PHYSIOLOGICAL OBSERVATIONS

ON THE

STRUCTURE AND FRUCTIFICATION OF FUCI.

IN CONTINUATION.

BEING convinced of the inſufficiency of the common Pillar Microſcope with a ſingle *Lens* to detect the Syſtem of Fructification in Marine Plants, and at the ſame time having a wiſh to clear up ſome doubts concerning their internal ſtructure, although by an attentive obſervation of recent plants I had made ſome * diſcoveries on the ſubject, I determined to furniſh myſelf with higher magnifying powers. My ſituation within reach of the ſubjects to be examined, and the opportunities I enjoy, likewiſe, of inveſtigating them at all ſeaſons of the year in a growing ſtate, made me entertain well-grounded hopes of adding conſiderably to our ſtock of knowledge on this intereſting ſubject.

I made my firſt experiment on the terminating fruit of the ſerrated *Fucus*, which ſtands at the head of the *Genus*, and is one of the moſt common ſpecies. Having found ſome of theſe in maturity, which was evident from their yellow colour, and a ſort of ſemi-tranſparency, and, likewiſe, from the apertures of the external tubercles diſcharging *mucus* plentifully, I cut out a † tranſverſe ſlice from the middle, and, having pared off the internal ſkin on each ſide of a part of it, I placed the piece on the field of my compound microſcope fitted with the loweſt power (No. 6.). I perceived that the internal ſubſtance, which appeared gloſſy and colourleſs to the naked eye, was in fact a beautiful network of capillary threads with ‡ orbicular maſſes or granules of a different ſubſtance, darker coloured, and not reticulated. Theſe maſſes were either near the internal coat, or adhering to it, and were furniſhed with five or ſix pear-ſhaped ſeeds each. The external tubercles, of which there were § five in the piece under examination, had very ſenſible apertures, as viewed under the glaſs, and communicated with the internal proceſs. Having made this diſcovery with my weakeſt power at firſt, to guard againſt optical deception, I applied my higheſt powers (No. 1. 2.) to the ſame object: with theſe I plainly perceived that the reticulated tranſparent fibres, or threads, were in reality *tubes forming* ‖ *meſhes, and interſecting each other; and furniſhed at intervals with tranſparent ſepta, or diviſions.*

* See the Preface to the Iſt Faſciculus.

† Pl. ix. A. nat. ſize AA magnified.

‡ In this ſpecies the maſſes containing ſeeds are rather elliptical, (See B.) one of them highly magnified. In F. veſiculoſus and moſt others they are perfectly globular. See C. C.

§ Pl. ix. AA.

‖ In this ſpecies the capillary fibres are wavy and interſect each other in oblong meſhes; in the uſual fructification of Fuci, where they are not ſo much compreſſed, the meſhes are ſquare, or hexagonal.

My next attention was paid to the fruit of the bladder *Fucus* in the ſame ſtate of maturity. I cut out a * ſlice containing a part of the external coat, and ſome of the internal clear *mucus*, which was ſolid enough to bear cutting, and ſubmitted it to inveſtigation under the different powers abovementioned. The ſame internal ſtructure was viſible, but much more beautifully arranged, which aroſe probably from the fruit having its coats more expanded, and conſequently affording more room on the inside. In this, likewiſe, as the cut was made through the external tubercle, the † paſſage from thence to the internal orbicular maſſes was very conſpicuous. Having met with *F. bifurcatus* of Major Velley, the *F. tuberculatus* of Hudſon, and of the Linnean Tranſactions, in full fruit, with the ſummits beautifully tranſparent, and ſhewing the granules to the naked eye, when held up to the light, I cut the ſummit down lengthways, and took out ‡ a ſlice, and ſubmitted it to inveſtigation, and the internal ſtructure was perfectly analogous to thoſe before deſcribed. I have had opportunities during the courſe of the laſt year of repeating my experiments on theſe plants at my leiſure, and, likewiſe, of extending them to the fruit-pods of the kindred ſpecies—*F. nodoſus, F. ſpiralis, F. canaliculatus, &c.* I purſued the ſame mode of cutting a tranſverſe ſlice from the middle of the pod, and was happy to find a perfect analogy in their mode of fructification: the only ſpecific diſtinctions I found, were in the form of the meſhes, in the ſize and ſhape of the ſeeds, and in the number contained in each orbicular maſs.

A ſimilar mode of fructification I obſerved in ſome ſpecies of *Fuci*, differing widely in habit from thoſe already mentioned, and not having an appropriate fruit-pod. Among theſe are to be reckoned the *F. loreus*, a ſucculent plant with maſſes of ſeeds, and internal tubercles throughout its whole length. This plant, on having tranſverſe ſlices cut through it, ſhews the tubular organization and the maſſes of ſeeds, but with this difference, that the tubes, though occaſionally interſecting each other, are in general flexuous and wavy; the granules, or maſſes of ſeeds in this ſpecies contain from three to ſix each. *F. tamariſcifolius* has its ſummits above the imbedded bladder pretty much ſwollen at the time of fruiting, and the diſſecting knife diſcovers the tubular proceſs, and the maſſes of ſeeds: *F. cæſpitoſus*, a very minute ſpecies recently diſcovered by me, has a ſimilar fructification, and it may fairly be concluded that many of the ſhrubby *Fuci* do not differ eſſentially from thoſe already deſcribed.

It having been hinted to me from high § Botanical Authority that the pear-ſhaped bodies deſcribed and figured by me, as they appear in the compound microſcope, might not be real ſeeds, but only *gems*, or particles of the medullary ſubſtance of the different plants; as it ſeemed impoſſible from their extreme minuteneſs to diſſect their component parts with ſufficient accuracy, in order to inſure conviction, I reſolved to procure, if poſſible, the ſpontaneous diſcharge of the ſeeds in ſea water, in order to ſubmit them to a more accurate examination. I likewiſe conceived the

* See C. nat. ſize C. C. highly magnified.

† See Fig. C. C. magnified.

‡ See Fig. E. magnified.

§ Sir Joſeph Bankes, Bart. K. B. Preſident of the Royal Society.

the idea that I might close my experiment by sowing the seeds on sea pebbles, and by alternate immersions and emersions procure seedling plants from those seeds. I selected three species, viz. *F. serratus*, * *F. canaliculatus*, and *F. bifurcatus*. I carefully detached these plants with their bases uninjured from the rock, and placed them in wide-mouthed glass jars, with a change of sea water every twelve hours. In the course of a week I succeeded in procuring the seeds, which now appeared † oval rather than pear-shaped, and, when ripe, burst asunder transversely in the middle with an ‡ explosion: these seeds were inclosed in a bright mucus immiscible with sea water, and likewise specifically heavier than it; so as to serve the double purpose of carrying them to the bottom, and of affixing them to the rock when settled there by their gravity. This spontaneous discharge of *similar shaped bodies*, all inclosed in a glassy *mucus*, and all opening transversely, would hardly have needed the additional corroboration of causing them to vegetate in order to evince their being actual seeds; this, however, I likewise happily accomplished §.

My Friend Major Velley, in his Inquiry into the Mode of Propagation peculiar to Sea Plants, had noticed that the fruit, or pericarp in *F. vesiculosus*, and likewise the fructifying summits

* See an accurate representation of this species with its fructifying summits in Major Velley's Dissert.

† See the remark made by Major Velley on the explosion of a minute grain on the fruit pod of *F. vesiculosus*.

‡ See Pl. ix. F. n. 1. 2.

§ As many curious Persons, who occasionally visit Sea-Bathing Places, may be desirous of ascertaining these facts under their own eyes, I shall detail the Experiments I made. Having procured a number of wide-mouthed jars together with a Syphon to draw off the water without shaking or disturbing it, on September 7, 1796, I placed my plants carefully in the jars with their bases downwards, as in their natural state; on the following morning I decanted off the sea water, and, letting it subside in the bason, I found a few particles at bottom, which, on being viewed in the microscope, appeared to be little fragments detached from the surface by friction in carriage. I then poured a fresh quantity of sea water on the plants, and placed them in a window facing South; on the following morning the jar containing the plants of *F. canaliculatus* discharged into the bason a few yellowish grains, which, on examining them, I found to be the actual seeds of the plant; they were rather oval than pear-shaped, but the most curious circumstance attending the observation was, that each individual seed was not in contact with the water, but enveloped with a bright mucilaginous substance. It was easy to guess the wise œconomy of nature in this disposition, which, as hinted above, serves a double purpose; each equally necessary towards continuing the species. On the following morning a greater quantity of seeds were discharged by this plant, and at this time a few seeds were procured from *F. serratus*; but this latter plant discharged such a quantity of mucous fluid, that the sea water in which the plant was immersed was of the consistence of thin syrup, and, consequently, the seeds being kept suspended, it was difficult to separate them. The seeds of *F. canaliculatus*, however, were numerous, and visible to the naked eye, and, after letting the water rest for a few minutes, it was no difficult matter by gently inclining the bason to pour off the water, and let the seeds remain. In performing this operation I was witness to an explosion or bursting of one of these seeds or pericarps, which agitated the water considerably under the microscope and brought to my recollection the circumstance mentioned by Major Velley during his investigation of *F. vesiculosus*. I at last obtained a discharge of seeds likewise from *F. bifurcatus*; these perfectly resembled the others. Having established this point, viz. *that marine plants scatter their seeds in their native element without violence, when ripe, and without awaiting the decay of the frond*, I next procured some sea pebbles and small fragments of rock taken from the beach, and, after having drained off the greatest part of the water in the jar, I poured the remainder on the pebbles. I left them dry for some time that they might affix themselves: I then fastened strings to them, and alternately sunk them in sea water in a wide-mouthed stone jar, and left them exposed to the air, in order to imitate as nearly as possible their peculiar situation between high and low water-mark, and when the weather was rainy I took care to expose them to it. In less than a week a thin membrane was discoverable on the surface of the pebble where the seeds had lodged with a naked eye: this gradually extended itself, and turned to a darkish olive colour. It continued increasing in size till at last there appeared mucous *papillæ*, or buds coming up from the membrane: these buds when viewed in the glass were rather hollow in the centre, from whence a shoot pushed forth: in some instances they seemed to rise on a [a] short thick footstalk, and in this latter case resembled in some measure the Peziza-formed seedling of *F. loreus* (see Pl. xii. A. B.), and the others without stems were like the stemless Peziæ [b].

[a] As this is the case, it is very fair to infer that the first stage of the plants of this *genus* at least is not dissimilar to that which has occasioned so much surprise in the case of *F. loreus*, and that they differ only in size.

[b] These plants continued to put forth the central shoots for some time, but their growth was not rapid after the first efforts; most probably owing to their confined situation; and, as I was distant six or eight miles from the sea, and had not the opportunity of placing the pebbles in some

ſummits of *F. ferratus* had no perforations through the internal tubercles until the ſeeds were ripe, and ready to be diſcharged. I had not obſerved this circumſtance, when theſe two ſpecies were inveſtigated by me in my former FASCICULUS; however, I have had abundant reaſon to be convinced of this fact in the courſe of my obſervations ſubſequent to that time.

As the previous impregnation is effected *internally*, and confined to a particular ſpot, the moncœcious character attributed to theſe plants by Reaumur, and adopted by me, with a diffidence, notwithſtanding, becoming the intricacy of the ſubject, muſt be totally abandoned.

The curious proceſs reſpecting the fruit-pods in the former part of this Eſſay may with reaſon be ſuppoſed to bear ſome analogy to the parts of fructification in Land Plants, and we may ſafely infer that the capillary tubes are fitted to contain an impregnating *aura*, and that this is communicated to the orbicular maſſes, which at firſt appear *pellucid*, then marked with *nebulous* ſpots, and, laſtly, diſcover in a more advanced ſtate the perfect ſeed. In confirmation of this, it is neceſſary to obſerve that the granules compoſing the *pollen* of land plants may be conſidered probably as capſules containing a ſubtle vapour, as they are known to explode. At all events, as the impregnation is effected in perfect ſecluſion from the ſea, the pencils of fibres in the mouths of the cavities in the fronds of ſome ſpecies, and thoſe threads obſervable in the inſide of the air-bladders in others, can have no reference to fructification.

With reſpect to thoſe cavities with which all the ſpecies in Linneus's firſt diviſion of the *genus* abound, and which give the frond a punctured aſpect, as they are found at times with tufts of very fine whitiſh filaments, and at other times deſtitute of them, I made them the ſubject of repeated inveſtigation under all their different appearances. That they are in part, if not wholly, intended for the diſcharge of a thick, pellucid, mucous fluid, is proved by an eaſy experiment, and the quantity which the plant * exſudes under water is aſtoniſhing. A ſingle plant being put in a ſhallow pan and covered with a pint, or a little more of ſea water, converted the whole into a liquor of the conſiſtence of ſyrup in the ſpace of twelve hours. The experiment was repeated on the ſame plant with nearly an equal diſcharge for ſeveral ſucceſſive days. This fluid was found to be ſpecifically heavier than water, and for ſome time immiſcible with it †.

Having remarked that the punctured frond of *F. ferratus*, which exhibited, when dry, tufts of whitiſh filaments, when viewed immerſed in water under the microſcope appeared without any,

of thoſe pools which are left by the ſea at low water, I diſcontinued the experiment. It is proper to notice in this place how nearly the conjectures of our countryman Moriſon approach the truth: "If any one aſſerts that the *Algæ* are produced from ſeed, or ſomething analogous to it, I do not contradict him; for in ſome plants there ſeems ſomething thick and tuberoſe, adhering to the leaves themſelves; ——— it is probable that a viſcous and viſcid humour (if it be merely a humour) is produced in them endued with a ſeminal power." (Linn. Tr. v. 3. p. 89.)—If the viſcous and viſcid humour mentioned by him had been ſubmitted to a microſcope, he would have diſcovered the actual ſeed.

* This cannot ariſe wholly from the decay of the plant, as an ingenious Correſpondent of mine, Mr. Dawſon Turner, has ſuggeſted; it ſeems to take place in a very ſhort time after immerſion.

† In order to aſcertain theſe facts I took an infuſion of Cochineal in ſpring water, and ſome of the mucous fluid obtained as above, and placing the latter in a drinking glaſs I poured the tinted infuſion gently on it, which remained on top, perfectly unmixed; I then reverſed the experi-

any, it occurred to me that thoſe filaments might be nothing more than the exſuding *mucus* * hardened and whitened by the ſun and air. I fully convinced myſelf of this fact by repeated experiments. The reaſon why theſe plants are ſometimes covered with theſe tufts, and at other times are bare and naked, ariſes from a peculiarity in them, as they at intervals diſcharge plentifully, and at other times not, from ſome œconomy of nature at preſent unknown to us. In order to aſcertain how deeply theſe *muciferous* veſſels were imbedded, I took very thin croſs cuts of the frond of the ſame *Fucus*, taking care to cut through ſome of theſe cavities. Theſe ſlices I placed edgeways on the field of the microſcope armed with my higheſt power, and I found them to be *pitcher-ſhaped*, and rounded at the bottom; and that they extended preciſely to the *middle* of the ſubſtance of the frond. From this regularity, and conſidering that theſe veſſels are found on both ſurfaces, I conjectured that there was a *diaphragm*, or membrane in the middle. The thinneſs of the frond not admitting the aſcertaining this fact by the inſtrument, it muſt reſt as yet in conjecture.

I have, however, detected this membrane in the thick leathery frond of *F. digitatus*, and, indeed, it ſeems reaſonable to ſuppoſe, as theſe cavities extend preciſely *midway* through from either ſurface, and as the frond of marine plants is not diſtinguiſhed, as the leaves of land plants are, by an *upper* and *under ſurface*, that the abſorption of the alimentary juices is effected indiſcriminately by either ſurface, and that this internal † membrane is the channel of communication from the baſe to the ſummit. This tranſverſe cut of the frond exhibited to view, beſides the imbedded muciferous veſſels, a pellucid, colourleſs, organized *mucus*, appearing to be compoſed of roundiſh, or ovate granules; and this, with the two external coats, forms the whole of the frond in by far the greater part of the *Fuci*, being equally to be met with, though not at all times pellucid, in the thick midribs and ſolid ſtems of the larger *Fuci*, as in the thinner and more membranaceous fronds of the minute ſpecies. It is remarkable that this internal ſubſtance, which is of ſo ſtiff and horny a texture in the large ſtems of *F. digitatus*, has notwithſtanding a tendency to ſoften and diſſolve in water, and is conſequently no other than the ſame *mucus* a little more ſolid.

I would not be underſtood to infer that theſe pitcher-ſhaped veſſels in the frond of *F. ferratus, veſiculoſus, &c.* are the common organs of abſorption, as they are ſituated at too great diſtances from each other, and are peculiar to a very few ſpecies; whereas the mode of growth is moſt probably analogous in all. I rather think the abſorbent pores of *Fuci* are infinitely minute, as in land plants, ſituated, however, on *each ſurface* of the frond; and that theſe pitcher-ſhaped veſſels, which puncture over the frond of certain ſpecies, are deſigned as excretory ducts, either to

 diſcharge

ment, and put the tinted water in the bottom of the glaſs firſt, and the mucous liquor in this experiment, being poured on the tinted liquor, ſubſided unmixed to the bottom. Leaving the two glaſſes till the following morning, the two fluids began to aſſimilate, and in a day or two the mixture was complete.

* This mucus being of a very thick conſiſtence immediately hardens, as the tide leaves the plant; and if a frond is nicely examined even with a common eye-glaſs juſt as it is taken out of the water, the *mucus* will be ſeen exſuding and condenſing into ſtrings.

† This membrane conſiſts of reticulated tubes in *F. digitatus*.

diſcharge ſuperabundant moiſture in theſe vigorous plants, or to generate a mucous liquor of ſome uſe in the element they inhabit. Theſe, however, are conjectures, which future experiments muſt either refute or verify.

From the conſiderations abovementioned, it is no leſs certain that the fibrous proceſs on the inſide of the air-bladders in ſeveral ſpecies can have no poſſible reference to fructification. I have ſince the publication of the former FASCICULUS examined theſe bladders on *F. veſiculoſus* and *nodoſus* in different ſtages of growth. In the younger bladders the threads are more numerous, and matted together like wool; in thoſe more advanced they are fewer, and many of them are extended acroſs the * hollow part from ſide to ſide; in which caſe they have bubbles † of air imbedded in them, like the beads of a necklace. In thoſe which are full-grown, and whoſe ſkins have acquired a proper degree of ‡ elaſticity, there are ſeldom any to be met with, but on the inſide of all of them there are globular incruſtations. The external ſurface of theſe bladders is of the cloſeſt texture, and as it were varniſhed over, which ſeems wiſely contrived to confine the elaſtic vapour, conſidering them in the nature of § buoys. If this were not ſo, the tender, ſoft ſkins of the infant || air-bladders would certainly collapſe, and we find that as the coats acquire thickneſs, the fibrous proceſs becomes nearly extinct.

After theſe diſcuſſions on the Structure and Fructification of *Fucus*, as far as they regard thoſe plants, which in my opinion ſhould conſtitute *the whole of that genus*, it will be proper to continue the obſervations and experiments I have made on thoſe ſubmarine Plants, which I conſider as forming diſtinct *genera*, during the interval ſince the publication of my former FASCICULUS. I therein hinted that the fructification of theſe plants was more difficult, as the parts were infinitely ſmaller. The *Anomaly* that prevails reſpecting the plants which conſtitute the *genus Fucus* is confeſſed by every Writer, and, however feeble the attempt here made to ſubſtitute a better arrangement, it is hoped, it may ſtimulate abler Botaniſts to unite their labours in endeavouring to remove the opprobrium that reſts on this part of the claſs *Cryptogamia*.

FUCUS.

FRUCTIFICATION—*a jelly-like maſs, with imbedded ſeed-bearing granules and external conical papillæ*—¶ *terminating.*

This generic character is taken from Fructification, *as viſible to the naked eye,* or a common eye-glaſs,

* Mr. Woodward ſuſpects from this deſcription, that there is a conſiderable analogy between theſe fibres and the air veſſels in terreſtrial plants.

† See Fig. D. PL. IX.

‡ The bladders at the baſe of an aged plant of *F. nodoſus* are nearly of the thickneſs of the ſole of a ſhoe.

§ From the buoyancy of theſe ſpecies the Bretons, I am informed, have a ſingular and very commodious way of procuring large quantities of them for the purpoſes of agriculture. They cut them and collect them at low water, and confining them with ropes, wait the return of the tide, and placing themſelves on the maſs conduct them by long poles to the place of loading.

|| It muſt be obſerved, however, that there is a thin viſcid liquor in the cavities of the infant air-bladders.

¶ The ſituation of the fructification will form a good generic character between this *genus* and *Ceramium*. *F. loreus* is the only exception.

eye-glaſs, which it is preſumed is a more proper foundation for a ſyſtem than microſcopic obſervations: ſimilarity of Fructification unites ſo many in this *genus*, that no generic character can be taken from the frond as in the following ones *.

CERAMIUM (Gærtner.).

Fructification—*a jelly-like maſs, without the ſeed-bearing granules; internal, univerſal; papillæ inviſible.*

I have repeatedly examined the plants contained in this *genus* in all ſtages of their growth. At times large irregular ſhaped † bladders cover the frond, and on cutting tranſverſely through theſe bladders there iſſues a thin mucous fluid quite tranſparent, which appears in the field of the compound microſcope to be compoſed of capillary tubes interſecting each other, though not regularly reticulated. On placing this thin tranſverſe ſlice edgeways under the glaſs, there appeared numerous ſmall bubbles adhering to the inner coat of the bladder: when theſe are ſeparated by preſſure from the coat, they remain unmixed with the other fluid, as being of much greater denſity, and form flat circular maſſes, as they lie on the field of the glaſs. In theſe are to be ſeen by means of high magnifiers extremely minute roundiſh ſpecks. As theſe flat maſſes conſiſt of the ſame bright glaſſy denſe *mucus*, as that which envelopes the ſeeds of the ſpecies already deſcribed, I conjecture that theſe minute ſpecks are the ‡ actual ſeeds, and that the bright denſe *mucus* ſurrounding them is to ſerve the double purpoſe of gravitation and agglutination. Should this prove to be the fact, there appears to be a greater analogy between this plant and thoſe before deſcribed than I at firſt imagined. The ſeeds, when ripe, may be ſeen on the ſurface of the frond at times with very high magnifiers, either diſpoſed in ſmall cluſtered maſſes, or in ſtrait lines interſecting each other. Although *F. polyſchides*, which is included in this family, is often found to have the ſame irregular bladders on the frond, yet, as I ſuſpected that the warty protuberances with which the bulb is covered might ſerve a double purpoſe, and occaſionally contain ſeed, I diſſected ſome of thoſe on the upper ſide, and found ſeeds imbedded in a clear reticulated *mucus*. Theſe ſeeds, or pericarps, were roundiſh, and of a larger ſize than thoſe of *F. ſerratus*.

CHONDRUS §.

Fructification—*an ovate rigid imbedded pericarp* ‖, *containing ſeeds in a clear mucus, and prominent in either ſurface.*

Theſe

* The Phyſiological Obſervations detailed above apply to this *genus* excluſively.

† See *a. a. a.* Pl. iii.—It is a doubt whether theſe irregular bladders diſcoverable on the frond of *F. digitatus*, &c. are eſſential to the fructification. Very high magnifiers diſcover, as I before obſerved, when the plant has been out of water, very ſmall conical *papillæ* with perforations for the diſcharge of the ſeed, where no bladders are found, and theſe bladders may be occaſioned by the expanſion of ſome elaſtic vapour detaching the upper cuticle at the time of impregnation by accident, as I have never ſeen them till the plant has been expoſed on the beach.

‡ Having macerated ſome of the frond in changes of ſea water, I found at the end of a week what I ſuſpected to be the ſeeds diſcharged in the water: they are extremely minute, and each included in a coat of bright glaſſy jelly.

§ Χονδρος—Cartilago.

‖ See Pl. xi. *F. lacerus*, *g. g. g.*

Theſe pericarps are viſible to the naked eye, and are particularly ſenſible to the touch, as they project on each ſide from the frond. They contain numerous infinitely ſmall ſeeds. Their internal ſubſtance is a colourleſs *mucus* compoſed of capillary veſſels, analogous, if examined under very high magnifying powers, to that of the kinds firſt deſcribed, but the ſurface of the frond has *no papillæ*. Theſe pericarps, when ripe, often burſt aſunder, and diſcharge the ſeeds on the ſurface.

SPHÆROCOCCUS.

