our own. This author seems to suspect that the difference may depend upon the different ages of the two plants. To this it must be objected, that the young stems of the Fucus falciglatus, even before they become branched, greatly exceed in size and extent those which Wulffen has delineated in their completely-falciglate character, and which in this state seem to be truly filiform, and scarcely exceed an inch and quarter in height.

In maturity the medullary substance of this fucus becomes mucilaginous, and escapes from the fumitum, which built open in a longitudinal direction. At this period, an innumerable quantity of white ovate grains may sometimes be discovered enveloped in a kind of woolly substance. If these grains are condensed as the fucus, they do not appear connected with any perforation in the fumitum, and which in this instance would be useless.

This fucus has frequently been found to vary in the same specimen with long accumulated segments, from which circumstance it has been contended with the F. furcellatus of Linnaeus; but in the opinion of Dr. Smith, which may be considered as decisive, the latter remains a distinct species, and at present an entire stranger to the English shores.

* * *

1 The entry opposite here

2 The entry opposite here

3 The entry opposite here
CONFERVA fucicola.

CONFERVA. filamentis simplicissimis capillaribus geniculatis brevissimis confertis.


EXPL. T A B.

Fig 2 CONFERVA fucicola. FUCO vesiculofo a Filamenta plurimum auta in quibus diaphragmata apparent.

CONFERVA fucicola.

SPECIFIC CHAR. CONFERVA. filaments most simple, capillary pointed very short crowded together.

This is a very minute conferva, and does not appear to have been described. It is found in the Spring, growing in thick tufts upon the Fucus vesiculosus or nodosus. It does not seem to suffer that indifference, with respect to the place of its growth, which marine plants generally do: for in the course of two or three months it was never discovered on rocks, shells, or other extraneous bodies. It consists of numerous filaments loosely half an inch in length, closely matted together at the base, from whence they diverge sometimes in a circular direction.

The filaments appear simple and unbranched. They are tubulous, and have numerous diaphragms: their termination is obtuse. When viewed separately they are almost transparent, or have a light yellow tint. In the mals their colour is deeper, and partakes of a muddy-yellow or brown.
This conferva is found in great abundance under an elevated cliff near Weymouth, called the Look-out: particularly in the Spring Months. The fructification has not yet been discovered.

The Fucus obtusus and many other marine plants may be found near the spot above-mentioned.

EXPLANATION OF THE FIGURE.

Fig. 2. The Confera fucicola growing upon the Fucus vesiculosus.

a. The filaments magnified, in which the diaphragms are apparent.
ARABIS stricta.

TETRADYNAMIA Siliquosa.

CHAR. ESSENT. Glandulæ melliferæ quatuor, singulæ intra calycis foliola, squamæ inflexæ reflexæ.

ARABIS. foliis finuato-dentatis hispidis: radicalibus spatulatis, caulinis semiamplexicaulisbus siliquis tenuibus suberecis.


RADA simplex vel subramosa, ad imum sēpe fibrosa
Caules plurès subramosi teretes, brunées ulterque ad semipedes et ultra circa basin hirsutie, super-nē glabri
Calyx Penanthium tetraphillum, foliolis concavis, superinè conniventibus, ad basin truncatis. fig. 4.
Corolla Petala quattuor, integra, apice obtusa, dilatata, longiorum flaminum basi affixa calycle duplo longiora fig. 2. 5
Siliqua Filamenta sex, quorum duo paululum breviora fig. 6 Anthéroæ flavæ fig. 7
Pistillum Germineterec, longitudine flaminum Stylus nullus * Stigma obtusum, pilis brevi-ibus pubescens
Pericarpium. Siliqua tenuis fixturealis bivalvis femina continens. fig. 3—et auda, fig. 8

Glandulæ melliferæ intra calycis foliola frutetianum, ut poterit, et quâlibv fructis. Neque siliquam ad basin quadrangulam elice, affinirem audirem

* Val. Linn. Cat. P.
A R A B I S \textit{tritica.}

\textbf{TETRADYNAVIA Siliquosa.}

\textbf{Essent. Char.} Four mellowferous \textit{glands}: one within each leaf of the calyx resembling a reflected scale.

\textbf{Spec. Char.} Leaves finate-toothed hispid those near the root somewhat spatulate. the cauline leaves half-embracing the stem. Pods slender, nearly upright.


\textit{Root} simple, or somewhat branched, fibrous at the end

\textit{Stems} several, somewhat branched, round, from two to six inches and more in height, hispate near the base, smooth upwards.

\textit{Leaves} toothed, hispid those near the root finate-toothed, spatulate, and gradually reduced in breadth towards the base the upper leaves toothed, and half-embracing the stem.

\textit{Calyx} a Petal of four leaves concave, connivent at the top, the base of each truncate \textit{fig. 1.}

\textit{Corolla} of four Petals, entire, dilated, obtuse at the summit, apparently inserted at the base of the longest flamin~ twice the length of the calyx \textit{fig. 2.5.}

\textit{Stamens} six filaments, two of which are in a small degree shorter than the others. \textit{fig. 6.} Another yellow \textit{fig. 7.}

\textit{Pistil} Globe round, the length of the filaments. \textit{Style} none \textit{Stigma} obtuse, covered with hairs.

\textit{Pericarp} a Siliqua slender, two-valved an inch and half in length \textit{fig. 3.—and magnified \textit{fig. 8.}}

The mellowferous Glands I have not yet been able to discover. The food vessels do not appear to be quadrigula.

\textit{See also Gats. 11.}

The Author is obliged to the Hon. Mrs. Broderick, for an elegant and characteristic drawing of the \textit{Arabia} plant, which has been ranked among the most British plants, and not described by many. The specimen here represented, exceeds in fine the plant, as it is usually found on the more receivable parts of St Vincent's Rock. Yet as it was brought from there in its native soil, and was preserved in its purity, no apology, it is presumed will be necessary, for the preference now bestowed upon it. We learn from individual synonymy that we adopted is a native plant one, which probably has never been discovered in this Country, and belonging to the same natural class as the \textit{Arabia} indica, namely, the \textit{Carnallina bellidifolia} Ray, in his Synopsis p. 300, describes a plant from St Vincent's Rock in the following words: "Carnallina pulchra Bellidifolia Alpina. And at the same time refers to Gerard p. 260, fig. 8, which clearly shows it is not the plant in question. The leaves in Gerard's figure being nearly oblong, and the flake, according to that Author, "four hundred high,—both which circumstances prove it to be at all different as possible from the \textit{Carnallina} bellidifolia of Linnaeus, \textit{See H. Lap. ed. et Smyth, i. 9.} We frequently find the \textit{Carnation}, botana on that part of St Vincent's Rock to which Ray alludes.
Medical theory and practice of the 1700s developed rapidly, as is evidenced by the extensive collection, which includes descriptions of diseases, their conditions, and treatments. Books on science and technology, agriculture, military technology, natural philosophy, even cookbooks, are all contained here.

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