FRUCTIFICATION—*external globular pericarps, adnate or immerſed; ſeſſile or pedunculate; containing ſeeds as above.*

This forms a very numerous *genus*, as many of the larger ſhrubby ſpecies, and almoſt all the minuter kinds are found to be tubercled, and it does not appear to me that the tubercles being ſometimes *internal* is a ſufficient reaſon to ſeparate them from this *genus*, as it may ariſe either from accident, or from the plants not being ſufficiently advanced in maturity *. There can be no doubt, however, that this *genus*, as well as *Fucus*, as it is here conſtituted, will hereafter be ſeparated into ſeveral diſtinct *genera*, when the ſyſtem of cryptogamic Botany ſhall have made further advances. In the mean time I have thought proper in the † enumeration of the ſpecies to follow the arrangement laid down by Dr. Goodenough and Mr. Woodward in their Synoptic Table ‡.

CHORDA.

FRUCTIFICATION—*a mucous fluid in the hollow part of a cylindrical frond, with naked ſeeds affixed inwardly.*

This genus is not numerous: the principal one *F. filum* is a ſingular plant, as will be ſeen by the deſcription of it in this FASCICULUS. It is neceſſary to obſerve that the mention of the ſeeds in the generic deſcription of this, and the other genera is not ſtrictly conſonant to the Rule laid down above, as it requires a pretty good eye-glaſs at leaſt to perceive them. The detailed account of the diſſection of this plant under the article *F. filum* will ſerve as an additional illuſtration of this genus.

CODIUM.

FRUCTIFICATION—*inviſible; frond roundiſh; ſoft and ſpungy, when wet; velvety, when dry.*

I have

* *F. articulatus* and *coccineus* have both external, and imbedded tubercles.

† See the Synoptic Table at the concluſion of the Latin Preface.

‡ Linn. Tranſ. v. 3. p. 102.—I ought here to notice with proper reſpect the improved arrangement of *Fuci* by Dr. Withering in his laſt edition of the Bot. Arr. of Britiſh Plants, which is well worthy the attentive peruſal of all thoſe who wiſh for a more intimate knowledge of Sea Plants.

I have not inſerted Fructification in the Generic Character, as it is wholly inviſible except with ſtrong magnifiers, and as the ſingularity of the frond is ſuch as not to need it. I have examined it, however, under the compound microſcope ſince the publication of my former FASCICULUS, and it appears to be a congeries of tubes ariſing from an internal membrane interwoven with and implicated in each other *. Theſe tubes ſeem occaſionally to open and ſhut, and near the ſummits are dark-coloured granules, which are doubtleſs the ſeeds †.

Beſides the above genera a few anomalous ſpecies ſhould be noticed, as proper to be referred to a future inveſtigation ‡.

Theſe general Obſervations on the diviſions of *Fuci*, as to the mode of fructification, will I apprehend ſtrike any perſon converſant with marine Botany, as diſtinctions ſufficiently obvious to juſtify a departure from the LINNEAN SYSTEM. As to thoſe Gentlemen, who have made theſe plants the object of their particular inveſtigation, it is preſumed they will think they admit of a ſtill farther ſub-diviſion. It is for their inſpection that I have ventured to arrange the above Synoptic Table, which it is hoped will prove the means of a final and determinate arrangement of ſub-marine plants.

The preceding Obſervations having been made by me in a diſtant part of the Kingdom, and the courſe of experiments having commenced immediately after the publication of the former FASCICULUS; I was agreeably ſurpriſed at the ſight of a Memoir written by Mr. Corréa da Serra, F. R. S. and publiſhed in the Philoſophical Tranſactions for the year 1796. The reaſonings of this very ingenious Naturaliſt on the analogies obſervable in the vegetable and animal kingdoms are acute and profound, and well worthy the attentive peruſal of thoſe who wiſh to acquire a knowledge of the more abſtruſe parts of the ſexual ſyſtem. It will appear from the commencement of my reſearches with a compound microſcope, that I had diſcarded the notion of *male organs* exiſting in a *filamentous proceſs*, either in the air-bladders of ſome ſpecies, or the urn-ſhaped muciferous pores of others. Mr. Corréa da Serra ſuppoſes the *mucus* to be actual *pollen*, reaſoning from the mucilaginous nature of *pollen* in ſome families of § Land Plants. My ſituation affords me no opportunity of examining the plants referred to, which ought to be done under high magnifiers, but it does not ſeem probable that any reſemblance can obtain in the mode of fructification between plants inhabiting different elements, and whoſe fructification at firſt ſight is ſo totally unlike, merely on account of this *mucilaginous pollen*. If indeed we go up to the firſt principle of fecundation—the *aura*; it will probably be found the ſame in both caſes: in the Land Plant, either attached to, or incloſed in very minute granules, which conſti-

 tute

* The *Ulva decorticata* of the Linnean Tranſ. v. 3. p. 56, a very curious plant, Mr. Woodward thinks will rank with *genus* CODIUM.

† See PL. XII. C. *c. c.*

‡ *F. ligulatus, rubens* L. Tr. *lichenoides* L. Tr. *lycopodioides* L. Tr.

§ In the *Apocyneæ, Orchideæ, &c.* to which may be added *Potamogeiton natans*. See the Differt. Phil. Tranſ. 1796, Pt. 2d.

tute *pollen*, and which float in our atmoſphere: in the ſubmerſed plant, on the contrary, it ſeems confined in ſmall capillary tubes, and carefully ſecluded from contact with the water. Theſe tubes are interwoven and furniſhed with *ſepta*, or partitions, and *anaſtomoſes*. With reſpect to the aſſertion of Gærtner, that the ſeeds of *Fuci* have no coat, my experiments evince that they are furniſhed with a coat, and that this coat burſts aſunder * tranſverſely. This coat, with the clear, glaſſy *mucus* in which the ſeed is incloſed, ſeems to form the diſk by which the ſeedling plant attaches itſelf.

* Pl. ix. Fig. F. 1, 2, 3.

POSTSCRIPT.

I cannot conclude this Eſſay without mentioning the Obſervations on the Britiſh Fuci, &c.—a Paper, which has made its appearance in the Third Volume of the Linnean Tranſactions, and which is the joint production of Dr. Goodenough and Mr. Woodward. I * noticed the expectation entertained by the Botanical World on the united labours of two Gentlemen ſo eminently qualified for the undertaking, and who, beſides, had free acceſs to the different Libraries and *Herbaria* both public and private. The Catalogue of Britiſh Fuci publiſhed by theſe Gentlemen is enriched with many new ſpecies, and contains accurate, amended ſpecific characters of each, together with very diffuſe Obſervations on the more intricate ones; the whole arranged in a clear and ſyſtematic manner, at leaſt as far as our preſent knowledge of Marine Plants extends; but what will for ever merit the thanks of the Botanical World is the fixing the fluctuating and confuſed Synonyms of ancient Authors on a baſis which cannot hereafter be ſhaken; and, while we advance daily in the Field of Diſcovery, we enjoy the heart-felt ſatisfaction of being aſſured, that the labours of our predeceſſors can no longer miſlead, or confound.

* See Preface, p. iv.

Pendarvis, Sept^r. 25th, 1797.

"A MAXIMIS EXORSA EST, ET AD MINIMA PROGREDIETUR PHILOSOPHIA."

BURNET. ARCHÆOL. PRÆF.

PRIOREM in lucem edens FASCICULUM, paucula de *Fucorum* fructificatione præmiſi, in quibus rem adeò ſubtilem lente ſimplici aggreſſus, haud mirum eſt ſphalmata quamplurima occurrere. Hiſce igitur perpenſis, et microſcopio, ut vocatur, compoſito, et maximè augenti inſtructus, *Fucorum* familiam, illorum ſaltèm in quibus planiora apparebant fructificationis veſtigia, ad examen revocavi.

Portio fructûs *F. veſiculoſi* de medio tranſversìm ſecta imprimis ſeſe obtulit. Gelatina tenax, et vitri inſtar pellucida (ut nudis oculis, et lente modicè augenti conſpiciebatur), opus * tubuloſo-reticulatum pulcherrimè exhibuit; granulis orbicularibus ſeminiferis immerſis, et interiori cutis lateri plerumque affixis. Granula hæc, coloris ſub-fuſci, nebulis, vel punctulis ab initio notantur; fructu dein maturo, ſemina pyriformia, vel ſaltem oblonga quina, vel ſena, in ſingulis granulis cernere eſt. *Fuci* conſimiles fructu ſc. mucoſo, terminali; ut *F. ſerratus, nodoſus, ſpiralis, canaliculatus, &c.* ſimilem partium ſtructuram exhibent, maculis retium ſolummodò in diverſis ſpeciebus formâ et figurâ inter ſe diſcrepantibus.

In aliis etiam ſpeciebus, ubi nulla extrorsùm apparet fructificatio, haud abſimilis ſeſe propagandi ratio eſt. *F. loreus,* ubique gelatinam reticulatam, granis, vel pericarpiis ſeminiferis intùs ad intervalla diſpoſitis, cultello tranſversìm, vel longitudinaliter ſectus, continuò exhibet. *F. tuberculatus,* vel *bifurcatus,* in † apicibus paululùm incraſſatis (cùm penitùs ſit diaphanus) granula ſeminifera intùs etiam nudis oculis conſpicienda præbet. In apicibus *F.* ‡ *tamariſcifolii, F. cæſpitoſi,* aliorumque, fronde cylindricâ vel compreſsâ, grana orbicularia ſeminibus confertis, gelatinamque obſervavimus. In omnibus ſupradictis ſpeciebus notandum eſt, ubi fructificatio intùs ſita eſt, papillas extrorsùm inveniri, foraminibus nunc apertis, nunc clauſis, prout maturitas ſeminum poſtulat. Semina per hæc foramina ſponte in mari exire, muco, vel gelatinâ obducta, § experimento mihi probatum eſt.

Novum hoc phænomenon, priores omnes REAUMURII, GMELINI, GÆRTNERI hypotheſes, necnon quæ de monœciâ quarundam ſpecierum naturâ in FASCICULO priori aſſerui, funditùs evertens

* Vid. Tab. IX. Fig. B. B B.

† Vid. Tab. IX. D.

‡ Vid. Tab. XI.

§ Vid. Experimentum in notulis Præfationi Angliæ ſubjunctis, p. xi.

evertens ſtatìm mihi ſeſe obtulit, nec niſi iteratâ inveſtigatione, poſt tot illuſtres Viros, oculis omninò fidendum fuit.

In omnibus, quas adhuc obſervavi, ſpeciebus materies iſta gelatinoſa, et pellucida in interiori frondis parte reperitur: in craſſioribus, *F. digitato* ſc. *bulboſo, &c.* ſectione è frondis medio tranſversìm decerptâ, oculo inermi; in tenuioribus, armato, patebit. Tubuloſa ſit necne ab initio materies hæc, vix adhuc pro certo affirmarem, maturâ tamen ætate ſemper conſpiciuntur tubuli retiformes, diſſepimentis ad nodos inſtructi, *anaſtomoſantes*, et *aurâ* fœcundanti intùs, ut par eſt conjicere, repleti.

Nullo igitur fructificationis funguntur officio veſiculæ aëriferæ, quæ in pauciſſimis reperiuntur ſpeciebus; nullo glanduli iſti, in fronde *F. veſiculoſi, ſerrati* occurrentes, et penicillis fibroſis ad oras cincti.

Etſi vero in ſpeciebus enumeratis materies iſta gelatinoſa, retiformis, vel ſaltem vaſculoſa, reperiatur, grana orbicularia feminifera in quibuſdam è grandioribus, necnon in omnibus fronde planâ donatis, omninò deſunt.

F. digitatus, polyſchides, ſaccharinus, edulis, palmatus, &c. &c. ſemina minutiſſima, et parvitate ſuâ aciem oculorum eludentia niſi tempore opportuno, interiori cutis parti affixa exhibent. *F. filum, thrix, flagelliformis ?* ſeminibus etiam nudis, glomeratis, intus affixis gaudent, fronde tamen adeò diversâ ut neceſſe eſt duo *genera* diſtincta conſtituere.

Veſiculas denique aëriferas, quas * olim partem fructificationis maſculam intùs continere ratus ſum, paulò accuratiùs inveſtigavi. Fila diaphana, lucentia, tranſversìm in veſiculis expanſa ferè ſemper in junioribus cernere eſt, rarò autem in adultis. Fila hæc † globulis aëris ad intervalla ſcatent, haud rarò ſphærularum monilis ad inſtar ordinatis. Pars interior quoque veſicularum aciculis pellucidis, et tuberculis obducta eſt, unde ſuſpicari libet modo quodam occulto aërem, ſive vaporem elaſticum intùs gigni, quo veſicularum latera, alioqui collapſura, diſtendantur, et intumeſcant.

Inveſtigationi Fructificationis Plantarum Marinarum per totum tempus, ex quo Fasciculus prior in lucem prodierit, unicè intentus, notas et characteres quamplurimos hactenùs inobſervatos, utpote et ſpecies quaſdam novas animadverti. Quod ad plantas jam a me deſcriptas attinet, ſummarium adjiciam.

FUCUS SERRATUS.

Veſiculas ſeu vaſcula urceoliformia in fronde, queis vim maſculam attribui, ſolummodò mu-

ciferas

* Vid. Præf. Lat. p. 1.

† Vid. Fig. 1x. D.

ciferas eſſe * experimentis comprobavi. Fructificationis partes ſingulas in interiori apicis intumeſcentis parte ſitas, ut in microſcopio compoſito exhibentur, in Præfatione Anglicâ ſatis copiosè expoſui, atque † iconibus illuſtravi.

Var. β.—Occurrit mihi nuperrimè in Cornubia juxta St. Ives oppidum varietas admodùm ſingularis fronde anguſtâ, apicibus prælongis, et margine ſimplici, nec ſerrato.

FUCUS VESICULOSUS.

Fibras villoſas in interiori veſicularum aëriferarum parte accuratiori indagationi lentibuſque compoſitis ſubjectas, minimè antherarum, vel filamentorum vice fungi certiſſimum eſt. De earum naturâ itemque partium fructificationis in fructu vel pericarpio terminali, vide quæ obſervavimus in Præfatione Anglicâ ‡.

Varietates hujus ſpeciei accuratiſſimè notavit D. Withering §, M. D.

FUCUS DIGITATUS.

Sectio tranſverſa craſſæ admodùm frondis ſpeciei hujus ſtructuram internam prorsùs ſingularem exhibet. Membrana intermedia retiformis totam frondem percurrit, ſubſtantiâ pellucidâ vaſculosâ, utrinque, inter membranam, et cuticulam externam, poſitâ. Hinc abundè patebit ſuccum a porulis in fronde abſorptum, tubulis, ex quibus conſtat membrana, per totam plantam facilè propelli poſſe, modumque creſcendi haud abſimilem in marinis, ac in plantis terreſtribus obtinere. ‖ Veſiculæ irregulares in fronde cultello recluſæ, et microſcopio ſubjectæ, globulis interiori cutis lateri adhærentibus inſtruuntur. Hi, ſuper vitrum effuſi, moleculas circulares, a muco tenui, quo veſiculæ implentur, ſeparatas, et immixtas formant. In his minutiſſima quædam corpuſcula conſpiciuntur, quæ proculdubiò, ſunt ſeminula, vix oculo armato conſpicienda. Mucus quoque tenuis maximè auctus ſtructuram retiformem maculis flexuoſis oſtendebat. Provectiore ætate ſeminula matura coloris caſtanei in ſuperficie frondis cernere eſt, vel in orbes congeſta, vel lineis rectis producta.

FUCUS POLYSCHIDES.

Tubercula, quibus bulbus in hâc ſpecie obtegitur, in quibuſdam individuis tranſverſìm ſecta, ſemina muco pellucido obducta oſtendunt; unde conjicere libet, veſiculas in fronde rariùs produci.

* Præſ. Angl. Pl. xii. l. 18.

† Tab. ix. f. A. A A.

‡ Vid. Præf. Angl. Pl. x.

§ Dr. Withering's Bot. Arr. of Britiſh Plants, ed. 3. v. 4. p. 85.

‖ Vid. *a*, *a*, *a*. Ner. Brit. faſc. 1. Pl. iii.

duci. Semina iſta iis, quæ in *F. ſerrato* et *veſiculoſo* notavimus, grandiora quidem, et pænè orbicularia. Radix divaricata et ramoſa hujus ſpeciei eodem, ac ceterarum diſci, inſtruitur glutine.

Notandum eſt *Fucum* hunc a D. D. Goodenough et Woodward *F. bulboſum* appellari. Lin. Tr. v. 3. p. 153.

FUCUS SILIQUOSUS.

Seminibus in hâc ſpecie detegendis intentus, ſiliquas complures maturas, ac immaturas ad examen revocavi. Structura partium interna in diverſis individuis varia eſt: in quibuſdam fila longitudinalia ſimplicia cernuntur; in aliis, pars interior cutis aciculis undique cingitur: ſepta, quoque, et cavitates veſicularum cryſtallis pellucidis ſæpiſſimè obtegebantur. Hac partium ſtructurâ liquet folia hæc ſiliquarum æmula, veſiculas reverà aëriferas eſſe, et plantæ in aquâ ſublevandæ inſervire. Fructificationem nuperrimè detexit et mihi mandavit D. TURNER plantarum maritimarum ſcrutator auſpicatiſſimus. Forma fructus oblongo-ovata, et acuminata eſt. Fructificatio interior ut in *F. veſiculoſo* et congeribus *; juxta YARMOUTH plantæ fructiferæ, ut mihi mandat, ſatìs copiosè reperiuntur.

FUCUS SPIRALIS.

Tubercula externa in fructu *F. ſpiralis* maximè prominent. Fructus quoque in ſicco relictus, penicillis † muci exſudantis, et ſole indurati obtectus, formam echinatam præ ſe fert. Forma fructûs varia; rotundiuſcula, oblonga, bicornis.

FUCUS TOMENTOSUS.

Planta hæc microſcopio compoſito ſubjecta ſtructuram partium *Fucis* diſſimilimam exhibet. E tubulis intertextis, et membranæ interiori affixis conſtat. Tubuli hi, ore nunc aperto, nunc clauſo, provectiore ætate ad apices ramulorum evolvuntur, et marceſcunt. Seminula in medio tubulorum conſpicua, coloris ſub-nigri; in ſingulis, ut videtur, ſingula ‡.

FUCUS PLICATUS.

Recentem, ex quo prodierit FASCICULUS prior, ſpeciem hanc, ad rupes imis maris receſſibus in ſicco relictam, obſervavi. Subſtantia, etiam in plantâ vivâ, lignea eſt et tenax; fructum verrucoſum

* In Act. Linn. v. 3. p. 125. ſeminum in ſiliquis repertorum mentio fit. Siliquæ fructiferæ ad apices ramulorum ſitæ ſunt diſſepimento unico longitudinali; congeries ſeminum minutiſſimorum intùs reperiebantur.

† Vide quæ obſervavi de penicillis iſtis ſupra.

‡ Vid. PL. XII. C. *c c c c*.—Generi novo, ſub nomine CODII, una cum Ulvâ decorticatâ D. Woodward (L. Tr. v. 3. p. 55.) in enumeratione generum refertur *F. tomentoſus*. p. xvii.

rucoſum lateralem, apiceſque incraſſatos, et ſeminiferos nuper detexi *. Color plantæ recentis ad baſim fuſco-purpureus, ſupernè olivaceus.

FUCUS ACULEATUS. p. 24.

Baſis plantæ craſſa, et quaſi ſpongioſa eſt; caulis verò ad baſim cortice ligneo obductus : ſubſtantia interna diaphana, vaſculoſa.

FUCUS ARTICULATUS. p. 28.

Suſpicor plurimas eſſe varietates ; fructificationem ſaltem nunc exſertam, nunc innatam eſſe conſtat : Specimen unicum ſaltem fructu pedunculato juxta PENSANCE oppidum collegi.

FUCUS RUBENS.

Species hæc a D. D. GOODENOUGH et WOODWARD *F. ſinuoſi* nomen obtinuit; *F. prolifero* D. LIGHTFOOT, qui idem eſt ac *F. criſpus* HUDSONI, in Herbario LINNEANO conſervato, nomenque *F. rubentis* præoccupante.

FUCUS FASTIGIATUS.

Varietas major noſtra coloris olivacei apud D. D. GOODENOUGH et WOODWARD, *F. lumbricalis ;* minor, *F. radiatus* nuncupatur : ſpecies radicibus necnon, et fructificatione, diſtinctiſſimæ. Illarum deſcriptiones ſpecificas, necnon *F. faſtigiati* LINNEANI, operæ pretium erit accuratiùs perpendere.

FUCUS VERRUCOSUS.

Species hæc quoque fide *Herbarii* LINNEANI nomen triviale HUDSONI abrogavit, *F. confervoidis* aſſumpſit ; haud ſcio tamen an *F. albidus* D. HUDSON. huc referendus ſit.

Forſan haud abs re foret numeroſiſſimam *Fucorum* familiam, quum adeò ex omnium conſenſu ſit anomala, in nova quædam genera diſtribuere, notis præcipuè a Fructificatione, prout oculo inermi apparet, ſumptis.

* Fructum ſemi-globoſum lateralem apices etiam quandoque incraſſatos, et forſan fructiferos, obſervavit nuperrimè D. WOODWARD.

SYNOPSIS GENERUM.

FUCUS.

CHAR. GEN.—Fructificatio mucosa, pellucida: granulis suborbicularibus seminiferis intùs: papillis conicis foratis extus—terminalis.

CERAMIUM.

CHAR. GEN.—Fructificatio mucosa, pellucida, sine granulis seminiferis: papillis invisibilibus—per totam frondem.

CHONDRUS.

CHAR. GEN.—Pericarpium, ovatum immersum, utrinque prominens; seminulis intus in muco pellucido.

SPHÆROCOCCUS.

CHAR. GEN.—Granula seminifera sub-orbicularia; adnata, vel immersa; sessilia, vel pedunculata.

CHORDA.

CHAR. GEN.—Fructificatio mucosa in cavitate frondis cylindricæ: seminulis glomeratis, nudis, cuti adhærentibus.

CODIUM.

CHAR. GEN.—Fructificatio in tubulis implicatis—frons cylindrico-compressa; statu madido, spongiformis; sicco, tomentosa.

FUCUS.

* *Fructificatione exsertâ.*

F. ferratus,
veficulosus,
inflatus, *var.*
volubilis, *var.*
divaricatus, *var.*
spiralis,
nodosus,
cerânoides, [a]
canaliculatus,
filiquosus,
filiculosus, [b]
cœspitosus. [c]

** *Fructificatione innatâ.*

F. tamariscifolius, [d]
bifurcatus, [e]
loreus,
abrotanifolius, [f]
barbatus,
granulatus, [g]
fæniculaceus,
fibrosus,
natans.

CERAMIUM.

C. saccharinum,
bulbosum, [g]
digitatum,
edule,
palmatum,
phyllitis, [h]
esculentum. [i]

CHONDRUS.

C. crispus,
ceranoides,
lacerus,
stellatus,
echinatus,
mamillosus. [k]

SPHÆROCOCCUS.

* *foliis destinatis.*

S. sanguineus,
finuosus, [l]
hypoglossum,
ovalis,
fedoides,
dasyphyllus,
membranifolius. [m]

** *stipite medium folium percurrente.*

S. alatus.

*** *fronde planâ aveniâ.*

S. laceratus,
bifidus,
ciliatus,
jubatus, [n]
pinnatifidus,
osmunda. †

**** *fronde hinc canaliculatâ.*

S. patens.

***** *fronde compressâ.*

S. corneus,
gigartinus, [o]
coronopifolius, [p]
coccineus, [q]
plumosus,
obtusus. [r]
aculeatus. ‡

****** *fronde teriti.*

S. fastigiatus,
radiatus, [s]
kaliformis, [t]
confervoides, [v]
albidus ?
fubfuscus, [w]
pedunculatus,
asparagoides, [x]
tenuissimus, [y]
articulatus, [z]
opuntia, [aa]
pinastroides, §
variabilis.
amphibius,
plicatus.

CHORDA.

C. filum,
flagelliformis ? [bb]
thrix.

CODIUM.

C. tomentosum.

Species fructificatione anomalâ.

F. ligulatus,
rubens ? [cc]
lycopodioides, [dd]
lichenoides, [ee]
membranifolius, [ff]
pusillus. [gg]

NOTÆ.

[a] fide Herb. Linn.—vid. Act. Soc. Linn. sive L. Tr. v. 3. p. 149.
[b] nov. sp. tab. XI.
[c] nov. sp. tab. XII.
[d] F. cricoides, L. Tr. v. 3. p. 130. vid. Fr. auctam. tab. XII.
[e] F. tuberculatus Hudsoni et L. Tr. v. 3. p. 198.
[f] Sex quæ sequuntur species habitu F. tamariscifolio affines, *Fuco* potius quam *Ceramio* forsan referendæ sunt.
[g] nov. sp. L. Tr. v. 3. p. 131.
[g] F. polyschides Hudsoni.
[h] Fructificatio forsan in veficulis. vid. tab. IX.
[i] Species hæc in teretem, et tetragonum dividitur, L. Tr. v. 3. p. 149.
[k] nov. sp. L. Tr. v. 3. p. 174. af. finis planta, fructu tamen in medio mamillarum, nec utrinque prominens, ut in ceteris.
[l] F. rubens Hudsoni, &c. pericarpia in fronde aliquando obfervavit D. Woodward, unde *Chondro* forsan melius associandus foret, utpote et F. sanguineus, &c.
[m] nov. sp. L. Tr. v. 3. p. 120. una cum figura.
[n] nov. sp. L. Tr. v. 3. p. 162. unà cum Fig.
† nov. sp. tab. XI.
[o] nov. sp. L. Tr. v. 3. p. 183. icone adjunctâ.
[p] nov. sp. L. Tr. v. 3. p. 185.
[q] Fructificationem duplicem obfervavit D. Woodward, in hac plantâ innatam et exsertam idem obfervavi in F. articulato.
[r] Haud scio an species hæc sit eadem ac species a D. Velley delineata.
‡ Fructus F. acul. sing. admodum: haud scio an semina intus contineantur, vel extus, ut in fragariâ.
[s] nov. sp. L. Tr. v. 3. p. 202.
[t] nov. sp. L. T. v. 3. p. 206. icone adjunctâ.
[v] Fucus verrucosus Hudsoni, nomine ex Herb. Linn. sumpto.
[w] nov. sp. vide icon. L. Tr. v. 1. p. 131. una cum descriptione fructificationis racemosi.
[x] nov. sp. L. Tr. v. 2. p. 29. tabulâ adjunctâ.
[y] nov. sp. L. Tr. v. 3. p. 215. tab. adj.
[z] Duplicem in hac specie fructificationem, exsertam sc. et innatam, nuper detexi.
[aa] nov. sp. L. Tr. v. 3. p. 219,
§ F. incurvus D. Hudf.
[bb] F. flagelliformis, D. Lightfoot, F. confervoidi refertur, L. Tr.
[cc] Granula D. Lightfoot forsan nihil aliud sunt quam foliola convoluta.
[dd] Fructificatio forsan eadem ac F. pinastroidi.
[ee] Species singularis, Licheni quam Fuco affinior. L. Tr. v. 3. p. 191.
[ff] nov. spec. tab. VI.
[gg] ib.

FUCUS SACCHARINUS. TAB. IX.

FUCUS. fronde cartilagineâ, ſimplici, rugosâ, enſiformi. *Linn. Sp. Pl.* 1650.—*Bauh. Pr.* 154.—*Pin.* 364.—*Raii, Syn.* 39.—*Lightfoot*, 940.—*With. Bot. Arr.* 4. 96.

Var. β.—*Linn. Tr.* 3. 151.

RADIX divaricata, lignea, agglutinata.

CAULIS teres, brevis, ſolidus.

FRONS ſimplex, enſiformis, prælonga, in medio [a] bullata.

FRUCTIFICATIO mucoſa, reticulata: interna, vel in ſinubus rugarum.

SEMINA minutiſſima.

OBSERVATIONES.

Fucus hic, *Balteiformis* Raij, *Phaſganoides* Bauhini, è caule rotundo, breviuſculo in longitudinem cubitalem, aut ſuprà, producitur. Frons [b] ſimplex, craſſa, in medio eximiè rugoſa, marginibus undulatis, apice rotundato. Radix fibroſa, et [c] glutine tenaci inſtructa tantam plantæ molem commodiſſimè ſuſtentat. Superficies glaberrima, nitens, et quaſi vernice quodam obducta; color olivaceus, maceratione plantæ in aquam efunditur. Edulis hæc planta eſt; cocta tamen, et lacte infuſa: exſiccata, autem et ad parietem ſuſpenſa, ad dignoſcendas cœli mutationes pauperum ſit *Hygrometer*. E plantâ ſiccâ ſal, ſacchari guſtu exſudat, autore Sibbaldo, unde nomen a Linneo ſumptum. Frons quandoque ad baſim triquetra eſt.

Fructificatio juxta D. Gmelin in ſinubus rugarum ſita eſt: attentiſſimè rem perpendenti, nec non microſcopii compoſiti ope multoties repetitâ, mucum internum reticulatum per totam frondem maturo tempore fructiferum eſſe, ſeminulaque in ſinus per foramina lente maximè augenti conſpicienda [d] unà cum muco evadere conſtat. [e] Veſiculæ irregulares, innatæ in fronde, ſicut in F. digitato, reperiuntur; et in iis, tempore opportuno, granula quædam interiori cutis ſuperficiei adhærentia obſervavi: hinc libet conjicere plantas haſce congeneres eſſe.

(var. β.)

FUCUS. fronde ſimplici, planâ, enſiformi. *Herb. Buddle. p.* 21.—*Petiver. v.* 1. *p.* 15.—*Linn. Tr. v.* 3. *p.* 151. *var.* α.

Affinis valde præcedentis, ſi non ſit potius F. digitati varietas; qui perſæpe ſtipiti brevi innititur; fronde quam maximè dilatatâ et indiviſâ.

[a] Frondis ſuperficies aliquando, ſed perrarò occurrit ſine bullis.—Var. α. D. D. Goodenough et Woodward. Gmelin, t. 28.

[b] Etſi duo, tres vel plures quandoque plantæ radicibus inter ſe implicatis reperiantur, ſingulæ tamen ex ſingulis radicibus oriuntur.

[c] Corrigendus hîc error in priore Fasc. ubi radices F. digitati ramificatione ſolâ plantam ſuſtinere aſſerui.

[d] Seminula in ſuperficie F. digitati detexi. Vid. Præf. Lat. p. xxi.

[e] Veſiculæ hæ a bullis, ut vocantur, diſtinctæ ſunt; et forſan, rugæ in medio frondis, ex unâ parte convexæ, ex alterâ concavæ minus rectè vocantur bullæ, quæ aërem incluſum denotant.

SUGAR FUCUS. PL. IX.

OR

SEA BELT.

FUCUS. frond ſimple and undivided, welted, ſword-ſhaped.

PLATES.

[a] *Gmel.—t.* 27.—*Act. Gall.* 1712. *t.* 3. *f.* 4.—*Gunn.* ii. 7. 2.—*Oed. Dan. t.* 416.

ROOT ſpreading, fibrous, woody.

STEM ſhort, cylindrical, ſolid.

FROND ſword-ſhaped, very long and broad; thick, ſtiff, and welted in the middle; margin thinner, undulated.

FRUCTIFICATION internal, or in the folds of the wrinkles; conſiſting of a reticulated, tubular, tranſparent mucus.

SEEDS very minute; only at times diſcoverable by the microſcope.

OBSERVATIONS.

THIS is one of the largeſt growing *Fuci*, often extending more than a yard in length, and four or five inches in width. It conſiſts of a [b] ſimple undivided frond, ſhaped and welted as above deſcribed.

This frond is of the moſt poliſhed ſurface, and ſhines as if it had been varniſhed over; its ſubſtance is cartilaginous, and remarkably full of deep longitudinal ſinuſes near the margin, and irregular cavities and protuberances tranſverſely: the [c] *bullæ*, as they have been called, being hollow or indented on one ſide, and in relief, or prominent on the oppoſite one.

Nature has furniſhed this plant with a ſtrong, woody, fibrous root, by which it inſinuates itſelf among rocks or ooze, or lays hold of large pebbles and the ſtems of other *Fuci*, and theſe roots are ſupplied with the ſame *Gluten* that abounds in the diſcoid baſes of the reſt of the genus. Its name of *Saccharinus*, or Sugar Fucus, was adopted by LINNEUS from SIBBALD's obſervation of its exſuding a white ſugary efflorеſcence when dry: RAY's term *Belt-ſhaped*, and BAUHINE's *Sword* or *Scymitar-ſhaped* are certainly more appropriate.

This ſpecies is eaten in the Northern part of the Iſland; not raw, but boiled with milk; and, when dry, and ſuſpended in an airy place it forms an admirable Hygrometer, and preſerves its qualities for years.

With

[a] Gmelin's Plate is not very expreſſive of its figure: it repreſents three ſtems growing from one root.

[b] Small cluſters of theſe plants are ſometimes, though rarely, met with, but each has its ſeparate root.

[c] The term *bullæ* has been applied by reſpectable authority to the tranſverſe welts in the middle of the frond, but as the Latin term implies a hollow Ball, it does not hold good, as will be ſeen by a tranſverſe ſection of the frond.

With reſpect to its mode of Fructification, I have paid great attention to it under the different powers of my microſcope in all ſtages of its growth, and at different ſeaſons of the year. [a] Gmelin ſays the *ſinuſes* on the frond are filled with a prolific *mucus* containing naked ſeeds. Having nicely pared off the external coat, I found the internal ſubſtance the ſame as in the kindred plants of *F. digitatus* and *polyſchides*—*a reticulated pellucid mucus with a membrane of partition in the middle.* This membrane conſiſts of tubular veſſels, as I have deſcribed in [b] *F. digitatus.* At ſome ſeaſons of the year irregular [c] bladders ſimilar to thoſe on *F. digitatus* are obſervable, which may be conſidered I think as an expanſion of the mucus preparatory to fructification. On diſſecting theſe bladders I could perceive the reticulation in the *mucus*, which is now more fluid; and, at ſome favourable moments I have ſeen cluſters of very minute ſeeds, as I ſuſpect them to be, adhering to the inner coat of the bladder. The ſurface under the ſtrongeſt magnifiers, when the fructification is maturated, diſcovers minute apertures like [d] pin-holes; from whence we may imagine that the mucus or ſeeds, which GMELIN obſerved in the *ſinuſes*, were diſcharged from within. On maceration this Fucus gives out a brown tint.

(VAR. β.)

FUCUS. frond ſmooth, without welts.

PLATES.

Gmel. 28.—*Act. Nat. Cur. v.* 8. *t.* 9. *f.* 2.

THIS variety is inſerted on the authority of BUDDLE and PETIVER's *Herbaria.* I have never yet met with it. I ſhould imagine that the dried ſpecimens in the *Herbaria* of BUDDLE and PETIVER were more enſiform than the figure of GMELIN, in order to entitle it to a place here. I am rather inclined to arrange GMELIN's t. 28, as a variety of *F. digitatus.*

N. B. This ſpecies from fructification belongs to Genus *Ceramium* of the Synoptic Table.

[a] Lightfoot has quoted Gmelin's words without acknowledging it; I queſtion if he confirmed the truth of it by his own experience.

[b] See the Introduction, p. xiii.

[c] See PL. III. *a, a.*

[d] Theſe may be the abſorbent pores.

FUCUS PHYLLITIS. TAB. IX.

FUCUS. fronde membranaceâ, planâ, ſimplici, enſiformi; marginibus undulatis; ſtipite breviſſimo. *Raii. Syn. p.* 40.—*With. Bot. Arr. v.* 4. *p.* 100.—*Lightfoot. F. ſacch. var.* β.—*Hudſ. var.* δ.

RADIX divaricata, tenax, agglutinata.

CAULIS, breviſſimus, teres, corneus.

FRONS, enſiformis, ſimplex, membranacea, in medio plana, marginibus undulatis.

FRUCTIFICATIO incognita. OBSER-

OBSERVATIONES.

Species hæc, ut varietas *F. ſaccharini*, vulgò recenſetur, etſi ſubſtantiâ et habitu longè diſſimilis ſit. Multos abhinc annos D. Lhwyd in Synopſi Raij hujuſce plantæ ſub nomine *Fuci phyllitidis folio*, mentionem fecit, ac Inſulæ Monæ attribuit. [a] Recentiores Botanici parum cautè, ut mihi videtur, cum *F. ſaccharino* conjunxere. D. Lightfoot (Fl. Scot. p. 941.) ait "frequenter a ſe obſervari ſaxis affixas, et mari innatantes juniores *F. ſaccharini* plantas, mirari tamen ſe illarum tenuiſſimam, et quaſi membranaceam texturam; manû enim impoſitum foliolum calore illicò criſpari, et intorqueri." Hinc inductus ut varietas *F. ſaccharini* potius quam junior planta in Flora Scotica collocavit; hujus ſecutus exemplum, D. Hudson. [b] duabus prioribus tertiam hanc adjunxit. Re verâ, unus et idem eſt Fucus hic, etſi in tam diverſis littoribus reperiatur, nec ulla ferè ſpecies eſt vulgatior. Notavimus rugas, bullaſve in medio frondis *F. ſaccharini* ſinuoſas admodùm, et profundas; notavimus quoque craſſitiem folii etiam in plantis junioribus: his adjungenda eſt nota ad diſtinguendas ſpecies etiam per ſe idonea; *F.* enim *phyllitis* faſciculatim provenit, radicibus inter ſe implicitis; *F. ſaccharinus* è contra ferè ſemper ſolitarius oritur. Altitudo plantæ rarò pedalis, latitudo uncialis.

Fructificatio incerta admodùm. Semel, vel bis inter ramenta a procellis in littore ejecta portionem frondis veſiculis ut in *F. ſaccharino* obductam repperi. Mucus intùs tenuis; haud ſcio an ſit reticulatus necne.

Edulem eſſe teſtatur D. Lhwyd, nec mirum ſi *ulvam umbilicam*, cui ſubſtantia et tenuitate affinis eſt, etiam ſapore æmuletur.

Hab. in Inſ. Mona, Scotia, et in Auſtrali Ang. littore.

[a] Vid. Raij Syn. p. 40.

[b] Vid. quæ obſervavi reſpectu var. *bullati* et *ſimplicis*, in articulo *F. ſacchar.*

Hart's-tongue FUCUS. PL. IX.

FUCUS. ſimple, membranaceous, ſword-ſhaped, without a midrib; edges waved and plaited, ſtalk cylindrical, ſhort.

PLATE.

[a] *Gmel. t.* 28. 2.

ROOT, fibrous, woody, ſpreading.

STEM, ſhort, round.

FROND, long and narrow, tapering upwards; thin and ſmooth in the middle; plaited, and flounced at the edges.

FRUCTIFICATION [b] uncertain.

OBSER-

[a] This, though a very faulty repreſentation, is referred by Gmelin to Ray's Synopſis, p. 40. n. *.

[b] Irregular inflated bladders appear at times on the frond, as expreſſed in the Plate, and theſe contain a thin mucus, but I have not been able to diſcover either the network of tubes, or the ſeeds.

OBSERVATIONS.

This, as a rare Welch Plant, has been enumerated in every Britiſh Flora ſince the days of Ray. Its long, narrow, ſword-ſhaped leaf, ſhort ſtalk, and branching root, has cauſed it to be taken for a variety of the *Sea Belt* deſcribed in the former article. The ſlighteſt attention to the habit of that plant would have evinced the neceſſity of making this a new ſpecies. I have found the former very ſmall, and to appearance budding out; but even in that young ſtate, its firm fleſhy texture, and ſtrong ſinuous wrinkles are very conſpicuous.

I entertain little doubt that thoſe ſmall pellucid plants noticed by Lightfoot on the Scottiſh Coaſt, ſo thin as to curl inſtantly on being laid in the palm of the hand, were individuals of this ſpecies, and not varieties of the *Sea Belt*. Hudſon likewiſe in his ſecond edition ſeems to have noticed this plant, and to have placed it among his varieties. I firſt diſcovered it at Tenby in South Wales, and afterwards plentifully at Portland Head. In colour and thinneſs it much reſembles the true *Laver*, and I have no doubt might be ſubſtituted for it; for we find from Mr. Lhwyd that it is eaten in Wales. This *Fucus*, where it is met with, is found in great abundance in pools of ſhallow water, and has a ſtriking peculiarity, which likewiſe ſerves to diſtinguiſh it from the great Sea Belt, viz. its growing in [a] cluſters with the roots entangled together; whereas the Sea Belt is uſually a ſolitary plant. The general height is from ſix inches to a foot, and about an inch wide. I have never ſeen it of the ſize mentioned by Ray, Syn. 40, but believe it grows ſometimes larger in deep water, as I have found fragments with the bladders mentioned in the deſcription thrown up after ſtorms. The reference to Bauhine's Prodromus, p. 154. n. 4. by Lightfoot muſt be rejected, as, from the ſhort deſcription given of that plant, it does not ſeem a native of the Britiſh Seas.

[a] It is hardly ever found in cluſters of leſs than five or ſix, and often many more together.

FUCUS NODOSUS. TAB. X.

FUCUS. caule compreſſo, dichotomo; medio ramorum in veſiculam dilalato. *Herb. Linn. Buddle, p.* 13.—*Petiver, p.* 35.—*Sp. P.* 1628.—*Fl. Lapp.* 464.—*Bauh. Pin.* 365.—*Raii, Syn.* 48.—*Roy. Lugd.* 514.—*Hudſ.* 468.—*Lightfoot*, 918.—*With. Bot. Arr. v.* 4. *p.* 84.

RADIX diſcoides, ſaxis agglutinata.

CAULIS, longiſſimus, ramoſus, compreſſus; veſiculis caule grandioribus.

FOLIA ſpathulata è margine caulis.

VESICULÆ, caulinæ ovatæ, ampliatæ.

FRUCTIFICATIO, ovata, tuberculata, in apicibus foliorum, è muco retiformi, granulisque orbicularibus, ſeminiferis conſtans.

OBSERVATIONES.

Ubique occurrit ſpecies hæc permixta Fucis vulgatioribus—*veſiculoſo*, *ſerrato*, et *canaliculato*. Veſiculis ovatis

ovatis in caulis medio intumeſcentibus, necnon habitu creſcendi in longum extenſo, ab aliis diſtinguitur. In ſcopulis alternatim ſiccis, ſubmerſiſve, æquè ac in profundioribus locis reperitur. Altitudo plantæ variat reſpectu ſitûs; aliquando uſque ad ulnas duas accedit. Subſtantiæ coriaceæ admodùm et tenacis eſt, et in portubus terrâ interclusis, ſignis haud dubiis etiam *annoſa* reperitur.

In iſtiuſmodi plantis veſiculas aëriferas juxta baſin plantæ uncias quatuor longas, et cuti eraſſiſſimâ obductas cernere eſt. [a] Fructus, a veſiculis ſupradictis longè diverſus, in apicibus foliorum producitur, oleam conditam formâ et colore ementitus, tuberculis extùs, ut in *F. veſiculoſo*. Portio ejus tranſversìm vel longitudinalitèr de medio [b] ſecta gelatinam tubuloſo-reticulatam, granaque, ſeu pericarpia orbicularia, ſeminibus pyriformibus, immerſis exhibet. Maculæ retium in hac ſpecie ſub-hexangulæ ſunt. Rami bini, ternive prælongi: folia uncialia, vel biuncialia, ſpathulata, nullo certo ordine, quandoque alternatìm, in aliis ſpeciminibus faſciculatìm producuntur, et planta tota ramoſiſſima eſt. Notandum eſt apices ramulorum ferè ſemper furcatos, et divaricatos eſſe, apicibus furcarum longiſſimis.

Veſiculæ in caule, fila quædam diaphana in medio oſtendebant, quandoque aëris incluſi bullis monilis ad inſtar baccata. Pars interior veſicularum muco chryſtallino obducta eſt. Deſunt fila iſta, utpote et mucus, in provectioribus veſiculis unde cuivis facilè patebit illorum usus; ætate enim incraſſatis veſiculæ lateribus, non opus eſt intùs aëre elaſtico, quo diſtendantur. Re verâ, tanta ineſt veſiculis ſublevandi vis, ut planta bicubitalis in tranquillo mari è fundo, arboris ad inſtar erigatur, ut ex ſcaphâ obſervavi. Species hæc perrarò fructifera eſt.

Accurata admodùm obſervatio in Act. Linn. v. 3. p. 191. Confervam polymorpham parasitam hujuſce ſpeciei pæne excluſivam eſſe.

Hab. paſſim.

[a] Vid. Tab. x. *a*, *a*, *a*.

[b] Vid. Tab. ix. *c c*.

KNOBBED FUCUS, PL. x.

OR

Sea Whiſtles.

FUCUS. frond compreſſed, dichotomous, imbedded with air-bladders, larger than the ſtem.

PLATES.

Fl. Dan. 146—*Gmel. F.* 1. *B.* 1.—*Hiſt. Ox.* xv. 8. *row*, 3, 2.—*Baſter.* 11. 5.—*Dod.* 481. 1.—*Ger. emac.* (*well expreſſed conſidering its being ſo much reduced*). 1568. 6.—*Park.* 1293.—*Reaumur. Act. Gall.* 1712. *t.* 2. *f.* 3.

ROOT diſcoid, adhering to the rock.

STEM, very long, branched, much compreſſed; with large oval air-bladders ſwelling out at intervals; and decreaſing in ſize upward.

LEAVES

LEAVES battledore-ſhaped, ſub-alternate, growing from the edges.

FRUCTIFICATION, an oblong, tuberculated fruit, ſwelling out in the ſummits of the leaves; with an internal reticulated *mucus*, and round, ſeed-bearing granules.

OBSERVATIONS.

THIS ſpecies is common every where, intermixed with the *ſerrated*, *bladder*, and other larger *Fuci*. Its ſingularly trailing habit, and the large oblong air-bladders imbedded in the ſubſtance of, and twice as large as the ſtalk, ſerve at once to diſcriminate it. It generally conſiſts of [b] one or two very long compreſſed branches riſing from the bottom, garniſhed with leaves coming out of the edges, which are often ſingle, and frequently two or more out of the ſame ſocket. Theſe leaves are from one to four inches long; narrow and compreſſed for the greateſt part of their length, and expanding near the ſummits in a circular form. The height of the plant varies according to its ſituation: in expoſed rocks not exceeding two feet, in deep tranquil water being more than two ells long. The uſe of the air-bladders in the latter ſituation is conſpicuous; I have paſſed in a boat over beds of this weed in FALMOUTH Harbour, with their ſummits near the ſurface even in deep water and their ſtems as erect as trees.

The fructification of this ſpecies in colour and ſtructure is analogous to that deſcribed in [c] the generic character *Fucus*. It is produced in the ſummits of the leaves, which occaſionally, though rarely, fructify. This plant, as well as *F. ſiliquoſus*, is properly *aphyllous*, or leaf-leſs. The reticulated jelly differs from that of *F. veſiculoſus* in the form of the meſhes, which are inclined to hexagonal. The ſeeds, as in the others, are pear-ſhaped. I cut open ſome of the air-bladders of different ages; in the growing ones I found [d] threads of a ſhining tranſparent ſubſtance, with air-bubbles occaſionally in them like beads. In the more adult bladders there were none of theſe threads, but the ſides had acquired a great degree of [e] thickneſs and elaſticity ſo as to be perfect buoys. On the inſide there was generally a beautifully emboſſed net-work.

LIGHTFOOT ſays, Boys amuſe themſelves by making [f] whiſtles of them, from whence its name is derived. I have never ſeen that uſe made of them, but they are conſtantly made into ſquirts to ſpout water, for which purpoſe, the larger ones are admirably adapted by their elaſtic texture.

[a] This Plant fructifies very rarely indeed.

[b] This is not always the caſe: I have ſeen it regularly alternate branched, the branches ſhortening as they approach the top as in the fern.

[c] See the Preliminary Diſſertation, PL. IX. A A. *c. c.* [d] See PL. IX. D.

[e] There is no doubt that this ſpecies, which has the firmeſt texture of any in the *genus*, acquires a conſiderable degree of longevity.

[f] I am informed from reſpectable Authority, that the Boys on the river Severn conſtantly make whiſtles of them.

FUCUS LOREUS. TAB. X.

FUCUS. fronde filiformi, compreſſa, dichotoma, undique, utrinque tuberculata. *Linn. S. N.* 813.—*Raii, Syn.* 43. *n.* 15. (*planta recens è ſemine*). *Hudſ.* 583.—*Lightfoot*, 920.—*Schloſſer in Gent. Mag.* 1756. *p.* 54.—*With. Bot. Arr.* 4. 89.—*Linn. Tr. v.* 3. *p.* 176.

RADIX

RADIX diſcoides, [a] cotyledonem fungiformem ſuſtentans.

FRONS è *cotyledone*, dichotoma, craſſiſſima, tuberculata, viſcoſa.

FRUCTIFICATIO, gelatina, pellucida, flexuoſo-retiformis, granulis orbicularibus, ſeminiferis, per totam frondem.

SEMINA, grandiuſcula, pyriformia.

OBSERVATIONES.

Frons Fuci hujus, quæ in plantis vigentibus ferè ſemunciam lata eſt, perperam a LINNEO *filiformis* vocatur; in plantis enim recentibus Phaſeoli ſiliquam latitudine, imò et craſſitie æmulatur. Subſtantia viſcoſa admodùm, [b] tuberculis utrinque ordine obliquo per totam ſuperficiem erumpentibus. Tubercula iſta apicibus ab initio obſerratis, maturo dehinc tempore foraminoſis, etiam oculo inermi cernuntur. Mucus hinc ſeminibus miſtis in mare exſudat.

Origo ſingularis admodùm; ineunte æſtate rupes, ubi ſpecies hæc habitat, plantulis acetabuliformibus operiuntur. [c] Hæ pro Fungis, vel potius Pezizis marinis, a RAIO accipiuntur; harum è medio prodeunt folia bina, craſſa, ſub-compreſſa, quæ, intervallis ſatis longis, dichotomiam perfectè incremento ſervant, et ad [d] longitudinem trium, vel etiam ſex ulnarum aliquando producuntur.

Fructificatio è baſi per totam plantam extenditur. Tubercula numeroſa utrinque ordine obliquo extùs conſpiciuntur, et, ſi ad lucem ſpectes, pericarpia orbicularia, ſeminifera, generi propria, intus ſeſe oſtendunt. Portio quælibet tenuis de medio tranſverſìm ſecta gelatinam prorsùs diaphanam exhibet è tubulis, haud quidem reticulatis, ut in *F. veſiculoſo*, ſed undulatis vel flexuoſis compoſitam. Granula orbicularia, ſuprà notata, coloris pallidè fuſci, interiori cutis parti adhæreſcunt. In ſingulis granulis, ſemina pyriformia bina, terna, et quandoque ſena reperiuntur. Ineunte hyeme [e] tubercula, ſeu verrucæ pro ratione frondis ſatis amplæ, oblongæ, opacæ, innatæ haud rarò per intervalla inveniuntur; neque alienum fuerit conjicere haſce è ſeminibus pullulantibus enaſci, et fronde marceſſente in Pezizas iſtas ſupradictas ſeſe evolvere.

Frons intermedia inter cylindricam et compreſſam, cujus ſectio tranſverſa figuram ovatam, latitudine dimidio minorem longitudine, exhibet.

(VAR. β.)

OCCURRIT var. a D. WOODWARD juxta YARMOUTH obſervata, fronde latiſſimâ, irregulari, planâ, internodiis paucioribus, angulis quoque dichotomiæ obtuſioribus. Linn. Tr. v. 3. p. 179. NAR-

[a] Partem hanc radici, ſeu baſi ſuperimpoſitam *cotyledonem* nominavi, etſi reverà unica ſit, et ſui generis. Vid. Tab. x. *e*.

[b] Vid. Tab. x. *fff*. [c] Vid. Tab. x. *e*.

[d] Intervalla, ſeu ſpatia inter dichotomias plerumque pedalia, aliquando cubitalia ſunt, internodia tamen hæc in plantis in orientali Angliæ littore breviora eſſe, totamque plantæ molem ex litteris D. Woodward certior ſum factus.

[e] Semina aliquando in fronde creſcunt, et in tuberculum ovatum ampliantur. Vid. Tab. x. Fig. *g g g*.

NARROW-LEAVED FUCUS, PL. X.

OR

Sea Thongs.

FUCUS. ſtrap-ſhaped, compreſſed, dichotomous, tubercled throughout on each ſide.

PLATES.

Fl. Dan. 710.—*Gent. Mag.* 1756. 64. *f.* 1. 4.—*Ger. em.* 1565. 5. (*very inaccurate*). *Reaumur. Act. Gall.* 1712. *p.* 24. *f.* 2. *et* 1772. *p.* 2. *pl.* 3. *f.* 14. *y.*

ROOT, diſcoid, ſupporting a cup-ſhaped [a] baſe.

FROND, dichotomous with long ſegments, ovate-compreſſed, full of tubercles, ſemi-tranſparent, viſcous.

FRUCTIFICATION, extending through the plant—a tranſparent jelly with a flexuous network of tubes, and orbicular ſeed-bearing granules.

SEEDS—largiſh, from three, to ſix in each globule. N. B. *Theſe are frequently impregnated in the frond and ſwell into large knobs.* [b]

OBSERVATIONS.

It ſeems ſtrange that LINNEUS has applied the term (*filiformis*) thread-ſhaped to the frond of this ſpecies, which, in luxuriant ſpecimens, is nearly half an inch wide. It may, however, be in ſome meaſure accounted for from the very unuſual contraction of this viſcous, ſpongy plant in drying, and it is well known how many plants were deſcribed by him from *Herbaria*. The growth of this plant is ſo remarkable that in its infant ſtate it was miſtaken by a very accurate [c] Botaniſt for a kind of ſub-marine Fungus. The [d] rocks early in the ſummer ſeem covered with theſe little ſaucer-ſhaped plants. As the ſummer advances, they puſh forth from their centres two; ſometimes, though rarely, three leaves, which, at intervals from nine inches to a [e] foot, or more, are regularly forked and divided, and are continued in that perfect dichotomous mode at times to the length of ſeven yards: the intervals between the forks increaſing in length upwards. The frond is thick, and ſucculent; ſomewhat between cylindrical and compreſſed; a tranſverſe ſlice exhibiting an elliptic figure twice as long as it is wide. It is [f] tubercled on each ſurface throughout its whole length in an oblique direction, and, when held up to the light, diſcovers through the ſkin the orbicular maſſes of ſeeds on the inſide. When the ſeeds are ripe, theſe tubercles have perforations viſible to the naked eye, and at thoſe times a thick *mucus* filled with ſeeds is diſcharged. If the plant is ſuffered to dry in the ſun or wind, the jelly hardens into pellucid ſilky filaments, which have been taken

 for

[a] See PL. X. *c*. [b] PL. X. *g g g*. [c] Ray. Syn. p. 43. n. 15.

[d] See the curious account of this occurrence in Borlaſe's Nat. Hiſt. Cornwall, p. 237, and the figure of the Peziza at the baſe of the plant, PL. X. *c*.

[e] In vigorous ſpecimens I have ſeen them four feet long: theſe *internodia* Mr. Woodward informs me are much ſhorter on the Norfolk Coaſt. See Linn. Tr. v. 3. p. 177.

[f] This plant, when mature, is one of the moſt proper to be diſſected in order to ſtudy the mode of fructification peculiar to Genus *Fucus*, as it is conſiderably larger than in any of the other ſpecies. See PL. X. *ff*.

for [h] pencils of hairs. In order to inveſtigate the fructification, I cut a thin tranſverſe ſlice out of the frond, and placing it on the field of my compound microſcope, I diſcovered the jelly pellucid as glaſs, with the tubes not reticulated, but as it were undulated; the orbicular maſſes were ſticking to the interior coat juſt beneath the external tubercles. The ſeeds were of a conical ſhape, larger than any I had obſerved, and fewer in each globule. [i] I noted RAY's obſervation on it in its ſeedling ſtate, as a perfect plant; the ſame miſtake occurs in BAUHINE's Hiſtory, p. 364, with reference to IMPERATI under the name of muſhroom-ſhaped [k] Fucus. Dr. BORLASE, in his Natural Hiſtory of Cornwall, p. 237, mentions having actually meaſured ſome plants twenty-two feet long. This I have never aſcertained, though the tangled maſſes thrown on the ſhore, which from the tender texture of the plant it is impoſſible to unravel, may juſtify the notion of its being ſo long.

(VAR. β.)

THE frond quite plain and flat, very irregularly varying from half an inch to an inch and half in width: the diviſions fewer and the angles of the dichotomy very obtuſe. Found at YARMOUTH. Linn. Tr. v. 3. p. 179.

This ſingular variety has been noticed in the Memoirs of the Royal Academy at Paris, 1772. v. 2. Pl. 4. f. 18.

Hab. Geer Rock, PENSANCE, *and elſewhere plentiful.*

[h] See With. Bot. Arr. v. 4. p. 96. This happens to the fruit pods of the *bladder, ſerrated,* and other *Fuci;* and it is the induration of the ſame jelly exſuding through the orifices of the imbedded veſicles in the frond of the above, and ſome other ſpecies, which has been miſtaken for pencils of hairs—the *filets courts* of Reaumur, but without *antheræ.*

[i] From three to ſix in each granule.

[k] *Fucus fungularis.*

FUCUS FILUM. TAB. X.

FUCUS. fronde filiformi, ſimplici, longiſſimâ, inflatâ, ſub-pellucidâ.
Linn. Sp. Pl. 1631.—*Raij, Syn.* 40. 3.—*Hudſ.* 587.—*Lightfoot.* 963.—*With. Bot. Arr. v.* 4. *p.* 108.—*Linn. Tr. v.* 3. *p.* 193,

RADIX diſcoides, tenuis.

FROND, ſimplex, longiſſima, inflata, futurâ ſpirali, diſſepimentis? ad intervalla.

FRUCTIFICATIO, gelatina, pellucida, tubulis flexuoſis, bulliſque aëris intùs.

SEMINA, fine granulis; minutiſſima, glomerata, interiori cutis ſuperficiei affixa.

OBSERVATIONES.

"FUCUS teres, prælongus Chordam referens," aptiſſimè a RAIO nuncupatur planta hæc; utpote quæ non ſolum longitudine, et formâ, ſed etiam pellucidate habituque creſcendi intorto *chordam muſicam* refert. Minus ap-

tè

tè " ſubfragilem " vocat LINNEUS, nulla enim ſpecies, recens, tenacior; etſi ad ſolem dealbata, vel in Herbario exſiccata fragilis evadat. Filum Germanicum BAUHINI (Prod. 155), et BOCCONIS (Muſ. 271.), diverſa videtur ſpecies " pluribus ex eâdem baſi provenientibus filis, nigricantibus, et inter ſe complicatis." Notandum eſt plantam hanc juxta baſin valdè exilem eſſe, itemque ad apicem etiam attenuatum. Longitudine *Fuco loreo* par eſt; in Portu FALMOUTH dicto uſque ad ſeptemdecim pedes, ut ipſe expertus ſum, accedit. A nemine, ut ſcio, obſervata eſt cuticula per totam longitudinem ſpiræ ad modum contorta; futurâ etiam ſpirali, quæ etſi minùs coſtâ aliquâ exteriori evidens ſit, plantâ tamen ad lucem ſuſpensâ, vitroque modicè augenti inveſtigatâ, cuivis facilè patebit. Apparent ad lucem etiam nudo oculo diſſepimenta, globulique aëris paſsim et ſine ordine. [a] Diſſepimenta hæc, etſi fibris capillaribus intertexta, nihil attinent ad fructificationem: vapor elaſticus intus incluſus, forsàn mediantibus hiſce, intra certos fines cohibetur. Internâ hâc partium ſtructurâ planta hæc omnium forſan maximè elaſtica, antequam a rupibus vi fluctuum avellatur, nuſquam non ſine nodo, et rectè ſeſe extendit. Fructificatione genericâ *Fuci* in Præfatione ſtabilitâ, ex charactere ſuprà notato neceſſe eſt plantam hanc *genus* novum conſtituere. [b] Gelatina interior, fibrarum capillarium texturâ, bullis quoque aëris immixtis primo aſpectu diverſa eſt; deſunt etiam granula intùs, ſeu pericarpia orbicularia, ſeminifera, necnon tubercula, vel papillæ in ſuperficie, foraminibus ad apices. Vitris tamen compoſitis, et maximè augentibus, [c] ſeminula minutiſſima rotundiuſcula, glomerata, interiori cutis ſuperficiei affixa detexi. Color olivaceus, ſuperficies lubriciſſima.

Hab. In Portu FALMOUTH, *et paſſim.*

[a] Accuratiſſimi Botanici fruſtrà ſepta hæc quæſivere, et pro certo tenuiſſima ſunt, et quaſi evanida; cuti adeo tenaci incluſa ut difficillimum ſit frondem ſine injuriâ diſſecare. Sæpius tamen fila quædam implicata, partem, ut fum ſuſpicatus membranæ cujuſdam retiformis, ad intervalla tranſversim protenſa obſervavi: et ratiò quidem poſtulat vaporem intus elaſticum internodiis quibuſdam contineri.

[b] In Tab. Syn. p. xxiv. *Chorda* nuncupatur.

[c] Vid. Tab. x. *b.* portionem plantæ maximè auctam. *c c* Tubulos flexuoſos unà cum aëris bullis. *d d d* Seminula glomerata.

THREAD FUCUS, PL. X.

OR

Sea Laces.

FUCUS. frond thread-ſhaped, very long, elaſtic, ſemi-tranſparent.

PLATES.

Fl. Dan. 821.—*Pet. gaz.* 91.5. ("SUSSEX SEA STRAW.").

ROOT diſcoid, thin, ſmall.

FROND cylindrical, ſingle, very long, twiſted, inflated; parted internally by diaphragms?

FRUCTIFICATION, a tranſparent mucus with tubes wreathed, and twiſted with numerous imbedded air-bubbles.

SEEDS, extremely minute, naked, cluſtered; adhering to the inner coat.

OBSER-

OBSERVATIONS.

THIS Plant, notwithſtanding its [a] internal partitions, has no affinity with genus *Conferva*. The uſe of theſe I conceive to be to confine the air, or elaſtic vapour within certain ſpaces, which ſeems quite neceſſary in a plant which is extended to ſuch an [b] amazing length, as likewiſe to increaſe its buoyancy, which is ſo conſiderable, that I have ſeen it in tranquil waters pointing upwards like a reed. Its elaſticity is ſuch in a growing ſtate, that it never entangles itſelf, as we find to be the caſe when thrown on the beach. From hence it may be inferred that LINNÆUS when he inſerted the terms "*ſub-fragilis et opaca*"—*brittle and opaque*, muſt have deſcribed from dry ſpecimens, and it is equally probable that PETIVER's plant [c] *The white Suſſex Straw* was no other than a ſpecimen bleached, as we often find it by the ſun, or wind. The whole plant conſiſts of a tough, pellucid, and very ſlippery ſkin covering a tranſparent colourleſs jelly, which is much thinner than that obſerved in the genus *Fucus*. This jelly is compoſed of very fine capillary veſſels, beautifully wreathed, and twiſted, with numerous oval air-bubbles. This is diſcoverable in a thin tranſverſe ſlice with high magnifiers, or by removing the ſkin lengthways. The [d] diaphragms, or partitions, diſcoverable by holding the plant to the light, are at unequal diſtances, from one inch and an half to two inches, or more: they conſiſt of a reticulated tranſparent membrane with pellucid threads, containing air-bubbles, ſtretched acroſs. Towards the extremity theſe partitions are wider apart, and the jelly ſeems more clearly fibrous; ſo that it appears, as if the impregnation began at top and the ripe ſeeds were diſcharged by the decay of the plant, as no external tubercles, or *papillæ*, were diſcoverable with minute holes for the diſcharge of the ſeed. The inſide coat is ſtriated lengthways, and the whole plant on being held to the light has a ſpiral growth, and not unfrequently a future may be ſeen even without an eye-glaſs, though there is no external protuberance to mark it. From what has been ſaid of the mode of fructification, it is evident that this plant muſt be ſeparated from genus *Fucus*. [e]

[a] See the note ſubjoined to the Lat. Obſ. and the doubts concerning the exiſtence of theſe *ſepta*.

[b] I have meaſured it ſeventeen feet long. [c] Ligula alba Suſſexiana. Pet. Gaz. 91. 5.

[d] I will not affirm that theſe are actual ſepta or diviſions, as Mr. Woodward, whoſe accuracy cannot be diſputed, found on diſſection only rings on the inſide. The ſuppoſed membrane I conceived to be of the thinneſt texture, and conſequently extremely difficult to detect; but I have repeatedly obſerved pellucid ſtrings extending acroſs from the inſide of the rings and interſecting each other, and I think it is fair to ſuppoſe there muſt be ſome diviſions to confine the elaſtic vapour which ſeems neceſſary to diſtend the plant.

[e] It is arranged as Genus *Chorda* in the Syn. Tab. p. xxiv. It is ſingular to obſerve how nature can effect the ſame purpoſes by different means. In this ſpecies and the preceding every end of buoys is anſwered by the general inflation and elaſticity of the whole frond.

FUCUS SILICULOSUS. TAB. XI.

FUCUS. fronde compreſsâ, ramoſiſſimâ, flexuoſâ; fructu oblongo, acuto. *With. Bot. Arr. v.* 4. *p.* 88.

(*Species nova?*)

RADIX, irregularis, diſcoides.

CAULIS, compreſſus, flexuoſus, ſubtùs nudus; hinc inde foliorum veſtigiis, acetabuliformibus.

FRUCTIFICATIO—Generi *Fuco* propria; in fructu ſiliquoidi incluſa.

SEMINA, pyriformia; plurima in ſingulis granis.

OBSER-

OBSERVATIONES.

Species hæc haud rarò occurrit in littore occidentali. Habitûs ſimilitudine, utpote junior *F. ſiliquoſi* planta, vel ſaltem varietas ejus minor, diu a me prætermiſſa eſt. Interiorem tandem ſiliquæ ementitæ partem cultello recludens, ſtudio ſemina in hâc ſpecie tam diu deſiderata inveſtigandi, fructificatio ex improviſo mihi ſeſe obtulit, gelatinâ tubuloſo-reticulatâ, granuliſque intùs ſeminiferis conſtans. Nulla intùs loculumenta, nulli extùs ſulci tranſverſi; [a] fibræque longitudinaliter in vacuo protenſæ omninò defuere. Habitus plantæ, ut ſupra notavi, *F. ſiliquoſo* totis partibus minor, neque adeo in longum protenſa. E baſi craſſiuſculâ, ſubtùs planâ, ſemipedalis, aut vix ſuprà aſſurgit, ramis pluribus, compreſſis, flexuoſis, et ad margines [b] nodoſis. Siliculæ, ſi ita dicam, ex omni parte producuntur, brevioribus petiolis inſidentes, acuminatæ, ſed minimè roſtratæ. [c] Gelatina intùs ſub-pellucida, microſcopio ſubjecta, tubulorum capillarium reticulationem pulcherrimè exhibet; maculis tamen retium perexiguis, et non niſi vitro maximè augenti conſpiciendis.

Hab. Pridmouth *et* Polkerris *juxta* Fowey, *et alibi in* Cornubia.

[a] Vid. Faſc. 1. p. 9. et Tab. v. f. *a*.

[b] Tubercula, ſeu potius nodi in margine caulis, ſunt acetabula foliorum, vi fluctuum avulſorum, ſeu ſponte ſuâ cadentium.

[c] Vid. Tab. xi. *f*, *f*. nat. mag. *ff*. auct.

Bastard-Podded FUCUS. PL. xi.

FUCUS. compreſſed, much branched, flexuous; fruit oblong, ſharp-pointed.

(*New Species.*)

ROOT, irregularly diſcoid, fleſhy.

STEM, compreſſed, flexuous, with hollowed protuberances at the edges, being the ſockets of former leaves.

FRUCTIFICATION, a reticulated pellucid jelly with ſeed-bearing granules, incloſed in an oblong capſule or fruit.

SEEDS, numerous, pear-ſhaped.

OBSERVATIONS.

This Species had been often noticed by me, and the ſpecimens as conſtantly taken for younger plants, or at fartheſt, as a dwarf variety of the Podded *Fucus* [a], the individuals of which I then obſerved, varied ſo exceedingly as to induce the belief of two ſeparate ſpecies. Diſſection, however, diſcovered the miſtake, as the ſuppoſed pod of the ſpecies under conſideration, on being cut open, diſcovered the appropriate fructification of *genus Fucus*, while

[a] Fasc. 1. p. 9.

all my attempts to diſcover ſeeds in the pods of the former have been hitherto [b] fruitleſs. The jelly in this ſpecies, though tranſparent, is not entirely colourleſs: it has a browniſh hue, and the [c] network of capillary tubes through a ſtrong magnifier appears much ſmaller than any of the *genus* which I have examined, as are likewiſe the globular maſſes, and the ſeeds contained within them. This plant is by no means ſo trailing as the *podded Fucus*. Its general height never exceeds nine inches, with numerous flexuous branches, ſo as to form a buſhy plant. Its colour is a yellowiſh brown: the [d] fruit cylindrico-compreſſed, ſharp-pointed, and not marked with tranſverſe furrows. It exhibits when ripe very minute external tubercles, if examined under a microſcope.

[b] I have lately been favoured with ſpecimens of F. filiquoſus *in fruit* from a very ingenious Correſpondent and moſt intelligent marine Botaniſt, Dawſon Turner, Eſq. of Yarmouth, Norfolk. They do not ſwell out from the pods, but are appropriate ſeed-veſſels, ſo that the pod-like leaves with their curious internal ſtructure ſerve no other purpoſe in all probability but that of *buoys*; unleſs, as ſeeds have been ſaid to have been actually diſcovered in the terminating bladders of ſome of them (Linn. Tr. v. 3. p. 126.), we may conjecture that theſe pods fructify in an early ſtage, and diſcharge their ſeeds, and afterwards expand with all the curious apparatus noticed in the former Faſc. p. 9. to give buoyancy to the frond.

[c] See Pl. xi. *f. ff.* magnified.

[d] Theſe leaf-like pods come out on all ſides of the plant: before impregnation they are compreſſed, as in many of the ſpecies.

FUCUS TAMARISCIFOLIUS. TAB. XI.

FUCUS. fronde ramoſiſſimâ, ſub-tereti; foliis ſubulatis; terminalibus, confertis; veſiculis ovatis folioſis in caulis medio. *Herb. Linn. Buddle. p.* 18. *n.* 2. 19. *n.* 2. 5.—*Petiv. p.* 40. *n.* 3.—*Hudſ.* 576.—*Gmel.* 128?—*With. Bot. Arr.* 4. 86.—*Linn. Tr. v.* 3. *p.* 130.

RADIX, irregularis, calloſa, agglutinata.

CAULIS, ramoſus, ſubteres, ſcaber, ad baſin nodoſus.

RAMULI, ſubteretes, longitudinaliter ſulcati; foliis ſubulatis, baſi incraſſatis, ſurſum tendentibus; inferioribus deciduis.

FRUCTIFICATIO, mucus tubuloſo-reticulatus, granulis ſeminiferis, internus: ſcutellis externis, acetabuliformibus; fibris ad oras radiatis.

SEMINA minutiſſima.

OBSERVATIONES.

Planta hæc a Linneo, Raij, ut videtur, auctoritate *F.* [a] *ericoidis* nomen obtinuit, et aptiſſimè ſub characteri *F.* "*hirti*" deſcribitur; tactu enim aſpera eſt, et pænè manum lædit. E baſi craſsâ ſpongioſâ caulis exit ſub-teres, pennæ olorinæ magnitudine, et fruticuli ad inſtar ramoſiſſimus; infernè ſubnudus, ſupernè foliolis acutis, conicis, quandoque bifidis, obſitus. Tubera, vel nodos oblongos, ſolidos juxta baſin haud rarò cernere eſt. [b] Veſiculæ *oblongæ*, diaphanæ, *folioſæ*, juxta ſummitates inveniuntur: notandum tamen eſt haſce in plantis junioribus omninò

[a] Fucus filiformis, ramoſiſſimus, *hirtus*. Linn. Sp. Pl. 1631.

[b] Veſiculæ hæ quandoque vacuæ; ſæpiùs tamen, muco quodam fructifero, ut ſuſpicor, repletæ ſunt. Deſcriptio Gmelini veſicularum in F. abro-

omnino deeſſe. Extremitates ramulorum tempore maturo obtuſæ et quaſi imbricatæ: in his ſita eſt [c] fructificatio gelatinâ reticulatâ, granuliſque, ſeminiferis conſtans. Acetabula, ad inſtar Lichenis ſcutellorum, ad baſin foliorum in apicibus cernuntur, [d] tubulos pellucidos radiatim diſpoſitos ſub aquâ protrudentia. Altitudo plantæ pedalis aut ſuprà, ſubſtantia caulis intùs mollis et ſpongioſa, unde frequentèr *Fucis*, *Confervis*, itemque *Zoophytis*, pænè tota obruitur. Species hæc omnium fere maximè variabilis eſt: notavimus ſuprà veſiculas aliquando deeſſe. Folia in junioribus juxta baſin omninò plana ſunt et lanceolata. Summitates etiam variant. Steriles foliis paucioribus, et ad baſin gracilioribus inſtructæ; fructiferæ autem turgidulæ, foliis numeroſiſſimis baſi tuberculiferis quaſi imbricatæ cernuntur. Apicis fructiferi lobus longitudinalitèr ſectus fructificationem [f] oſtendit. Ramulus *a*, paulùm auctus colorem plantæ vigentis ſub aquâ adumbrat. Color cœruleo viridis a D. Velley obſervatus in vigentibus plantis è muco quodam, ſeu vernice, ſi ita dicam, ſuperficiem oblinenti oritur, et, plantâ madidâ, etiam extra aquam conſpicuus eſt.

tanoidi ſingularis admodùm "bullæ aëriæ ipſi ramorum, ramulorumque medietati implantatæ, globosæ, oblongæ . . . . foliolis multifidis plerumque terminatæ." Gm. p. 89. F. tamariſc. apicem ſtatu maturo mirè deſignat, et quaſi ſub oculis ponit vir clariſſimus. Conferantur ſpecimina fructificantia cum ſpecimine D. Leofling in Herb. Linn. Obſervandum eſt veſiculas in *F. ericâ marinâ*, mininè in caule immerſas, ut in *F. tamariſc.* ſed "inter ramos ramuloſque provenire, ſingulaſque proprio pedunculo inſiſtere," unde neceſſe eſt concludere F. mediterranenſis Gmelini deſcriptionem, et iconem eſſe, ut ipſe etiam innuit. Gmel. p. 128.

[c] Tab. xi. *k k k.* [d] Tab. xi. *l, l.* acetabula cum tubul. radiat. [e] Vid. Pl. xi. *m, m.* [f] Vid. Pl. xi. *k k.*

Tamarisk-leaved FUCUS, Pl. xi.

OR

Sea Tamarisk.

FUCUS. frond roundiſh, much branched, thick-ſet with awl-ſhaped leaves, and leafy, innate air-bladders.

PLATE.

Gmel. 11. 2? (*faulty, eſpecially with reſpect to the fructifying ſummits.*).

ROOT, irregular-ſhaped, fleſhy, very tough.

STEM, roundiſh, large, knobby, with bulbous ſwellings at the baſe.

BRANCHES, numerous, thick-ſet with ſhort awl-ſhaped leaves pointing upwards.

FRUCTIFICATION in the ſummits: a reticulated mucus, and orbicular ſeed-bearing grains, with external *ſcutella*, and radiated pellucid tubes.

SEEDS, very minute.

OBSERVATIONS.

Hudson has introduced confuſion into this ſpecies by his ſynonyms, and the plant is likewiſe of ſo varying a nature, with reſpect to its different ſtates of growth, that it has added conſiderably to it. It is a common

mon plant on the S. Weſt Coaſt, though from the ſilence of LIGHTFOOT it ſeems to be unknown in the North. The Species deſcribed by J. and C. BAUHINE are different from each other, and both probably from this under conſideration, while LINNEUS's [a] *F. ericoides*, moſt probably deſcribed from BUDDLE's *Herbarium* and expreſsly referring to RAY, has been overlooked in the Engliſh Catalogues. The habit of this ſpecies is like that of a buſhy ſhrub with a thick knobby trunk, and there are bulbous ſolid ſwellings in the ſtem, and at the ſetting on of the branches, which, as they are generally garniſhed with young ſhoots, ſerve, probably, as one mode of propagation. The height of the plant is from ſix inches to a foot: it branches immediately above the baſe. The upper branches in the full grown plant are round, thick-ſet, and almoſt tiled with ſhort ſpinous leaves, large at the baſe, pointing upwards, and often bifid. In the younger plants the leafits are not ſo cloſely ſet, and many of the young branches are leaf-leſs, flat and lanceolate. No imbedded bladders, or ſwellings of the ſummits, are viſible in this early ſtate; but, when preparing to fructify, the ſummits aſſume a granulated appearance, which, on being magnified, is found to conſiſt of an [b] oval imbedded bladder and five or ſix pitcher-ſhaped terminating lobes, which on diſſection diſcover the proper fructification of the *genus*. In this flouriſhing ſtate this *Fucus* aſſumes thoſe beautiful changeable tints noticed by Major VELLEY: they are of a faint bluiſh green viſible not only under water, but when the plant is wet; and, when nicely viewed, ſeem like a ſlimy mucus, or varniſh. At times are ſeen imbedded [c] cavities like the ſaucers of a Lichen at the baſes of the leaves, and theſe under water emit radiated fibres: whether this is an animal of the Fluſtra kind, I have not been able to aſcertain; but this Fucus has a Marine Inſect of the genus *Scolopendra*, which [d] feeds on it, and makes a lodgement, or cell with various apertures, the whole length of the lower branches. This inſect is furniſhed with finny appendages, at the ends of its numerous feet, as is the caſe with many of the marine *Vermes*, and is I fancy a *non-deſcript*. Length, an inch; thickneſs, the ſize of fine packthread.

[a] The above having been written many months before the appearance of the Linnean Tranſactions, Vol. 3. it gave me great ſatisfaction to have my opinion confirmed, and I ſhould with equal pleaſure have adopted the trivial name, if my Plate, had not been already engraved and the copies worked off.

[b] See PL. XI. *a*, a branch ſomewhat magnified; *i*, *i*, the bladder; *k*, *k*, the ſummit magnified. See alſo what I obſerved in the remarkably expreſſive character of the *bullæ aëriæ*, as Gmelin calls them, which are imbedded in the branches of *F. abrotunoides*. From the vigorous ſtate in which I have ſeen this plant, when fruiting, and before it ſhrinks in drying, I ſhould be ſtrongly inclined to think Leoſling's Plant in the Linnean *Herbarium* belongs to this ſpecies. The bladders in fruiting Plants are not confined to the ſummits. See my Obſervations on GMELIN's *F. erica marina*, on the other ſide, which certainly is not this ſpecies.

[c] See PL. XI. *l*, *l*.

[d] The Entomologiſt will be pleaſed to ſee this affinity in a marine inſect with many of the land inſects, which are attached to particular ſpecies of vegetables for their food.

FUCUS OSMUNDA. TAB. XI.

FUCUS. fronde cartilagineâ, compreſsâ; ramis dentato-pinnatifidis; marginibus calloſis. *Petiv. p.* 25. 1. 2.—*Raij, Syn. p.* 48. *n.* 37.—*Gmel. p.* 155.—*Moriſ. Hiſt. Ox.* 646.—*Hudſ.* 473.—*Lightfoot*, 954.—*With. Bot. Arr. v.* 4. 106.—*Linn. Tr. v.* 3. 167.

RADIX diſcoides, agglutinata.

CAULIS, in frondem filicinam ſeſe expandens.

FRONS pinnatifida; apicibus ſegmentorum, obtuſis, calloſis.

FRUCTI-

FRUCTIFICATIO [a] immerſa, terminalis; è muco pellucido retiformi conſtans.

SEMINA, minutiſſima, glomerata, nuda.

OBSERVATIONES.

SPECIES hæc ætate maturâ perelegans a PETIVERO dudum obſervata eſt ſub nomine "*F. Dealenſis* pedicularis rubræ folio." Satis aptè a D. GMELIN *F. oſmunda* nominatur: ſpecimen tamen haud ita luxurians ac apud nos reperitur icon ejus t. 16. f. 2. repreſentat: Deſcriptio ſanè ſpecifica apud D. HUDSON *F. pinnatifidi* et *F. filicini* minus aptè, ut opinor, diſcriminatur; unde D. LIGHTFOOT ſcrupulus an ſint ſpecies diverſæ. [b] Re verâ autem, ſi ſpecimina inſpicias, diſcrimen ſatis magnum evidenter apparebit. Specioſa admodùm eſt frondis forma, et floridam *Oſmundæ regalis* apicem haud malè referens, unde nomen GMELINI. E baſi tenui, diſcoidi, caulis aſſurgit compreſſus, brevis, in folia tria, quatuorve filicina deſinens. Folia pinnatifida, marginibus flexuoſis, calloſis; apicibus etiam ſegmentorum obtuſis. Altitudo plantæ ſexuncialis; latitudo foliorum vix ſemuncialis; ſubſtantia tenera et enervis, et proculdubiò edulis; [c] color fuſco-purpureus. Fructificatio, etſi nunquam a D. LIGHTFOOT viſa, in apicibus ſegmentorum ſita eſt. Semina numeroſiſſima, coccinea, gelatinâ pellucidâ obducta, ſi cultello apices recludas, microſcopii ope facillimè detegentur. Foraminulas etiam perexiguas in ſuperficie fine tuberculis lente maximè augenti cernere eſt; odor iſte, ſeu ſapor, [d] piperis in hâc ſpecie prorsùs deſideratur. In Catalogo D. D. GOODENOUGH et WOODWARD nuperrimè mihi in manus tradito ſpecies hæc, [e] *F. pinnatifidus* audit: ſynonymis ſc. *F. pinnatifidi*, *multifidi*, et *filicini* noſtratium in unum redactis.

[a] Forſan ætate maturâ tubercula externa cernenda ſint.

[b] Subdubitat Auctor prædictus, ſeminibus *F. filicini* nunquam à ſe detectis, annon *F. oſmunda* ſit P. maſcula, *F. pinnatifidus* autem P. fœmina ejuſdem ſpeciei.

[c] Specimina in Herbario D. Woodward occurrunt coloris rubri, et viridis.

[d] Vid. quæ de ſapore piperis diſſerui, Obſ. Ang.

[e] Vid. Linn. Tr. v. 3. p. 167.

OSMUNDA FUCUS, PL. XI.

OR

Sea Fern.

FUCUS. frond, griſtly compreſſed, trebly winged; ſegments callous, blunt.

PLATES.

Gmel. t. 16. 2. (a branch.).—*Moriſ. Hiſt. Ox.* XV. *t.* 8. *f.* 2.

ROOT, diſcoid, flat, ſmall.

STEM flatted, ſhort, branching into two or three fern-ſhaped leaves.

FROND, winged-cleft, with the margins and tips of the ſegments callous, obtuſe.

FRUCTIFICATION in the inſide of the tips of the ſegments: conſiſting of a vaſcular pellucid jelly, with numerous minute ſeeds.

OBSERVATIONS.

THIS Species, the *F. ofmunda* of GMELIN, has been conſidered as a variety of the *F. pinnatifidus* of HUDSON, the *jagged Fucus*, or *Pepper Dulſe* of the Scotch. It differs, however, from that ſpecies in not growing in matted cluſters, in being conſiderably larger and more elegant in the cut of the leaves, and in not poſſeſſing that peppery, aromatic taſte and ſmell ſo peculiar to that ſpecies. From a comparatively ſmall baſe or diſk, one, or more compreſſed ſtems ariſe, which expand into beautiful fern-ſhaped leaves. The height of the plant is about ſix inches, the breadth of the frond hardly half an inch. Its colour is a [a] dark, tranſparent purple: its ſubſtance is tender, and its texture veinleſs, and it is undoubtedly an eatable ſpecies. The fructification is [b] internal and imperceptible, reſiding in the tips of the ſegments. There are, indeed, extremely minute perforations like [c] pin-holes, without any protuberances, diſcoverable at certain ſtages of the plant's growth with the aſſiſtance of high magnifiers. In the enumeration of the Britiſh *Fuci*, ſo often referred to in this FASCICULUS, *F. ofmunda* is included, together with the two varieties which form the ſubject of the ſubſequent article, under the general name of *pinnatifidus*. Theſe Gentlemen are ſilent as to the ſmell and taſte of pepper recorded by LIGHTFOOT under *F. pinnatifidus*, and from their known accuracy ſo uncommon a circumſtance would not have eſcaped them. I have therefore no doubt but *F. ofmunda* will retain its place as a ſeparate ſpecies.

Hab. Portland Iſland, Penzance, *and the* S. W. Coaſt.

[a] The colours in this ſpecies vary much.

[b] The fructification in my ſpecimens was imbedded, and only diſcoverable by the knife. It is probable from analogy and from the obſervations in the Linn. Tr. v. 3. p. 187. that at advanced periods of maturity there may be external tubercles.

[c] I have noticed theſe minute perforations on the ſurfaces of the ſmootheſt fronds diſcoverable by very high magnifiers, and ſuppoſed them intended for the diſcharge of the ſeeds: they may, however, be only the perſpiratory ducts, the *ſpiracula foliorum* of HEDWIG. Theor. p. 17. See alſo G. C. REICHEL *de vaſis plantarum ſpiralibus*, and the Diſſertations of MALPIGHI and GREW.

FUCUS PINNATIFIDUS. TAB. XI.

FUCUS. fronde anguſtâ, ramoſâ, compreſsâ; ramis ſubalternis divaricatis; ramulis obtuſis brevibus.

RADIX diſcoides, repens.

CAULIS, compreſſus, anguſtus.

RAMULI, divaricati, irregulares; ſæpiùs ſub-pinnatifidi; pinnis ad latera obtuſis, calloſis, ſucculentis inſtructi.

FRUCTIFICATIO in pinnis, è muco pellucido interno, tuberculiſque externis globoſis conſtans.

SEMINA minutiſſima, nuda.

OBSERVATIONES.

FRONS in hâc ſpecie ſecundum D. LIGHTFOOT variat mirabilitèr, vel filiformis, vel ſemuncialis; ſi non re verâ ſint ſpecies diſtinctæ. Planta hæc paraſitica eſt, caulibus *F. digitati* aliorumque molis grandioris adnaſcens; altitudinis

titudinis triuncialis, aut ſuprà. Rami divaricati et quam maximè irregulares, pinnulis ex utroque latere obtuſis, et plerumque fructiferis obſiti. Ætate maturâ [a] tubercula in pinnulis hiſce cernere eſt, fructificatione intùs in muco pellucido; ſeminibus glomeratis, nudis.

(VAR. β.)

VARIETAS hæcce apud nos vulgatiſſima eſt. Rupes, muſci ad inſtar operit, cæſpite denſiſſimo, altitudinis tamen vix uncialis. Frons complanata, et filicina eſt: ſubſtantia, æquè ac prioris, tenera et pellucida: odor et guſtus idem. [b] Fructificatio in pinnulis, ut in priore, ſed ſine [c] tuberculis. Pars interior pinnularum muco pellucido anaſtomoſante, retiformi, ſeminuliſque minutiſſimis, nudis, conſtat.

Hab. paſſim; in ſcopulis propè Acton Caſtle, *et ad oppidum* Penſance *collegi.* *In* Scotiâ, D. LIGHTFOOT.

[a] Vid. Tab. XI. *b b.* pinnula cum tuberculis auct. *c* ejuſdem apex tranſv. ſect. *d* ſeminula cum muco in vitrum effuſa. *e* pinnula incipiens aucta.

[b] Vid. Tab. XI. *a* ſummitas nat. mag. *a a* eadem aucta, cuticulâ abrasâ.

[c] Ætate maturâ forſan tubercula reperiuntur.

JAGGED FUCUS, PL. XI.

OR

Pepper Dulse.

FUCUS. frond narrow, compreſſed: branches ſub-alternate, divaricated: with ſhort obtuſe callous ſhoots.

(*No Figure.*)

ROOT flat, creeping.

STEM, narrow, compreſſed.

BRANCHES irregular, ſometimes inclining to pinnatifid, with ſhort, blunt, fructifying *pinnæ* ſub-alternate on each ſide.

FRUCTIFICATION internal, in the *pinnæ;* conſiſting of naked ſeeds in a reticulated, pellucid *mucus;* with external tubercles.

OBSERVATIONS.

THE varying habit of this Plant, noticed formerly by Mr. LIGHTFOOT (Fl. Scot. 954.) induces me to give two diſtinct repreſentations of it: differing, however, ſo widely that they may well paſs for diſtinct ſpecies. They have a great ſimilarity in the ſucculency and tenderneſs of their texture, and in the ſtrong aromatic ſmell, which, as far as my obſervations on ſea plants extend, is *unique;* and, as it emits this uncommon and diſagreeable odour on being handled ever ſo lightly, it could not have eſcaped the notice of Meſſrs. GOODENOUGH and WOODWARD. This plant, figured as Var. α. is irregular and ſtraggling, about three inches high, ſufficiently deſcribed above with the aſſiſtance of the drawing. It is I believe generally a paraſitical plant, growing on the ſtems of the larger

VAR.

Fuci.

(VAR. β.)

THIS variety is very abundant and covers the rocks in wide patches, creeping like a *Lichen*. It is a matted, creeping plant, of no conſiderable height, probably owing to its expoſed ſituation: it is ſeldom higher than it is repreſented in the Plate. Its frond is flat, and of the ſame texture and ſmell with the preceding. Its branches are produced nearly oppoſite and at right angles, diminiſhing in length upwards. It appears much eaten by the ſmall fry of fiſhes. Its fructification is always diſcoverable by the knife, and may probably at times break out in ſmall tubercles.

Hab. Acton Caſtle Rocks *and elſewhere on the* Cornwall Coaſt.

FUCUS LACERUS. TAB. XI.

FUCUS. fronde cartilagineâ, dilatatâ, enervi; laciniis inæqualibus profundis; apicibus bifidis; tuberculis innatis. *Raij, Syn.* 44. *n.* 16.—*With. Bot. Arr.* (F. membranifol. *var.* β. *abſque Synonymis.*) *v.* 4. *p.* 106.

RADIX, tenuis, diſcoides, plures emittens caules.

CAULIS, cylindrico-compreſſus, ſtatim ſeſe expandens.

FRONS, expanſa, ſegmentis profundis, angulis ſegmentorum acutiuſculis.

FRUCTIFICATIO, pericarpium innatum, ovatum, rigidum.

SEMINA, minutiſſima in muco pellucido.

OBSERVATIONES.

FUCUS hic, varietas *F. ceranoidis*, D. GMELIN et RAY (vid. Syn. p. 44. n. 16.), in Syſtemate LINNEI *F. criſpus* audit. Quum habitûs ſit maximè omnium irregularis, laciniis inæqualiter inciſis, et quaſi *laceratis* BUDDLEII nomen "*laceri*" pro triviali ſumpſi. Caules plurimi ex eodem diſco oriuntur ad baſin cylindrico-compreſſi, anguſti, ſtatim ſeſe expandentes. Frons, ut ſuprà deſcripta, et in icone delineata, enervis, [a] ſub-pellucida; altitudinis triuncialis. Color frondis purpureus, vel brunneus. Juxta apices [b] tubercula, vel pericarpia ſolitaria, immerſa, et utrinque prominentia tempore maturo cernuntur. Species, vel varietas altera ſub nomine Linneano *F. criſpi*, in ſequenti Tabulâ icone illuſtratur, et protinus deſcribenda eſt.

RAGGED

[a] Texturâ cartilagineâ et pelluciditate diſtinguendus eſt *F. ceranoides* ſecundum D. GMEL. p. 116. "Evidenti pelluciditate gaudet in omnibus ſpeciebus, in quibuſdam verò evidentiori."

[b] Vid. Tab. XI. *g, g.* nat. mag. *gg.* auct. et tranſverſim ſect. cum ſeminibus. Minus accurata GMELINI fructificationis deſcriptio, ſpeciebus verrucoſis, ut videtur, propria: quæ, incipiente fructificatione ligulas vel mammillas in fronde convolutas oſtendunt.

RAGGED FUCUS. PL. XI.

FUCUS. frond cartilaginous, expanding, veinleſs, ſub-pellucid: ſegments unequal and deeply cut in; ſummits bifid, with imbedded pericarps.

(No Plate.)

ROOT thin, diſcoid, ſending up many ſhoots.

STEM compreſſed, narrow, gradually expanding upwards.

FROND widely expanded, with ragged, deep ſegments: the angles not rounded.

FRUCTIFICATION, an oval, imbedded, rigid tubercle, prominent on either ſurface.

SEEDS very minute in a clear *mucus*.

OBSERVATIONS.

IT is ſurpriſing to obſerve the confuſion which has crept into the ſpecies called *F. ceranoides* in our Catalogues from the tranſpoſition of that familiar name by LINNEUS to a different plant. GMELIN, who has retained the name of RAY, ſays it is not leſs ſportive in its habits than *F. veſiculoſus* (p. 116.) it therefore needed not the inſertion of a different ſpecies to add to the uncertainty. The errors, however, in the ſynonyms may have ariſen in ſome meaſure from the different acceptation of the Latin Term, [a] *ceranoides*; ſome applying the reſemblance alluded to, to the ſhape of the frond, and others to its texture. The *Fucus* here repreſented is by no means ſo much laciniated at the edges as GMELIN's *F. ceranoides* (tab. 7. f. 1.), nor are the angles of the ſegments ſo much rounded; but the characteriſtics, which under all its varied forms ſerve at once to diſtinguiſh the ſpecies, are *texture* and *fructification*; in which latter reſpect the Author above cited has not been ſo happy, as he ſuppoſes the globules of ſeeds, *adnate*, or *agglutinated*, inſtead of being imbedded; taking the character from the *mammilloſe* and *warty* ſpecimens when young, which I imagine is only a proliferous, or luxuriant quality depending on circumſtances, eſpecially as my *F. criſpus*, var. Tab. XII, diſcovers proliferous, compreſſed, bifid ligaments coming out from the ſurface of the frond, with the imbedded pericarp [b] *prominent on either ſide*. It is neceſſary to caution the Reader againſt confounding this Species with *F. laceratus* of GMELIN and the LINN. Tr. v. 3. p. 155.——*N. B.* This arranges in the Table under *genus* CHONDRUS. See the Syn. Tab. p. xxiv.

Hab. Mounts-Bay, CORNWALL.

[a] *Ceranoides* from Κερας—Cornu, reſembling horn or an antler of a Deer.

[b] See Tab. XI. *g*, *g*. nat. ſize. *g g*. magn.

FUCUS JUBATUS. TAB. XI.

FUCUS. fronde membranaceâ, ramoſâ, lanceolatâ; margine ſuperficieque ligulatis; ligulis ramoſis. *Act. Soc. Linn. v. 3. p. 162.*

RADIX, tenuis.

CAULIS, ſubtùs anguſtus, compreſſus; ſurſùm ſe dilatans.

FRON

FRONS, membranacea, enervis, lanceolata; undique utrinque ligulis ramoſis obſita.

FRUCTIFICATIO, tubercula? in fronde immerſa.

SEMINA, incognita.

OBSERVATIONES.

Haud rarò occurrit in littoribus noſtris perelegans hæc planta *F. ciliati* affinis, diverſa tamen; cilia enim, ſeu mavis ligulæ, prælongæ ſunt, et frequentiùs ramoſæ, è margine, itemque ex ſuperficie frondis erumpentes. Ex baſi tenui, [a] furculos emittente, caulis exit compreſſus, ſensìm ſeſe dilatans: folia è caule exeunt tria, quatuorve, anguſta, lanceolata. Textura lævis, membranacea: color ſaturè rubens: altitudo triuncialis vel ſuprà. Nulla fructificationis in ligulis veſtigia; in fronde tamen aliquandò cavitates orbiculares, ſcutellis Lichenum haud abſimiles, [b] notavi. Semina hactenus latuere. *F. jubatus* [c] icone pereleganti ex quo inciſa eſt Tabula noſtra in lucem prodiit. In littoribus noſtris ſpecimina pari magnitudine nunquam adhuc repperi, neque ciliis adeò in longum effuſis. Forma etiam frondis in icone prædictâ, caſu, ut mihi videtur, truncata apparet.

Hab. Mounts-Bay, Cornwall.

[a] Quacunque furculi ſaxa attingunt radices agunt. Linn. Tr. v. 3. p. 160.

[b] Veriſimile eſt cavitates haſce ex tuberculis immerſis, diſruptis, provenire.

[c] Vid. Act. Linn. v. 3. Tab. 17. f. 2.

Shaggy FUCUS. PL. XI.

FUCUS. frond membranaceous, branched, ſpear-ſhaped: edges and ſurface garniſhed with branched, filiform *cilia*, or linear appendages.

PLATE.

Linn. Tr. v. 3. t. 17. 2.

ROOT ſmall.

STEM, narrow, branched from the baſe, compreſſed, expanding upwards.

FROND, membranaceous, ribleſs, ſpear-ſhaped, thick ſet all over with ſimple, or branched *cilia*.

FRUCTIFICATION, imbedded tubercles? as in *F. ciliatus*.

SEEDS unknown.

OBSERVATIONS.

This is a very elegant ſpecies, diſtinct from *F. ciliatus*, as having the ligular proceſſes, or *cilia*, as they are called, *branched*. It is, however, nearly allied to that ſpecies, which by a late arrangement includes three diſtinct

ones

ones of GMELIN—*ciliatus*, *ligulatus*, and *holoſetaceus*. It ariſes from a minute diſk adhering firmly to the rock; and near the baſe, as is the caſe with all its affinities, it has numerous crooked ſhoots, which, being furniſhed with the ſame adheſive *gluten* as the diſk itſelf, lay hold of the rocks, and ſerve either to add ſtrength to the parent plant, or to produce a future progeny. The *cilia* are produced at the edges and on either ſurface, ſo as to have a buſhy, fringed appearance. The ſtem is narrow and compreſſed, widening upwards, and branching into two or three ſpear-ſhaped leaves. There ſeems no proliferous tendency in this ſpecies, unleſs probably after laceration. The height of the plant is nearly five inches: its colour bright roſe, or pink. On a ſpecimen I have by me there are two or three regular imbedded cavities, reſembling the * faucers of a *Lichen*. Theſe I have no doubt contain the fructification, though I have not yet diſcovered the ſeeds. LIGHTFOOT ſays the *F. ciliatus* is eaten as *Dulſe*, but I think it would require a previous preparation, as it does not poſſeſs the ſucculency of *F. edulis*. Since this deſcription, together with the Drawing of the Plant have been prepared for the Public Eye, a very characteriſtic figure of *F. jubatus* has made its appearance in the Linnean Tranſactions (v. 3. p. 162.). The ſpecimen is much more luxuriant than any I have ever met with in the S. W. Coaſt: its ſummits appear to have been torn or eaten off, which gives it a truncated, inſtead of its natural lanceolate form.

Hab. Mounts-Bay, Penzance, *&c.*

* I ſuſpect theſe to be tubercles burſt.

F U C U S STELLATUS. TAB. XII.

FUCUS. fronde planâ, aveniâ, dilatatâ; apicibus multifidis, ſtellatis. *With. Bot. Arr. v. 4. p. 99.—Raij, Syn. 44. n. 18.—Hudſ.* F. ceranoides, *var. δ.—Lightfoot. var. β.*

RADIX, plana, diſcoides.

CAULIS, tenuis, ſenſim ſeſe expandens.

FRONS, plana, enervis, dilatata, ſegmentis paucis, apicibus ſtellatim diſſectis.

FRUCTIFICATIO, eadem ac *F. lacerati.*

OBSERVATIONES.

FUCUS hic, *F. ceranoidis var. δ*, D. HUDSON; *var. β*, D. LIGHTFOOT, nuperrimè a D. WITHERING in Catalogo ſuo utpote ſpecies diſtincta, collocatur. Valdè affinis eſt *F. lacerati*, et neſcio annon varietas ejus reputandus ſit: notandum tamen obiter ſubſtantiam in utrâque ſpecie *ſub-opacam* potius quam *pellucidam* eſſe, et idcirco plantas in Syſtematis ſui diviſione minimè disjungendas. Radix plana, diſcoides, fronde in tres, quatuorve laciniias diviſâ; apicibus tamen quam maximè fimbriatis, et ſtellatim, ſi ita dicam, expanſis. E baſi communi plures oriuntur cauliculi; uno vel altero ceteris elatiore. Color variat; plerumque olivaceus, vel brunneus, ad lucem diaphanus. Altitudo bi-vel tri-uncialis.

Hab. In litt. occident. ANGLIÆ *et alibi inter lapillos.*

STEL-

STELLATED FUCUS. PL. XII.

FUCUS. frond flat, veinleſs, expanded: ſummit fringed.

(*No Plate.*)

ROOT, flat, circular.

STEM, flattiſh, ſmall at bottom, expanding upwards.

FROND, veinleſs; ſingle, or two or three-cleft; the ſummits fringed and expanded, ſo as to give the plant a ſtellated appearance.

FRUCTIFICATION, as in *F. laceratus*.

OBSERVATIONS.

THIS Species is leſs than *F. lacerus*, and not ſo much, nor ſo deeply laciniated. Its ſummit, however, is much more fringed and ruffled. It throws out ſeveral ſhoots from the ſame common diſk, with one or two, generally, much larger than the reſt. Its uſual height is from one to three inches: its colour browniſh, but when held to the light it has a purpliſh tinge. Meſſrs. GOODENOUGH and WOODWARD have claſſed this plant as a variety of *F. criſpus* of LINNEUS (Linn. Tr. 3. p. 169.), and I am happy to find our ideas in this reſpect coincide. *F. criſpus*, and its varieties *lacerus*, and *ſtellatus* ſtill retain their affinity to each other, with this difference, that inſtead of being varieties of one common ſpecies, they arrange in my Synoptic Table under a new * *genus* as diſtinct ſpecies. Dr. WITHERING has enumerated this *Fucus* as a diſtinct ſpecies in his laſt edition of the Botanical Arrangement.

Hab. On the Shores of the Weſt *of* ENGLAND *and elſewhere among the Stones.*

* CHONDRUS, Syn. Tab. p. xxiv.

FUCUS PALMATUS. TAB. XII.

FUCUS. fronde planâ, aveniâ, palmatâ. *Linn. Sp. Pl.* 1630.—*Moriſ. Hiſt. Ox.* iii. 646.—*Raij, Syn.* 46. 29.—*Hudſ.* 472.—*Lightfoot*, 933.—*Linn. Tr. v.* 3. 163.—Ulva palmata, *With. Bot. Arr.* 4. 123.

RADIX diſcoides.

CAULIS breviſſimus, cylindrico-compreſſus.

FRONS enervis, glaberrima membranacea; in junioribus plantis, coriacea in adultis.

FRUCTIFICATIO in muco pellucido, annulatim reticulato.

SEMINA minutiſſima, nuda.

OBSER-

OBSERVATIONES.

HABITUS prolifer nequaquam *F. proliferi* proprius eſt. Multi ſponte, ex marginibus, vel ſuperficie frondis; plures accepto vulnere, ſobolem emittunt, et pullulant. Quo meliùs Tyronibus ſubveniatur *F. palmati* [a] ſpecimen ætate provectiore undique è margine emittentis foliola, oculis ſubjiciendum curavi. Nulla apud nos occurrit ſpecies vulgatior, neque eſt ulla, quoad ſcio, minus accuratè deſcripta. D. LIGHTFOOT icon plantam juniorem (ſi non forſan ſit [b] *Ulvæ* ſpecies) haud quidem ſatis felicitèr exhibet; ſegmenta enim longiora, et quaſi ligulata ſunt, nec unquam ad baſin ita actè ſtipantur, ut in Tabulâ ſuâ. Subſtantia in junioribus plantis, ut ſupra obſervavi, tenera eſt, et pellucida, margines integri: è contra in adultis frons coriacea ſit, et margo maximè omnium prolifer; foliolis marginalibus *pedunculatis:* notandum quoque eſt perpauca in adultis inveniri frondis primariæ ſegmenta, et ſæpiſſimè, ut in icone, folium unicum ſupereſſe amplum, coriaceum, lanceolatum. Fructificatio in adultis ferè ſemper cernenda eſt, præſertim ſi, abrasâ levitèr cuticulâ, frondem ad lucem oculo armato ſpectes. Mucus pellucidus tubulis [c] annulatìm diſpoſitis interiorem frondis partim permeat, et quandoque etiam papillæ in frondis ſuperficie lente maximè augenti conſpiciuntur, præſertìm plantâ recenti aliquot horas in ficco relictâ. Sectio frondis tranſverſa tempore maturo globulos interiori cutis parti affixos oſtendit; ſeminula in his nunquam adhuc detexi; matura tamen, frondi adhærentia, vel glomerata, vel in lineis diſpoſita, vitro maximè augente quandoque conſpicienda ſunt.

Hab. paſſim.

[a] Specimina ſpeciei hujuſce, ætatis provectioris, et fronde incraſſatâ rarò palmata conſpiciuntur: unica perſæpè, vel ſaltem perpaucæ ſuperſunt laciniæ, incraſſatæ, fructiferæ, foliis ad margines, ut in icone, numeroſiſſimis inſtructæ.

[b] Certior factus ſum *F. palmatum* D. LIGHTFOOT re verâ Ulvæ ſpeciem eſſe, utpote ex deſcriptione liquet, itemque ex ſpeciminibus penes D. WOODWARD.

[c] Fructificatio haud abſimilis *F. edulis*, vide Tab. XII. *h*, nat. mag. *h h*, auct.

PALMATED FUCUS, PL. XII.

OR

DILS (*SCOTIS.*).

FUCUS. frond flat, ribleſs; generally divided in deep ſegments.

PLATES.

Lightfoot, t. 27 (probably a ſpecies of ULVA).—*Hiſt. Ox. t.* 8. *f.* 1.

ROOT diſcoid.

STEM very ſhort, cylindrical.

FROND, deeply cut in a palmated form in the younger plants.

FRUCTIFICATION, tubercles imbedded in a clear mucus diſpoſed in annular tubes.

SEEDS hardly ever viſible.

OBSERVATIONS.

A PROLIFEROUS habit, diſcoverable in various ſpecies of *Fuci*, has occaſioned many plants to be conſidered as belonging to the ſame family, which have ſcarcely any reſemblance in other points, and Mr. LIGHTFOOT has increaſed the confuſion by adopting the trivial name "*prolifer*" as the diſtinctive character of a ſeparate [a] ſpecies, which ſtrictly ſpeaking is not proliferous. Perhaps the moſt proliferous ſpecies in its advanced ſtate, and at the ſame time one of the moſt beautiful, is the *F. palmatus*, the ſubject of this article. This ſpecies, which is common on our Coaſt, from inattention to it during the progreſſive ſtages of its growth, has been leſs accurately deſcribed than, perhaps, any other in the Catalogue. LIGHTFOOT's Plate, if his plant is not in reality an Ulva, is but an awkward repreſentation of *F. palmatus* in a young ſtate. The ſegments of the frond are not ſufficiently *cut in*, and their ſhape is too much rounded in the middle; but it will ſerve very well to give an idea of the plant in its [b] infant ſtate. Mr. LIGHTFOOT's deſcription of the delicacy of the texture of the frond in this ſtage of growth is ſufficiently correct; but whoever will attend to the progreſs of its growth, will find, that where it has had the good fortune to eſcape the numerous accidents, ſo tender a plant is liable to, it acquires gradually a firmneſs of texture, and becomes coriaceous and opaque. The proliferous habit diſcovers itſelf pretty early, and before the frond has loſt its tranſparency, but in that caſe the marginal ſhoots are few. The beautiful fringed appearance I have delineated is in its laſt ſtage, when the frond has acquired a great degree of breadth and firmneſs of texture. It is remarkable, and characteriſtic of the plant, that all the marginal leaves are ſupported on footſtalks, and have the ſame delicacy of texture as the infant plant. It ſhould likewiſe be obſerved, that the plant, from whatever cauſe, is ſeldom found compoſed of many ſegments when old; and often, as in the Plate, of a ſingle wide lanceolate leaf. In [c] this ſtate a regular fructification is generally obſervable with a good eye-glaſs, when the frond is held to a ſtrong light, particularly if the ſkin is carefully pared off. It conſiſts of a curious chain-work of pellucid tubes; and, if cut tranſverſely, there are found globules of *mucus* adhering to the inner coat, but without any viſible ſeeds, and at times, though rarely, I have ſeen the ſurface covered with ſmall *papillæ*, for the diſcharge of the ſeeds. The ſeeds may be ſeen with high powers, when ripe, adhering to the outer coat of the frond, either cluſtered, or diſpoſed in ſtrait lines. The Obſervations made by Dr. GOODENOUGH and Mr. WOODWARD on this plant evince the propriety of exhibiting it in its laſt ſtage of growth. Thoſe Gentlemen quote *F. dulcis* of GMELIN, p. 189, from the [d] Synonyms I imagine, which the Profeſſor has prefixed of MORISON and RAY. The repreſentation of that *Fucus* in the Plate (GM. 26.) has no reſemblance to *F. palmatus*, but a very ſtrong one to *F. edulis*—*the Dulſe* of the S.W. Coaſt, deſcribed in the following page; and, if it were not for its membranaceous texture, I ſhould have little difficulty in referring it to that ſpecies. I have no doubt that SIBBALD, MORISON, and RAY made their obſervations on the [e] *maſticatory* qualities of theſe Plants, and the ſmell of violets on an infuſion with alkali, from the reports of the fiſhermen of thoſe days; who in all probability made uſe of the fragments of each indiſcriminately, as poſſeſſing ſimilar properties, though *F. edulis* is certainly the moſt ſucculent and tender.

Hab. common.

[a] The growth of *F. prolifer* is natural, and not owing to accident; or rather it is an additional mode of continuing the ſpecies. It ſhould have been called *Catenato-prolifer*—chain-like proliferous. It is *F. rubens* of Linneus and the Linn. Tr. v. 3. p. 165.

[b] I ſuſpect this ſpecies to be *biennial* at leaſt, and that the appearance it aſſumes in the annexed Plate is in the ſecond year of its growth.

[c] From internal ſtructure and other properties, ſuch as the violet ſmell, with an infuſion of alkali when dry, there ſeems a great affinity between this ſpecies and *F. edulis*. See Ray's Syn. 46. 29. Lightfoot, p. 935.

[d] GMELIN's Plant, as he ſays, is an inhabitant of the Sea of KAMTSCHATKA.

[e] See the mode of chewing this Plant as practiſed by the Scotch and Iriſh. Lightfoot, p. 935. Gmelin, p. 190.

FUCUS EDULIS. TAB. XII.

FUCUS. fronde ſimplici, cuneiformi, craſsâ, enervi; apicibus rotundatis. *With. Bot. Arr.* 4. *p.* 101.—F. cuneiformis, HERBAR. BANKSIAN.—F. dulcis? *Gmel. p.* 164.

RADIX. Baſis expanſa, plures emittens caules.

CAULIS, ſub-rotundus, in folium cuneiforme ſtatìm ſeſe expandens.

FRONS ſimplex, variæ ætatis ac magnitudinis ex eâdem baſi, cuneiformis, ampla, craſſa.

[a]FRUCTIFICATIO—*Mucus* orbiculato-retiformis, pellucidus.

SEMINA minutiſſima.

OBSERVATIONES.

SPECIES hæc, adhuc inobſervata, etſi in Herbariis reperta ſit, in occidentali Angliæ littore vulgatiſſima eſt. Fragmenta copioſiſſimè, folia integra perrarò inter maris ramenta cernere eſt: piſcibus enim, et vermibus marinis cibus omnium gratiſſimus, Fucus hic tranquillo maris tempore corroſus, et ſemeſus; procelloſo autem, laceratus et divulſus, reperitur. E baſi communi dilatatâ plurimi aſſurgunt caules ſubrotundi, in folia plurima ſimplicia variæ magnitudinis ſeſe expandentes. Folia majora altitudinis ferè pedalis; latitudinis ſurſùm ſex-uncialis; ſubſtantiæ coriaceæ et enervis; coloris fuſco rubri, aut ſi ita dicam *chocolati*. In aquâ ſalsâ, vel fontanâ macerata ſuccum nobiliſſimi [b] purpurei emittit planta hæc; nec non odorem [c] violæ, ſale alkali imbuta [d]. Superficies folii glaberrima et nitens: maturo autem tempore tubercula minutiſſima glomeratìm diſpoſita, foraminulis in apice ubique erumpunt. Hiſce unà cum cuticulâ abraſis gelatina intùs pellucida per annulos vel globulos, ſi microſcopium adhibeas, diſpoſita eſt. Semina etiam minutiſſima, coccinea, lineis rectis tranſcurrentia, armato oculo ubique conſpicienda ſunt. Specimen F. hujus a D. Solander collectum in herbario Bankſiano ſub nomine *F. cuneiformis* reponitur. Notandum eſt iconem *F. dulcis*, GM. t. 26. formâ frondis huic noſtro proximè accedere.

[a] Fructificatione valdè ſunt affines inter ſe *F. edulis* et *palmatus*; frons tamen *F. edulis* ſucculentior; ideoque inveſtigationi ſub microſcopio accommodatior. Vid. Tab. XII. *hh*, Sect. frondis cum annulis maximè auctam. *h.* nat. mag.

[b] De *Fuco* veterum, ſeu pigmento ex ſucco Fuci cujuſdam in aquâ macerati, Vid. Gmel. Hiſt. Fuc. p. 4. In Inſulis Archipelagi, ut memorat D. STELLER, occurrit Fuci ſpecies, huic noſtræ forſan affinis, guſtu haud minus quam colore *purpureo*, quo cibos imbuit, inter culinæ delicias habita. Raij Hiſt. v. 1. p. 74.

[c] Vid. notulam RAIJ in Synopſi. n. 19. p. 46.

[d] Hâc arte condita, et exſiccata plantæ hujus fruſtula, commodiſſimè reſpectu ſaporis; et Scorbuto in Gingivâ medendo forſan ſaluberrimè maſticentur.

EATABLE FUCUS, PL. XII.

OR

Dulse (*CORNUB.*).

FUCUS. frond unbranched, wedge-ſhaped, ſucculent; rounded at top. ROOT

ROOT flat, membranaceous, ſpreading; throwing up numerous leaves.

STEM roundiſh, ſhort; expanding ſoon into a frond.

FROND ſimple, wedge-ſhaped and rounded at top; many from a common baſe of different ſizes.

[a] FRUCTIFICATION internal; a chain-work of annular tubes, as the pellucid mucus appears under high magnifiers, with external inviſible *papillæ*.

SEEDS very minute.

OBSERVATIONS.

It is ſurpriſing that this ſpecies, which is by no means uncommon on the S. W. Coaſt, ſhould have been ſo inaccurately, if at all, deſcribed. Its ſpecific character is fully ſufficient to diſcriminate it. A reaſon may be alleged, which in ſome meaſure may account for its not being particularly noticed hitherto, viz. Its being very rarely caſt on the ſhore in its perfect ſtate. Its tender ſucculent texture expoſes it to the danger of laceration by ſtorms, and its nutritive qualities, to the depredation of fiſhes. When gathered from its native bed at the loweſt ebb of an equinoctial tide, which I have frequently done, all the largeſt leaves, and many of the ſmaller ones, are found either half eaten off, or with the frond perforated in numberleſs places, as in the Drawing. This plant affords a no leſs grateful food to cattle, when acceſſible to them in its growing ſtate; and the Fiſherman either chews it raw, or [b] criſps it over the fire. To ſupply this continued conſumption, it not only throws up at firſt [c] a plentiful crop from its wide ſpreading baſe, but is continually [d] reproducing its leaves. The moſt ſurpriſing quality of this plant, and one that will probably render it of ſervice in dying I diſcovered by accident. Having placed ſome of the leaves to macerate in ſea water, in order to procure ſeeds from it, I perceived on the ſecond day a faint ruby tint, very different from the colour of the plant, which is a dull red, inclining to chocolate colour. Being ſurpriſed at this, I continued the maceration, and the tint grew more vivid, till it at laſt equalled the ſtrongeſt infuſion of cochineal. This liquor was mucilaginous, and had a remarkable property of being of a changeable colour; as it appeared a bright ruby, when held to the light, and a muddy ſaffron, when viewed in the contrary direction. [e] Little need be added to the ſpecific and detailed deſcriptions of this ſingular plant. It is ſometimes found nearly a foot high, and the larger leaves about five or ſix inches broad at the top, which is uſually rounded. Its ſubſtance is tender and ſucculent, of the thickneſs of neats leather, but never membranaceous, as in *F. palmatus*; its ſurface ſhining and poliſhed. Under the outer coloured ſkin a [f] pellucid colourleſs jelly pervades the whole frond. In this undoubtedly is the fructification. With a favourable opportunity the ſeeds may be ſeen on the ſurface of the frond with

[a] See *h*, a ſmall bit cut out, with the upper cuticle pared half off: *h h*, the ſame highly magnified.—*N. B.* It is impoſſible to aſcertain whether the *mucus* conſiſts of a network of annular tubes, or of globules in contact with each other, from the defective perſpective attending the uſe of the compound microſcope.

[b] See the Obſervation on the mode of eating it in Dr. With. Bot. Arr. 4. p. 101.

[c] I have counted nearly forty leaves from a ſingle diſk.

[d] It may not be amiſs to hint at the ſurpriſing power of re-production from the baſe and ſtems in ſome ſpecies, widely differing from the proliferous tendency at the edges, which many of the larger kinds of *Fuci*, ſuch as *F. veſiculoſus*, *ſerratus*, &c. poſſeſs. The inhabitants of Brittany, I am informed, cut theſe plants *twice* in the year for manure, and the crop is always abundant. This I am aſſured of, from a French Clergyman of veracity.

[e] This probably aroſe from a mixture of the ſubſtance of the frond in the liquor. I endeavoured to aſcertain its dying powers by the uſual methods without ſucceſs, as the quantity of tinging matter was not ſufficient; though, if attempted at large, and properly evaporated, it might be made ſufficiently ſtrong. However, an ingenious chemical Friend (the Rev. W. Gregor) aſſures me he has procured a fine Lake from an infuſion of it by means of alum.

[f] See Pl. xii. *h* nat. ſize; *hh* magnified.

with high magnifiers, either in cluſters or ſtretched in ſtrait lines, and croſſing each other; and at this ſtage of the plant numerous minute tubercles with perforations at the tips may be ſeen as in *F. palmatus*, but this happens only when it is advancing to a ſtate of decay, or when it has lain a few hours expoſed on the ſand. [s]

Hab. Menabilly, Fowey; Acton Caſtle, Penzance, *&c.*

[s] I have placed the *F. dulcis* of GMELIN (t. 26.) as a doubtful ſynonym of this ſpecies, from its remarkable wedge-ſhaped frond; and it ſeems a nearer affinity of this than of *F. palmatus*, to which it has been generally referred. Though the Synonyms of RAY, MORISON, and HUDSON are quoted by GMELIN, it is ſaid to have been an inhabitant of the ſea of KAMTSCHATKA. In addition to the maſtication of this and the preceding ſpecies the Lovers of *Laver* may be gratified with the account of a curious mode of dreſſing fiſh in the Iſlands of the Archipelago, extracted from Profeſſor GMELIN, p. 190. "They take ſlices of fiſh, and ſtew them with Crow garlick (*Allium Urſinum*, LINN.) chopt ſmall: when tender, ſome lard, or any animal fat, is added; and laſtly, a handful or more of this *F. dulcis*, called by them *Marvei*, is put on, which not only gives a moſt beautiful purple tinge to the *Ragout*, but diſſolves, and thickens the ſauce ſo much, that when cold the jelly is ſtrong enough to ſupport a ſpoon, or other thing placed in it in a perpendicular direction."

F U C U S CÆSPITOSUS. TAB. XII.

FUCUS. fronde ramoſiſſimâ, implicatâ; apicibus clavæ-formibus.

(Species nova.)

RADIX minuta, plana, agglutinata.

CAULIS filiformis, flexuoſus, ramoſiſſimus.

RAMULI, filiformes ſurſùm grandiores; apicibus incraſſatis.

FRUCTIFICATIO. Gelatina reticulato-tubuloſa; granulis orbiculatis, ſeminiferis, intùs; tuberculis foraminoſis extùs.

SEMINA minutiſſima, pyriformia.

OBSERVATIONES.

PARVULA hæcce, nec adhùc deſcripta ſpecies in rupibus Montis S^ti. MICHAELIS in CORNUBIA ſatis copioſè provenit. A *F. pygmæo*, cui mole ſuâ habituque creſcendi aliquatenùs eſt affinis, plurimùm, ſi attentiùs inſpicias, differt. Fructificatio enim, ut ſupra notavi, Generi *Fuco*, ſenſu reſtricto, propria eſt, et, quod mirum videatur in tam puſillâ plantâ, ſemina pari magnitudine ac in *F. veſiculoſo* cernuntur. Seges uberrima plantularum harum etiam in præruptis ſcopulis frequenter cernenda eſt, ſingulis inter ſeſe implicatis, et ſaxo baſi propriâ agglutinatis. Plantula quævis e cæſpite ſumpta ſtatìm e baſi ramoſa eſt. Ramuli filiformes, incurvi, ſubtùs attenuati, ramulis aliis breviſſimis, quibus cæſpes formatur, obſiti ſunt. Apices ramulorum pro ratione plantæ perampli, ſucculenti, nodo vel articulo juxta fructificationem inſtructi. In his, maturâ ætate pellucidis, et ferè cylindricis, ſita eſt fructificatio. Granula orbicularia intùs ad lucem, ſi microſcopium adhibeas, conſpicienda ſunt: tubercula quoque in ſuperficie; apicibus, ut in *F. veſiculoſo*, *&c.* foratis; et, ſi portionem tranſversìm ſeces, ſeminula minutiſſima in vitrum effundentur. Altitudo cæſpitis, vel etiam plantæ individuæ rarò ſemuncialis; color olivaceus;

us; ad radices nigreſcens, ad apices dilutè purpureus. In ſaxis mediis maris æſtubus copertis habitat ſpecies hæc; *F. pygmæus* è contra, Licheni affinior, ſi non re verâ Lichen, vel Genus intermedium, ferè ſemper in ſicco degit, nec unquam niſi ſummis æſtubus ſubmergitur.

Hab. MARAZION Cornub. oppid. *&c.*

MATTED FUCUS. PL. XII.

FUCUS. frond very much branched, matted together in cloſe patches: ſummits large, club-ſhaped.

(*New Species.*)

ROOT very ſmall, flat, adhering.

STEM thread-ſhaped, crooked, much branched.

BRANCHES thread-ſhaped, ſmalleſt at bottom: ſummits large for the ſize of the plant, cylindrico-compreſſed.

FRUCTIFICATION. A pellucid *mucus* reticulated with capillary fibres; with orbicular maſſes of ſeeds, within, and perforated conic tubercles on the ſurface.

SEEDS, minute, pear-ſhaped.

OBSERVATIONS.

AMONG the ſmaller ſpecies of *Fuci* many undoubtedly are as yet undeſcribed. The ſubject of this article is by no means uncommon on the S. W. Coaſt on rugged rocks, ſomewhat defended from the fury of the waves: it is plentiful on the Pier Stones of the Quay at St. Michael's Mount in CORNWALL. It may have been miſtaken for the [a] *Pigmy Fucus* of LIGHTFOOT, or a minute variety rather of *F. corneus*, but it differs eſſentially from them in many reſpects. In fructification this Plant agrees perfectly with the Genus *Fucus*, taken in the moſt reſtrained ſenſe of the word. The patches of it are of various ſizes, and ſometimes occupy large ſpaces of the rock. It ariſes from a very minute flat baſe: the ſtem and branches are round, and not exceeding the ſize of coarſe ſewing thread: it is branched from the baſe, and garniſhed near the bottom with ſhort, crooked, rigid ſhoots, which ſerve to implicate the maſs. The branches are ſmalleſt at the baſe, and ſuddenly expand at top into thickiſh ſummits, very large in proportion to the ſize of the plant, with an articulation generally near the top. Theſe fructify, and become nearly cylindrical, in which ſtate, as they are tranſparent, the orbicular maſſes of ſeeds are diſcernible, when held to the light, by a common eye-glaſs. On the ſurface likewiſe are to be ſeen conical protuberances with perforations for the diſcharge of the ripe ſeeds, as in the larger ſorts, and on taking off a tranſ-

[a] The Pigmy F. of LIGHTFOOT and the F. pumilus of HUDSON, p. 584, may be the ſame; but the ſpecific character of the latter, mentioning axillary bladders, is in that caſe erroneous. It is more probable, the plants deſcribed by Lightfoot and Hudſon are different ſpecies. Lightfoot's deſcription exactly correſponds with our Plant, and I ſhall hope at a future day to evince that its fructification is analogous to that of *genus* Lichen. Though an inhabitant of both elements it is known to be for weeks together without being ſubmerſed.

a tranſverſe ſlice, when the ſeeds are ripe, they will be ſeen to diſcharge themſelves on the *field* of the microſcope.[b] The height of this diminutive Plant is about half an inch; its colour olive, inclining to blackiſh near the bottom; the ſummits light brown, with now and then a faint tinge of purple. Its place of growth is much nearer low water-mark than that of the *Pigmy Fucus*.

Hab. St. Michaels Mount, CORNWALL, *and the* adjacent Coaſt.

[b] See Tab. XII. *a* A cluſter of Plants. *b* A ſingle detached ſpecimen, nat. ſize. *c* A ſummit magnified. *d* A Papilla or Tubercle. *e* Cluſters of Seeds.

FUCUS CORNEUS. TAB. XII.

FUCUS. fronde cartilagineâ, filiformi, ramoſiſſimâ; ramulis ad apices dilatatis, compreſſis, ciliatis. *Lightfoot* (Nereideus), *p.* 956.—*Hudſ.* (Filicinus), *p.* 586.—*Gmelin* (Sericeus ?), *p.* 149.—*With. Bot. Arr. v.* 4. 117.—*Linn. Tr. v.* 3. 181. *var.* β.

RADIX, fibrillis intertexta, minutiſſima.

CAULIS, tenuis, ſubcompreſſus, incurvus.

RAMULI filiformes, incurvi, maturâ ætate in medio dilatati, ciliati.

FRUCTIFICATIO in [a] ciliis (D. LIGHTFOOT).

OBSERVATIONES.

SPECIES hæc in occidentali Angliæ littore ſatis copioſè reperitur. Saxis adnaſcitur aliquando, frequentiùs autem caules Fucorum grandiorum copiâ ſuâ obruit. Minimè dubium eſt *F. ſericeum* GMELINI huic noſtro affinem eſſe, etſi plus duplo major ſit; *Fucus ſpinoſus* quoque ejuſdem Auctoris a D. D. GOODENOUGH et WOODWARD, ut varietas *F. cornei* enumeratur. Habitu tamen, ut ſuſpicor, ambæ hæ ſpecies a noſtro differunt: aptiſſimè quidem ibi deſcribitur plantæ noſtræ habitus "fronde ad baſin furculoſâ, furculis radicantibus, unde frondes plurimæ confertæ oriuntur, et cava ſaxorum ſæpe cingunt" (Linn. Tr. v. 3. p. 181.). Plantam individuam ſatis accuratè deſcribit D. LIGHTFOOT, et nullus dubito quin noſtra eſt: habitum tamen cæſpititium ſibi peculiarem, omninò prætermiſit. Ramuli juniores filiformes; provectiores, ſubtus tenues in medio dilatati, apicibus acuminatis. [b] Pinnulas ſetaceas, ſive cilia, per totam plantam, præſertìm ubi frons dilatatur, cernere eſt. Hiſce, utpote et ramulis junioribus, congeries plantularum implicatur. Altitudo plantæ individuæ bi-uncialis; color ſaturè coccineus. Fructificationem in pinnulis ſitam eſſe ſuſpicatur D. LIGHTFOOT. In tam parvulâ plantâ difficile forſan fuerit fructificandi methodum accuratè inveſtigare. Pinnulas intumeſcentes aliquando obſervavi: his tranſverſìm ſub microſcopio ſectis, granula quædam minutiſſima albida in vitrum ejiciebantur.

P. S.

[a] Cilia quandoque intumeſcunt, tuberculis intùs ſeminulis coccineis repletis, ut mihi mandat D. Woodward.

[b] "Ramuli ſetaceo-pinnati" nuncupantur a D. SOLANDER, notante D. LIGHTFOOT, p. 956, character ſane diſtinctivus.

P. S. Varietates quatuor hujuſce ſpeciei notavêre D. D. GOODENOUGH et WOODWARD, herbariis cl. virorum LINNEI, BUDDLEII, UVEDALIS, et PETIVERI accuratè inſpectis.

BRISTLY-EDGED FUCUS. PL. XII.

FUCUS. frond cartilaginous, thread-ſhaped, much branched: the branches widening in the middle, ciliated.

([a] *No Plate of this Variety.*)

ROOT, a congeries of crooked fibrous radicles.

STEM fine, rather flattiſh, crooked.

FROND thread-ſhaped; crooked, lanceolate in the ſummits of the branches, with ſetaceous ſpinules at the edges.

FRUCTIFICATION in ſetaceous pinnules (LIGHTFOOT)?[b]

OBSERVATIONS.

THIS Species is by no means rare with us, as LIGHTFOOT aſſerts it to be in Scotland. It covers patches of rock, and likewiſe the lower ſtems of *F. digitatus*, *tamariſcifolius*, and others. Its appearance is in matted tufts of thread-like ſhoots like many of the ſhrubby *Lichens*, or ſmall *Conferv*æ. This circumſtance ought to have been noticed by the Author above cited. Its diſtinctive character ſeems to be an expanſion of the middle of the larger ſhoots, which is very conſiderable for the ſize of the plant, as will appear by looking at the [c] Drawing. This enlargement is only in its [d] breadth, and not in thickneſs likewiſe, as in *F. cæſpitoſus*, and it ſharpens to a point, ſo as to reſemble a ſpear-ſhaped leaf. The root is ſingularly matted as above deſcribed, and is the cauſe of its adheſion to its place of growth with an unuſual firmneſs. A ſingle plant detached from the maſs is generally about two inches high, branched nearly from the bottom, and ſmalleſt downwards. It is rather cartilaginous in its texture, and of a gloſſy ſurface, from whence probably GMELIN has called an affinity of this ſpecies *Silky Fucus*. The whole plant is beſet with ſhort briſtly pinnules; thoſe on each ſide of the wide part of the frond are ſometimes ſwollen at the tips. In theſe LIGHTFOOT conjectures the fructification is ſituated, and Mr. WOODWARD informs me he has diſcovered tubercles of ſeeds in ſome of them. On cutting ſome of theſe tips tranſverſely under the microſcope, a clear mucus with very minute granules was poured out on the *field*. Theſe ſeem to be the ſeeds, but were probably in an immature ſtate.

Hab. Acton Caſtle, Marazion, *&c. &c.* FUCUS

[a] Gmelin's t. xv. f. 3. has all the habit of this ſpecies, but is three times as large; his t. xviii. f. 3. is likewiſe an affinity with the ſegments ſtill wider, and ſaid to be Britiſh. I have ſome ſpecimens very nearly as large. It is remarkable that Gmel. mentions a proliferous var. of this laſt (p. 161.) with *ſetæ* covering the two *ſurfaces*, as well as the edges, which ſhews an affinity between this ſpecies and *Jubatus*.

[b] Mr. Woodward likewiſe has obſerved theſe *cilia* in ſome inſtances ſwollen and appearing to contain a tubercle of deep red ſeeds. This Plant in the Linn. Tr. is ſaid to have a minute diſk, which I have not obſerved.

[c] See PL. XII. *f*, a cluſter of Plants, nat. ſize. *g*, a ſingle ſpecimen.

[d] This is not always the caſe: See the preceding account of it when fruiting, (note [a] p. 61.) though it is always compreſſed.

FUCUS CRISPUS. TAB. XII.

FUCUS. fronde anguſtâ, cartilagineâ, dichotomâ; apicibus furcatis; pericarpiis immerſis. *Linn. S. Nat.* 812.—F. ceranoides, *Lightfoot*, 913.—*Hudſ.* 582.—*Raij, Syn.* 44. *n.* 16.—*Linn. Tr. v.* 3. *p.* 169. *var*, β.—F. membranifolius. *With. Bot. Arr. v.* 4. *p.* 106.

RADIX, diſcoides, plures emittens cauliculos.

CAULIS, complanatus, dichotomus, ſurſùm dilatatus.

RAMULI dichotomi, plani, ſurſùm levitèr dilatati; ſegmentis ad apices numeroſiſſimis, divaricatis.

FRUCTIFICATIO: tubercula, ſeu pericarpia, ovata, ſolitaria, rigida, innata, utrinque prominentia.

SEMINA intùs in muco pellucido.

OBSERVATIONES.

Vix ulla ſpecies vulgatior eſt apud nos. A Raio quidem in Synopſi p. 44. n. 16. in ſectione plantas "folio plano, pellucido" continenti planta hæc, ſed haud ſatis definitè, deſcribitur. Vocabula quidem "*F. ceranoides*, variè diſſectus" errores et hallucinationes, ut [a] alibi obſervavi, ſatis conſpicuas induxere, nec ullibi, niſi in Florâ Scoticâ accuratus hujuſce plantæ extat character ſpecificus. E baſi communi dilatatâ, irregulari, plurimi oriuntur cauliculi [b] anguſti, complanati, leviter ſurſùm dilatati; primùm ſimplices et erecti, deinde per dichotomiam ſeſe expandentes: intervallis dichotomiæ ſurſùm brevioribus. Summitates frondium ramoſiſſimæ, et flabelli ad inſtar expanſæ, apicibus quoque furcatis. Subſtantia folii cartilaginea, et diaphana; altitudo triuncialis, et ſuprà: cauliculi uſque ad quadraginta ex eâdem baſi: color variat multùm. Fructificatio juxta apices ſita eſt. Tubercula duriuſcula, ovata, purpureo-rubra, frondi innaſcuntur. Intùs ſemina in muco cernere eſt, ſi adhibeatur cultellus; maturo autem tempore rupto tegmine in frondem ejiciuntur, ibique firmiter ſatìs adhærent.

P. S. Nullibi clariùs emicuêre labores D. D. Goodenough et Woodward quam in hâc ſpecie e tenebris Synonymorum eruendâ.

Hab. paſſim.

(var. β.) TAB. XII.

..... foliolis fructiferis complanatis, bifidis; pericarpio immerſo.

Substantia plantæ hujuſce, cujus ſummitatem fructificantem ſolummodò delineavi, æquè ac prioris cartilaginea eſt; fructificatio eadem: frondis tamen habitus variat laciniis ad apices dilatatis, truncatis, liguliſque, ſeu foliolis fructiferis è margine ſuperficieque erumpentibus. Proximè F. ceranoidis var. ε et ζ in Catalogo D. Lightfoot locum ſuum obtinebit planta hæc. Suſpicor quidem verrucoſas illas in Fl. Scotica varietates minimè a noſtrâ disjungendas; ligulæ enim ſuprà memoratæ, primò convolutæ verrucarum ad inſtar deìn ſeſe evolvunt. Notatu dignum eſt quoque corpuſcula hæc *verruciformia* a D. Lightfoot (p. 917.) "ligamenta" vocari, maculaſque quaſdam

T

[a] Vid. p. 50, 51.

[b] "Octavam unciæ partem lati" (D. Lightfoot, p. 914.); notandum eſt plurimum ineſſe ſimilitudinis inter habitum *F. faſtigiati*, et *F. criſpi*.

quaſdam rubras ab illo intûs inveniri ſeminulis repletas, pericarpii forſan rudimenta. Ut ut ſe res habet, fructificatio plantæ noſtræ (Tab. XII. *k, kk.*) *ſolitaria, immerſa*, et *utrinque prominens* affinitatem in Tabulâ Synopticâ (p. xxiv.) ſtabilitam, quæ in frondibus verrucoſis, ut vocantur, ligamentis proliferis convolutis, vel ſucculentis minûs perſpicua eſt, ſatis apertè denotat. Altitudo plantæ ſexuncialis: color fuſcus, vel brunneus in adultis; in junioribus, præſertìm in foliolis fructificantibus, amœnè purpureus.

Hab. juxta PENSANCE *in* CORNUBIA.

CARTILAGINOUS FUCUS, PL. XII.

OR

Buckshorn.

FUCUS. frond narrow, cartilaginous, dichotomous: ſummits much branched, divaricated; with ſolitary, innate pericarps.

PLATES.

Gmelin, t. 7. f. 3. (a ſingle branch, large).

ROOT thin, ſpreading, throwing up numerous ſhoots.

STEM flattiſh, griſtly, dichotomous near the top, and gently dilated.

BRANCHES dichotomous, ſhortening upwards and ſlightly dilated; ſpread out like a fan.

[a] FRUCTIFICATION ſolitary, imbedded, oval tubercles, of a horny texture, and a bright red colour; prominent on either ſurface.

SEEDS numerous, blood-red, in a clear mucus.

OBSERVATIONS.

THE Species here delineated is *F. criſpus* var. β of the Linnean Tranſactions, not the var. α, which, I underſtand, has a wider, and rather palmated frond like *F. ceranoides* of GMELIN [b], t. 7. f. 1. I entertain no doubt, however, but it is the true *F. ceranoides* of LIGHTFOOT and HUDSON, as it is one of the moſt common plants of our Coaſt. LIGHTFOOT's Deſcription, which I ſubjoin in a note, [c] is extremely characteriſtic; he there ſays the breadth of the leaves is generally one-eighth of an inch. When thrown on the ſhore after a ſtorm it is frequently found in large maſſes, with from forty to a hundred ſhoots from a common diſk. In this ſtate it reſembles very much the habit of *F. faſtigiatus*, the *ſhort forked Fucus*, as they both throw up numerous ſhoots from a common diſk, and both have their ſummits crowded, owing to the dichotomous ſegments being numerous and ſhort

[a] PL. XII. *ii* a fructified ſummit magnified. *k* the imbedded pericarp.

[b] I doubt the accuracy of Profeſſor GMELIN in his delineation of *F. ceranoides*, t. 7. f. 1. (not to mention his claſſing it in his firſt Order of *F. veſiculoſus*). I much doubt whether the round bodies on the frond may not repreſent incipient *mamillæ*, or leafits rolled up. They certainly give no idea of imbedded pericarps.

[c] "Many radical leaves ariſe from the ſame root or baſe, and ſpread upon the rocks in a circular form, or (as the water often leaves them) in

ſhort in each towards the ſummits. The height of this plant is about four inches, the breadth of the leaves about an eighth of an inch at top, narrower downwards. Colour very variable. The cartilaginous pellucid texture of the frond, and its ſolitary imbedded pericarps ſerve under all its varying forms to diſcriminate this ſpecies. I have been much gratified with the very accurate Obſervations of the Gentlemen ſo often alluded to reſpecting this ſpecies. I find they coincide with me in opinion as to the confuſion introduced by miſtaken ſynonyms. In conſequence of comparing the ſpecimens in the different *Herbaria*, they have placed the palmated, or broad leaved variety of GMELIN, t. 7. f. 1. at the head of the ſpecies. I think, however, from the frequency of the ſpecimens caſt on our ſhores that the plant I have delineated is the ſort deſcribed by [d] LIGHTFOOT and HUDSON. When it grows in that wide-expanded form, it is difficult to diſtinguiſh it, unleſs in fructification, from the *mamilloſe* and *echinated* ſpecies in a ſtate of adoleſcence.

(VAR. β.) PL. XII.

..... leafits, membranaceous, bifid, with an imbedded ſeed-bearing pericarp.

I INTRODUCE this Plant as a variety of *F. criſpus*, from ſimilarity in the eſſential point of fructification, and in compliance with our older Writers. The ſportive habit of the ſpecies *Criſpus*, the *F. ceranoides* of RAY, HUDSON, and LIGHTFOOT, has been long ſince noticed by them, and in a particular manner by Profeſſor GMELIN (p. 116.). This Plant, a ſummit of which I have delineated, will afford an agreeable illuſtration of this habit; for if reference were had to fructification alone, it would be difficult to conceive that a *wart-like excreſcence* on the ſurface, or at the edge of a frond, or a *projecting ſucculent ligament* as LIGHTFOOT calls it, could have any analogy with an *oval imbedded pericarp*, which is the character of *F. criſpus* in the Linn. Tr. v. 3. 170. This var. of *F. criſpus*, or, what I think more proper, this ſpecies of *Genus*, CHONDRUS, exhibits a ſingular mode of fructification, viz. at the edges and on the ſurface near the edges are produced leafits of the ſame texture with the parent frond, only proportionably thinner and more tranſparent. Theſe leafits are bifid at top, and in theſe are found imbedded the proper pericarp, *oval*, *immerſed*, and *prominent on either ſide*. On conſidering the Deſcriptions of RAY, &c. and the general affinity of their warty varieties, it is not unfair to conclude that the "wart-like excreſcences and proliferous ligaments" deſcribed by them may be only the leafits rolled up, as they appear in an immature ſtate. It is hoped that this matter will attract the notice of thoſe who are in daily habits of examining theſe plants in all ſtages of their growth. This *Fucus* is tall, with narrow ſegments.

the form of an arc of a circle. Each leaf is moſt commonly about four inches long, and one-eighth of an inch wide, but varies from one to ſeven inches in length, and from one-twelfth to an inch in breadth; of a tough cartilaginous ſubſtance, horny when dry, pellucid when held between the eye and the light; often of a bright purple colour, ſometimes of a green colour, moſt uſually a purple intermixed with green, and frequently, when caſt upon the ſhores, and expoſed to the ſun and air, of a yellowiſh-white or horn-colour.

Again, each leaf is plane or flat on both ſurfaces, entire on the edges, of an uniform texture, without rib, ſimple, undivided, and narroweſt at the baſe, wider and dichotomous upwards, but divided into ſo many ſegments towards the extremity, that, taken collectively, they reſemble a *Corymbus*. Each ſegment is bifid at the ſummit; the two lobes generally ſhort and obtuſe, but often longer and more acute.

The fructifications appear in the ſummits of the ſegments, imbedded ſingly, one for the moſt part near the apex of each lobe, reſembling a minute red waſt or veſicle, of the ſize of the ſmalleſt pin's head, and full of numerous ſeeds. Sometimes theſe fructifications are ſeen lower in the ſubſtance of the leaf." Fl. Scot. p. 914.

[d] Lightfoot makes Gmel. tab. 7. f. 3. the principal, and f. 1, 2. the varieties.

FUCUS ECHINATUS. TAB. XII.

FUCUS. fronde cartilagineâ, divaricatâ, profundè incisâ; ſuperficie ex unâ parte ſpinulis obtuſis obſitâ. (*Spe-*

(*Species nova.*)

RADIX tenuis, plana, agglutinata.

CAULIS dichotomus, compreſſus.

FRONS cartilaginea, expanſa, enervis; laciniis profundè inciſis, ſpinulis ex unâ frondis paginâ.

FRUCTIFICATIO in ſpinulis, interna.

SEMINA minutiſſima in muco pellucido.

OBSERVATIONES.

FRONS Speciei hujus ex unâ parte ſolummodò echinata differt aliquatenùs a *F. mamilloſo* D. D. GOODENOUGH et WOODWARD. Folia antiquitùs [a] "verrucoſa" audiere, unde et nomen Anglicum; minus accuratè tamen; ſpinulis enim quam verrucis ſimiliora ſunt, quæ è ſuperficie erumpunt, corpora cylindrica, et incurva. Planta tota re verâ echinata eſt, ut ex icone apparet: baſi nititur exili, complanatæ. Caulis tenuis, dichotomus, ſensìm ſeſe expandit. Folia expanſa, profundè inciſa, et quaſi palmata, è caule producuntnr, quorum divaricatio tanta eſt, ut "circuli curvaturam," ut ait D. LIGHTFOOT, efficiunt; necnon planta tota, utpote plurimis hiſce foliis inſtructa, quam maximè "corymboſa" apparet. E baſi communi plures oriuntur cauliculi variæ ætatis. [b] Fructificatio in ſpinulis maturo tempore etiam ſine vitro conſpicienda eſt. Altitudo plantæ triuncialis, latitudo ſæpe dimidio major: ſubſtantia frondis rigida, cartilaginea, ad lucem diaphana: color amœnè viridis, aliquando olivaceus aut fuſco-purpureus, et haud rarò in adultis, interſtinctus maculis, fuſci, viridis, et purpurei. Spinulæ rufæ aut brunneæ nonniſi ætate maturâ proveniunt, unde D. MORISON rectiſſimè dicit "foliis ut *plurimùm* verrucoſis." Frondis ſc. pagina in adoleſcentibus, vel ſterilibus, lævis, aut ſaltem verrucis minimis, foliolis forſan convolutis, punctata cernitur, unde GMELINI tab. VII. f. 1. intuenti ſcrupulus mihi injicitur, annon ſpecies illa etiam huc referenda ſit.

[a] Vid. Mor. Hiſt. Ox. 646.—Raij Syn. 44. n. 16. Spinulæ hæ, aut ſi mavis ſecundum D. Lightfoot, "Ligamenta prolifera" (91), immaturâ ætate, rotundiuſculæ ſunt et convolutæ.

[b] Vide quæ obſervavi reſpectu fructificationis in ſucculentis hiſce ligumentis, itemque affinitatis inter ſpeciem hanc et *Fucum criſpum*, var. β. p. 65.

ECHINATED FUCUS. PL. XII.

FUCUS. frond cartilaginous, widely ſpreading, with deep ſegments: the *upper ſurface* covered over with blunted ſucculent ſpines.

(*No Plate.*)

ROOT ſmall, thin, adhering.

STEM, compreſſed, dichotomous.

FROND

FROND, griſtly, ſuddenly expanding, ribleſs, tranſparent; cut into deep ſegments, echinated on one ſide.

* FRUCTIFICATION in the ſummits of the ſpines, conſiſting of numerous dark coloured and very minute ſeeds imbedded in a pellucid jelly.

OBSERVATIONS.

THIS Species is probably new, as having the ſpinous protuberances on one ſide only. Theſe are generally ſomewhat crooked, ſucculent, and tranſparent, and are deſigned as the organs of fructification. In their ſummits are lodged the ſeeds, which, when ripe, may be ſeen with a ſtrong eye-glaſs, if held to the light. Theſe ſpines, or "proliferous ligaments," as LIGHTFOOT calls them, uſually come out, as I before obſerved, from one ſurface only, and there are the appearances of cavities on the oppoſite ſide, as if they were hollow, and had a communication upwards. The general height of this plant is from three to four inches: its ſtem is narrow, and compreſſed, widening upwards, and dichotomous. Its divarication is ſo conſiderable, that its breadth is frequently double its height. The ſummits ſuddenly expand, and have very deep inciſions, ſo as to appear irregularly palmated: the tips of the ſegments are bifid and forked. Colour bright green, ſometimes olive: ſpines brown. It muſt be obſerved that this ſpecies when young, as likewiſe the other warted kinds, has no appearance of ſpines, which corroborates the idea of their being an appendage of fructification, and this is rightly hinted by [b] MORISON. I took it for granted on a firſt view, that this ſpecies would prove to be the *F. mamillofus* of the new Catalogue (Linn. Tr. v. 3. p. 174.); but on a careful examination of the ſpecific character of each, I ſhall venture to keep it diſtinct under the trivial name adopted above. The ſtem is rolled ſomewhat in at the edges, making a furrow in the middle, ſo as to anſwer the character of "*hinc canaliculatus.*" [c] Its bright apple green colour is remarkable in a ſea plant, and characteriſtic of the ſpecies.

Hab. Marazion, Acton Caſtle, *&c. &c.*

* PL. XII. *m* one of the papillæ magnified. *n* the ſeeds. [b] Mor. Hiſt. Ox. 646. [c] Linn. Tr. v. 3. p. 104.

FUCUS SEDOIDES. TAB. XII.

FUCUS. fronde tereti, gelatinosâ, diaphanâ, tenerâ; ramis paucis: foliis craſſis, utrinque attenuatis, petiolatis. *Reaumur. Act. Gall.* 1712. *p.* 40.—*Lightfoot.* (Vermicularis) *p.* 958 *?—Linn. Tr. v.* 4. *p.* 117.

RADIX diſcoides, plana, agglutinata.

CAULIS cylindricus, tener, diaphanus.

RAMULI pauci, ſub-dichotomi, teretes.

FOLIA ſucculenta, diaphana, petiolata, ramulos undique circumdantia.

FRUCTIFICATIO, gelatina, pellucida, retiformis, foliis immerſa.

SEMINA minutiſſima, glomerata, coccinea.

OBSER-

OBSERVATIONES.

Species duæ ſubſtantiâ et habitu paululùm inter ſe diſcrepantes in littoribus noſtris reperiuntur *F. F. ovalis* et *ſedoides*. Ambas haſce ſub communi *F. ovalis* nomine incluſit D. Hudson, ſynonymis *F. vermicularis* et [a] *polypodioidis* D. Gmelin in unum relatis. Habitus *F. ovalis* procumbens, divaricatus, rigidiuſculus, foliis ſparſis, apice *obtuſis*: *F. ſedoidis*, erectus, *mollis* (Reaum. Act. Gall. 1718, p. 40.), foliis undique glomeratis, apice *attenuatis*. E baſi tenui diſcoidi caulis unus et alter aſſurgit ſubnudus, erectus. Ramuli pauci, ad baſin foliis viduati. Folia hæc vix tertiam unciæ partem longa, formâ et ſubſtantiâ, ut ait D. Lightfoot (p. 958.), "foliis *Sedi albi* quam ſimillima ſunt." [b] Color amœnè roſaceus. Fructificatio in foliolis juxta apicem reperitur. In interiori ſubſtantiâ ad lucem oculo armato cernuntur ſemina, queis per foramina minutiſſima maturo tempore datur exitus in mare. Notandum eſt, cum ſit planta omnium tenerrima, habitum in ſpeciminibus ſiccis magnoperè variare, foliis inter ſiccandum, aut deciduis, aut compreſſis, et quaſi membranaceis. Species eſt ferè ſemper paraſitica.

Hab. Acton Caſtle, Penſance, *et alibi*.

[a] *F. polypodioidem* in Catalogo ſuo omiſit D. Lightfoot, qui deſcriptionem apud D. Gmelin "foliis oblongis, obtuſis, integerrimis ··· nervo in illis nullo, &c." p. 186, a ſpecimine exſiccato ſumptam, minus accuratè perſpexit. *F. daſyphyllus* nov. ſp. (Linn. Tr. v. 3. p. 119.) hujus ſpeciei affinis eſt.

[b] Character diſtinctivus, quoad hactenus obſervavi, inter haſce ſpecies a colore ſumendus eſt. *F. ovalis* in Cornubia ſemper olivaceus, vel candicans (Gmel. p. 162.) reperitur; *F. ſedoides*, ruber.

[c] Vid. Lightfoot, 958.

Stone-crop FUCUS. PL. XII.

FUCUS. frond cylindrical, tender, tranſparent: branches few; leaves ſucculent, ſwelling in the middle, ſurrounding the branches.

PLATE.

Act. Gall. 1712. *t.* 4. *f.* 8.

ROOT, diſcoid, flat, adhering.

STEM, round, of the ſize of large packthread, gelatinous, tranſparent.

BRANCHES, few, erect, of an equal ſize throughout.

LEAVES ſurrounding the branches, ſucculent, ſmalleſt at each end, pedunculated.

[a] FRUCTIFICATION, a net-work of capillary tubes immerſed in the ſubſtance of the leaves.

SEEDS very ſmall, blood-red.

OBSER-

[a] Pl. xii. *l. l.* a fructifying leaf magnified.

OBSERVATIONS.

This Species I have called *F. ſedoides*, as differing in many reſpects from the *F. vermicularis* of Lightfoot and Gmelin, which is the *F. ovalis* of Hudson. It is always, I imagine, a paraſitical plant, and commonly to be found growing on the large footſtalks of *F. digitatus*. It ſends up one, and ſometimes two or three ſtems, which are divided at top into a few principal branches; not, however, ſtrictly [b] dichotomous; the ſtem and lower part of the branches are naked: at the top the latter are garniſhed all round without any order, with tender ſucculent leaves growing on ſlender footſtalks. Theſe leaves ſwell in the middle, and are more pointed at the tops than *F. ovalis*: they are tranſparent, and of a ſmooth ſhining ſurface. The uſual height of the Plant is from two to four inches; the length of the leaves, which are all of a ſize, about three-tenths of an inch. The ſucculency of theſe leaves, and the manner of their ſurrounding the upper parts of the branches gave Lightfoot the idea of the *Sedum album*, or common white flowering Stone-crop. The whole Plant is of a bright clear pink colour. The fructification is ſituated in the upper leaves, and may be ſeen, if held up to the light, by a common eye-glaſs. It conſiſts of minute red globules, which on diſſection appear to be imbedded in a colourleſs reticulated jelly, in the ſame manner as *F. articulatus*, *pinnatifidus*, *kaliformis*, *&c.* On highly magnifying a piece of the leaf, I diſcovered the ſurface in an advanced ſtate perforated with minute holes for the diſcharge of the ſeeds. I find, on inſpecting Dr. Goodenough and Mr. Woodward's Catalogues, that this ſpecies is ſeparated from *F. ovalis*, and by a happy coincidence under the ſelf-ſame trivial name which I have adopted.

[b] This character is aſcribed to *F. vermicularis* by Lightfoot, p. 959, though Gmelin's Pl. 18. f. 4, which he commends, is far from dichotomous. There is certainly a great affinity, but the ſhape of the leaves, the firm texture, and ſtraggling growth of *F. ovalis*, and its globular fructification (Linn. Tr. p. 1. p. 117.) are ſufficient to keep it diſtinct; as likewiſe the colour, which in *F. ovalis*, as far as I have obſerved, is brown or olive, in *F. ſedoides* bright red.

FUCUS THRIX. TAB. XII.

FUCUS. fronde, ſimplici, ſetaceâ, tubulosâ; plurimis è baſi communi. *With. Arr. v.* 4. *p.* 116.

(*Species nova*).

RADIX plana, tenuis, agglutinata.

FRONS, ſetacea ad baſin attenuata in medio turgidula: futurâ ſpirali.

FRUCTIFICATIO interna, filamentis implicatis, diaphanis conſtans.

SEMINA minutiſſima, opaca.

OBSERVATIONES.

In fiſſuris rupium juxta Acton Castle in ſinu [a] Mounts Bay dicto occurrit parvula hæc ſpecies. Habitu frondis cylindrico, tubuloſo, nec non futurâ ſpirali *F. filum* refert, diſtinctiſſima tamen eſt; nunquam enim, quoad obſervavi,

[a] In Comitatu Cornubiæ.

obſervavi, ſolitaria reperitur. E baſi communi oriuntur bina, terna, ſena, aut etiam plura fila cylindrica, tubuloſa, variæ ætatis et magnitudinis: juniora, planè ſetacea; provectiora, in medio et ad apices turgidula, intùs filamentis capillaribus, tubuliſve pellucidis lanæ ad inſtar inter ſe implicatis, repleta. Altitudo plantæ biuncialis, vel etiam ſexuncialis; color olivaceus; cuticula glaberrima, lubriciſſima, nitens. Fronde matureſcente, apices marceſcunt, et ſubſtantiâ, ut nudis oculis apparet, lanosâ operiuntur: ſi microſcopium adhibeas, filamenta capillaria ſupradicta cernuntur, ſenſìm ſeſe evolventia. Filamenta hæcce ſeptis ad intervalla inſtructa, granula intùs opaca minutiſſima continent, quæ, vel ſemina, vel ſaltèm, ſeminum ſunt rudimenta.

Hab. Acton Caſtle, Penſance, *et alibi in occident.* Angliæ *littore.*

Capillary FUCUS. PL. XII.

FUCUS. frond thread-ſhaped, unbranched, hair-like: many threads from the ſame baſe.

(*No Plate.*)

ROOT flat, thin, ſpreading.

THREADS, hair-like, ſmall at bottom, ſwelling a little in the middle, and at the tips, with a ſpiral ſeam.

[a] FRUCTIFICATION. A collection of woolly fibres, which on being highly magnified appear to be tranſparent capillary tubes with *ſepta*, or partitions.

SEEDS, very minute dark-coloured granules in the tubes.

OBSERVATIONS.

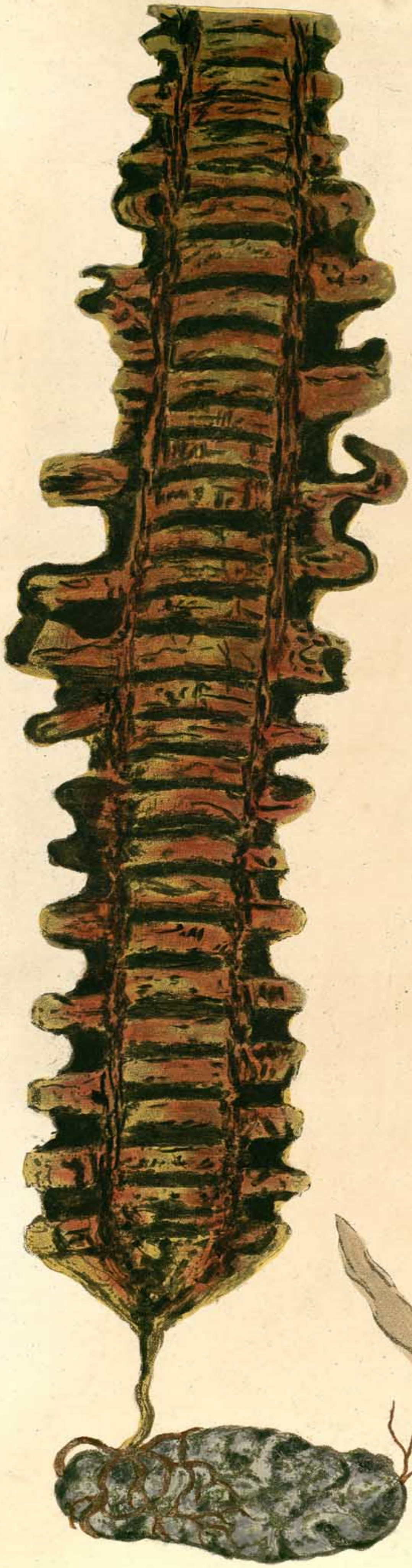
This minute plant has hitherto eſcaped Botanical notice. Indeed unleſs you ſtoop low it is not to be diſcerned, as it grows in the cleſts of the rock. Its uſual height is from two to four inches, ſome few threads occaſionally attaining the length of ſix inches. Its baſe or diſk is flat and creeping on the rocks: it ſends up from two, to ten thread-like unbranched ſhoots: the younger ones of an uniform ſlenderneſs; the elder ones very ſmall near the baſe, and gently ſwelling in the middle and at the tips. Theſe latter diſcover on being held to the light a ſpiral ſeam. Cluſters of theſe minute plants are ſometimes found ſpread, as it were in patches. Its firm elaſtic ſlippery coat, and gelatinous interior part, added to the ſpiral mode of its growth, might induce a belief that it was only a variety or infant plant of *F. filum*, but its cluſtered habit is alone ſufficient to diſcriminate it. The ſummits are frequently found decaying, and at that time they appear to be covered with woolly filaments: but on examining and diſſecting them, they appear to be pellucid [b] capillary veſſels continued through the frond, and evolving themſelves in the water. [c] Theſe veſſels when more highly magnified appear to be tubes furniſhed with *ſepta* or partitions, and not unfrequently when far advanced you diſcover very minute dark-coloured granules, which muſt be either the ſeeds, or the rudiments of ſeeds.

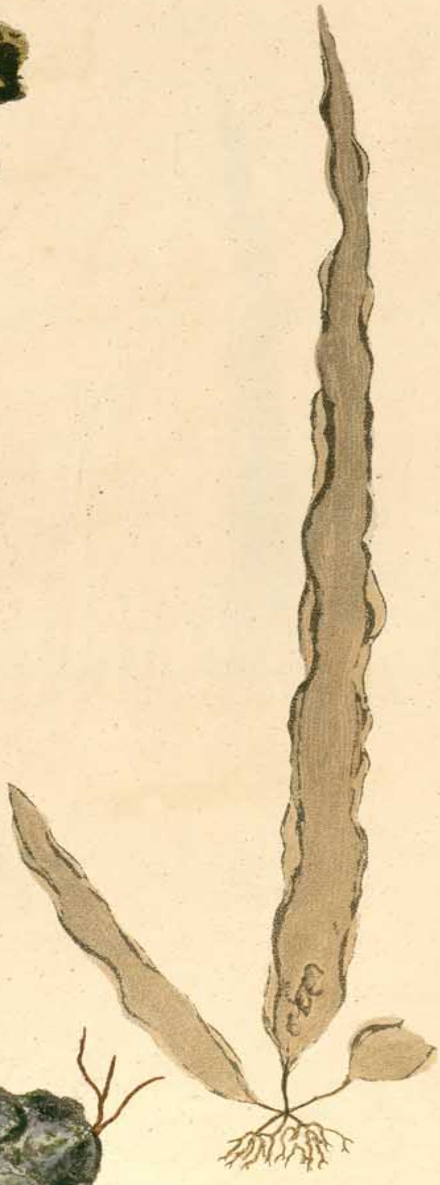
Hab. Acton Castle, Mounts-Bay, Cornwall.

[a] Pl. xii. *o, o, o* Summits evolving. *p* a Summit highly magnified. *q, q, q* The tubes.

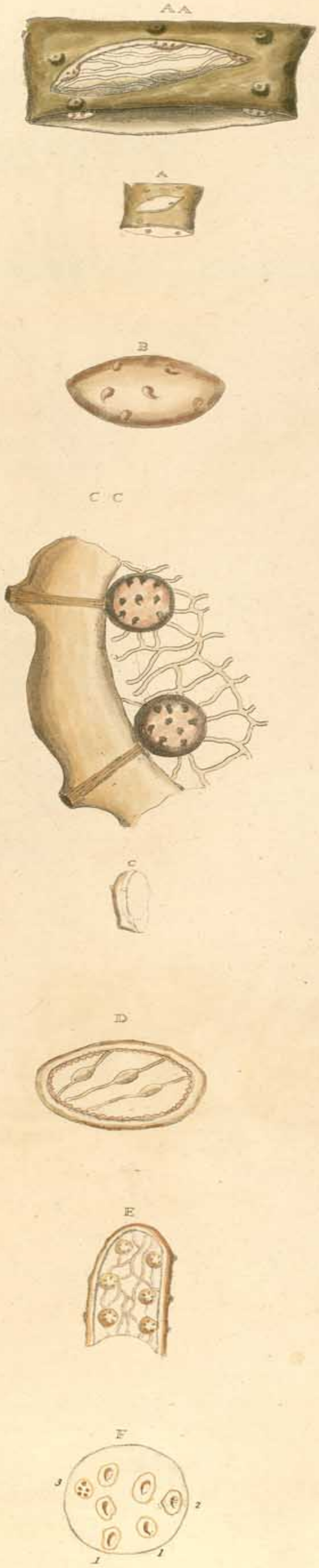
[b] See Pl. xii. *q, q.*

[c] I have arranged this minute Plant under *genus* Chorda in the Synoptic Table, but our knowledge is too confined as yet to fix the boundaries between many of the marine plants that are ſo nearly allied in habit. The tubular *Ulvæ* of Mr. Woodward (Linn. Tr. v. 3. p. 52.) will probably hereafter form a diſtinct *Genus.*





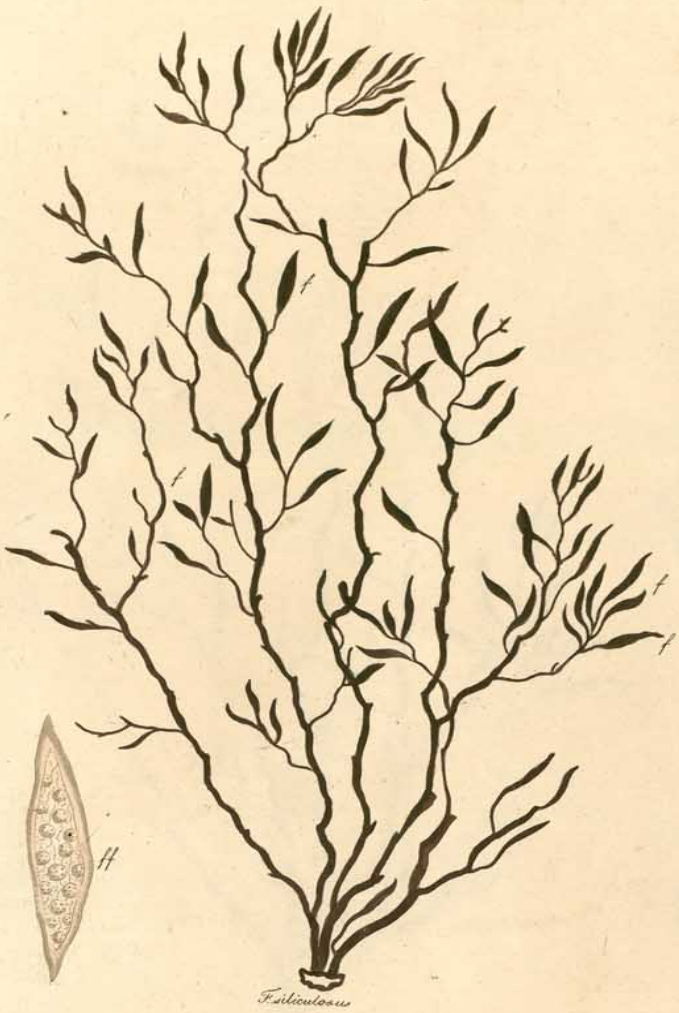
F. phyllitis



F. saccharinus

J. S. del


F. nodosus
F. loreus
F. filum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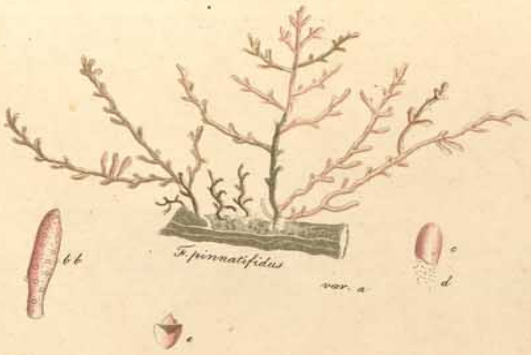
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var. a
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d
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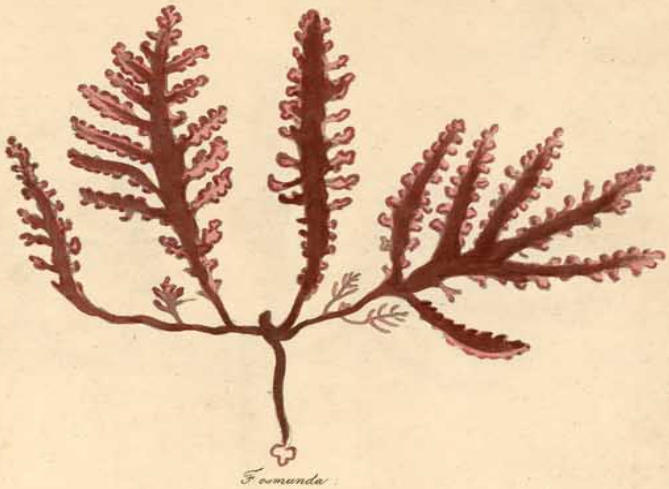
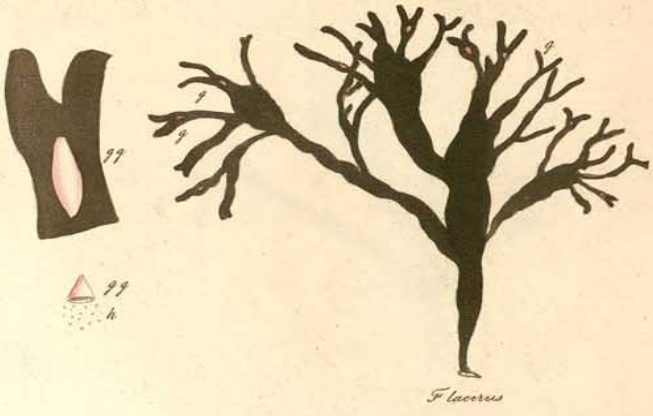
a a
F. pinnatifidus
var. b


F. ovinunda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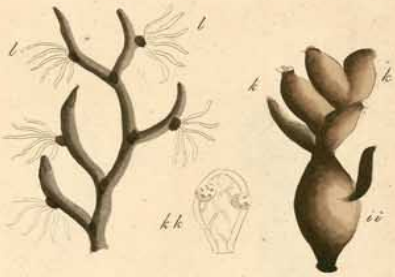
F. lacerus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F. jubatus


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F. tamariscifolius


a

J. S. del.


F. palmatus.
F. caespitosus.
F. corneus.
F. edulis
F. crispus.
F. stellatus
F. sedoides.
F. crispus. var
F. echinatus.
F. thria.
J. S. del.


F. Sherardi
N.° 1
N.° 2
Preface P. XXX
a a magn.d
F. Serratus nat: size
F. Ceranoides
F. Hypoglossoides
F. Pinastroides
Var. α.
F. Pinastroides
Var. β.
ddd.
dd.
d.
F. Laceratus
F. alatus mag.d tips
mag.d p.t of Var. β.
nat: size
magn.d
F. alatus Var. α
F. alatus Var. β
F. alatus
Var. γ
J. S. del: