TRANSACTIONS

OF THE

LINNEAN SOCIETY.

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LINNEAN SOCIETY.

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INTRO-

INTRODUCTORY DISCOURSE

ON THE

RISE AND PROGRESS

OF

NATURAL HISTORY.

DELIVERED BY THE PRESIDENT, APRIL 8, 1788.

THE Study of Nature, that is an attention to the ground on which we tread, the vegetables which clothe and adorn it, and the boundleſs variety of living creatures preſenting themſelves to our notice on every ſide, muſt have been one of the firſt occupations of man in a ſtate of nature. In no country hitherto diſcovered, however barbarous and unenlightened, is the human race found ſo negligent and helpleſs as not to have inveſtigated the natural bodies around them, ſo far at leaſt as from thence to ſupply

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their neceſſary wants, and even to obtain conveniences and luxuries. In the more hoſpitable climes in which probably mankind were firſt eſtabliſhed, this taſk was the more eaſy. The calls of nature would there be readily ſatisfied; and while the ſenſes were gratified with all they were capable of enjoying, the mind, ever prone to curioſity, would be continually exerciſed and delighted in inveſtigating the creation around it. Then, as the human race multiplied, would the ſpirit of competition ariſe for the diſcovery of hitherto untaſted luxuries or unknown conveniences; and he who firſt climbed the lofty palm-tree, and while its leafy honours were waving above his head, ſcattered the golden ſhower of plenty upon his admiring companions, would deſerve and enjoy more real glory, than any deſtroyer of his fellow creatures ever enjoyed, after thoſe very boughs became proſtituted to proclaim the triumph of deſolation and war.

By degrees mankind became ſo numerous and ſo adventurous as not only to occupy all that part of the world in which they were firſt ſettled, but alſo to migrate into far diſtant countries, where ruder ſkies and leſs fruitful plains taught them new wants, and put their ingenuity to greater trials. In ſhort, by means and accidents which moſt likely will long remain a problem for philoſophers, the human race became in proceſs of time diſperſed over almoſt every part of the globe where art and labour could find them protection and ſubſiſtence. Their various acquirements, in the courſe of their long, laborious progreſs, muſt have been all founded on the knowledge and obſervation of nature; and with ſo much accuracy have they ſtudied this ſubject, ſo intereſting to them all, that even in the moſt advanced ſtate of ſociety, as well as in the loweſt, mankind are perfectly agreed upon the uſes of moſt of the neceſſaries with which nature furniſhes them; they have all alike learned preciſely to what purpoſe each is fit, and all ſupply

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the ordinary wants of life, all remove its ordinary inconveniences, much in the ſame way.

If on the preſent occaſion my principal object were to amuſe the fancy, I ſhould dwell long on this early period of the hiſtory of the human race. The firſt probable wants and inventions of mankind; their progreſs from a ſtate of nature, peace and innocence, to one more turbulent and active, but leſs natural and happy; the ſimple origin of each art and ſcience, and eſpecially the ſource of all human knowledge, in the obſervation of nature, with the different degrees of cultivation which each ſcience may be ſuppoſed to have received according to the various circumſtances in which mankind have been—all theſe things might form a very amuſing ſubject for ſpeculation: but as ſuch diſquiſitions muſt be chiefly guided by the imagination, and after all could be only conſidered in the light of a romance, I muſt not at preſent enter upon them. My review of thoſe much later periods, although ſtill far remote from us, in which the progreſs of ſcience begins to be marked, muſt be even more ſlight than the traces of its footſteps in the page of hiſtory; and we ſhall eaſily conſole ourſelves for our ignorance of what former ages have thought and known, when we find how little real advantage is to be derived from the knowledge of thoſe much nearer to us.

In a very early ſtate of ſociety the ſum of human knowledge would become too much for every individual to acquire; of courſe ſome muſt neceſſarily purſue particular arts or enquiries in preference to the reſt; and this difference is obſervable not only among individuals, but alſo between different nations and bodies of men. In infant ſtates warlike accompliſhments more than any others engage the generality of the citizens, and, becauſe moſt evidently neceſſary to the ſafety of the whole, are held in the higheſt eſteem. But when external danger is kept at a diſtance, the inter-

nal regulations of the ſtate, and the ſofter arts of peace, become more intereſting to thoſe who have talents for cultivating them. A part of the community being ſufficient to ſupply the whole with the neceſſaries of life, the occupations of the reſt becoming voluntary, are as various as the virtues and vices, taſtes, genius and abilities of mankind; and the more a people are refined and enlightened, the more various and the more diſtinctly marked are the purſuits of individuals.

The early hiſtory of ſcience informs us rather of peculiar acquirements by which certain nations diſtinguiſhed themſelves from the reſt, than of the general ſtock of knowledge then in the world. Thus we are told of the ſkill of the Egyptians in aſtronomy, to which they were peculiarly led by their manner of repoſing on open terraces under a cloudleſs ſky. But we are not to conclude that this ſcience had never been cultivated by any people before, nor that the Egyptians, and all the reſt of the world, had lived totally void of curioſity, and blind to every thing around them, till their attention was excited by the trivial circumſtance above mentioned. We learn from the Old Teſtament, which if it were merely an human work would be the moſt venerable monument in the world, that Natural Hiſtory was very early one of the ſciences in the higheſt eſtimation. Without examining what was the preciſe degree of Solomon's ſkill in this ſcience, the manner in which his botanical knowledge is mentioned in the Bible, proves that to have been in thoſe days the moſt eſteemed perhaps of all learning whatever. Yet where are the records of its progreſs? How totally is the knowledge of thoſe ages and of numberleſs others loſt to us!

As botany and aſtronomy have been among the earlieſt purſuits of mankind, ſo they have been prepoſterouſly combined together, and connections frequently imagined between certain ſtars and particular plants. This is one of thoſe inſtances, but too numerous in

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the history of the human mind, of theory, like an ignis fatuus, having led men astray, and made them pay dear for a little real instruction, by bewildering them in endless errors and absurdities. And so hard is it to overcome prejudices, sanctified in a manner by antiquity, that this idea of a connexion between stars and plants, is only just got rid of in the most enlightened parts of the world.

But to console ourselves under the contemplation of such humiliating instances of human weakness, let us turn our attention to the father of philosophy, at least of our philosophy, rising so superior to the darkness in which he lived, darting his penetrating glance through all nature, and establishing principles which a long course of ages of enquiry have but confirmed. With Aristotle begins the real history of science; and how much soever he may have erred on particular points, the greatness of his conceptions and the justness of his ideas on the whole, entitle him to our high veneration, and we should correct his mistakes with awe. His labours in the investigation of the animal kingdom have laid the foundation of the knowledge we now possess, and it cannot sufficiently be regretted that we have only an imperfect account of his discoveries.—Theophrastus, the worthy disciple of Aristotle, has given us the first scientific views of the vegetable and mineral kingdoms. His works are indeed short and imperfect sketches, but they are by the hand of a master. These two great men stand unrivalled as the only philosophical naturalists of antiquity of whom we have any satisfactory knowledge.

Several ages afterwards came Pliny, that laborious compiler, whose mind, too much occupied by a variety of pursuits, could properly cultivate none. He has transmitted to us, as far as he was able, all that was known of Natural History, or rather all that had been imagined, at the time in which he lived. Whether Dioscorides

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lived before or after him, and which borrowed from the other, the learned are not agreed, nor is it of much conſequence to the reputation of either. Dioſcorides has had perhaps no great injuſtice done him by a celebrated modern writer, who ſtyles him "a great compiler of receipts." In fact his works are nothing elſe than a materia medica, in which he has enumerated all the natural bodies known at that time to have been uſed in medicine, with their imaginary virtues, but with ſo little judgment, that it were charitable to ſuppoſe he meant only to collect the opinions of others, without ever attempting to exerciſe that faculty. How he came to be called the father of botany is wonderful to me. It is leſs extraordinary that he ſhould, after the revival of learning, have had innumerable commentators, becauſe his ſhort and imperfect deſcriptions would afford ample ſcope to thoſe who imagined all human wiſdom to be contained in the obſcure works of men who had lived in the world a few ages before themſelves.

That age of commentators we muſt now conſider. I purpoſely paſs over thoſe times of darkneſs which followed the ruin of the Roman Empire, during which, if there were any ſhadow of ſcience in the world, it was among the Arabians, and they cultivated Natural Hiſtory only as a branch of medicine. Thoſe who wiſh to ſtudy this part of the hiſtory of botany, will find ample ſatisfaction in Haller's Bibliotheca Botanica, where they may alſo ſee an account of all the Greek and Roman authors who have at all touched on this branch of Natural Hiſtory; and whom I have avoided mentioning, not only that I might keep within the bounds I had preſcribed to myſelf, but becauſe the labours of thoſe writers do not appear to have contributed to the knowledge we now poſſeſs.

When learning began to raiſe its drooping head in the fifteenth century, thoſe ſciences of which moſt traces were found in the writings

writings of the ancients began firſt to be cultivated. Botany was more eſpecially attended to very early, as medicine, which, however it might have been degraded in the ages of barbariſm, could never have been totally neglected, ſtood in immediate need of its aſſiſtance. The works of the ancients, and particularly thoſe of Dioſcorides, were then ſtudied with the moſt pertinacious aſſiduity; remedies which this writer had recommended were deemed infallible, and virtues which he had attributed to any plant, indiſputable. The chief difficulty in almoſt every caſe was to find out the plant he meant; and this difficulty becoming at length ſo great as to be abſolutely inſurmountable, his commentators were loſt in mazes of their own conjectures. It was happy for the credit of Dioſcorides that this was the caſe, and that the world were ſo occupied by this kind of criticiſm, as ſeldom to have examined the truth of his aſſertions.

Of theſe commentators ſome few had great original merit in giving figures of the plants of which they treated, and thoſe figures are many of them executed with ſuch perfection as to excite our aſtoniſhment; they have rarely been excelled at any following period. The firſt of theſe is Brunfelſius, whoſe figures, although only wooden outlines, often expreſs the plant intended better than many fine modern engravings, and were evidently drawn by a firſt-rate painter. Matthiolus, the moſt celebrated of all the commentators on Dioſcorides, has likewiſe given excellent figures of all the natural ſubſtances mentioned in his book; thoſe of the two Venetian editions of this work are ſtill the admiration of botaniſts, and make thoſe editions much ſought after by collectors.

The large figures of Fuchſius are no leſs celebrated, nor with leſs reaſon; although only outlines, they repreſent the plants extremely well.

The example of theſe authors was ſoon followed by others, who

publiſhed figures of plants from their own obſervation; and ever ſince the middle of the ſixteenth century the preſs throughout Europe has teemed with ſimilar publications; certainly to the great advancement of botany, although the merit of theſe works has been very various.

For almoſt two centuries after the revival of letters in Europe the attention of naturaliſts was chiefly confined to the vegetable creation; and although ſince that time the animal and mineral kingdoms have received an eminent degree of cultivation, ſtill botany has always kept its ground. The infinitely varied beauties of the vegetable tribe have, in every country, engaged ſome ingenuous minds in the contemplation of this branch of the great family of nature, and excited them to inveſtigate the laws by which it is governed. Whether their labours have been crowned with the ſmile of princes, rewarded with worldly honours and emoluments, or only deſtined to enliven the ſcenes of rural retirement, to relieve the mind amid the buſy purſuits of active life, or add new charms to ſocial intercourſe; they have never failed to carry with them their own reward, in that ſweet and innocent pleaſure which riſes under the ſteps of the botaniſt wherever he goes, in thoſe ſublime and delightful ideas of the Author of nature to which ſuch enquiries lead, and the complacency they always excite in the mind.

The inſtitution of public botanic gardens is a memorable æra in the hiſtory of botany. The firſt of theſe was, I believe, at Padua in 1533 *, where it ſtill continues to make a tolerable figure, although now ſurpaſſed by ſeveral others, which have had more powerful protectors. The gardens of Florence, Piſa, Bologna and Leyden were ſoon after eſtabliſhed, and all ſtill exiſt. Nor muſt I

* The eſtabliſhment of a *botanic* garden at Rome about the year 1450 ſeems not ſufficiently authenticated. See Sabbati Hortus Romanus.

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forget to mention that we had at London a tolerable collection of plants in the garden of Gerard, a catalogue of which, printed in 1596, exiſts in the Britiſh Muſeum, but is elſewhere rarely to be met with. The ſucceſs of botanic gardens has pretty much kept pace with the commerce of the countries in which they were eſtabliſhed; nor is this to be wondered at. The intercourſe of the Dutch with the Eaſt Indies, and their poſſeſſion of the Cape, long gave their collections, in all the different branches of Natural Hiſtory, a decided ſuperiority over thoſe of other nations. The Engliſh have now enriched their gardens far beyond any others by the ſupplies obtained from the Eaſt and Weſt Indies, and eſpecially from America.

I find myſelf obliged to paſs over a number of naturaliſts who flouriſhed from the middle to the end of the ſixteenth century. Thoſe whoſe works are the moſt known, and have been of the moſt ſervice to the world, are Tragus, Leonardus, Fuchſius, Dodonæus and Dalechampius in Botany, Bellonius in Ornithology, and Rondeletius in Ichthyology. But there are a few great names which ought not to be ſo ſlightly mentioned; I muſt be allowed to enlarge a little on the merits of Geſner, Aldrovandus, Cluſius and Cæſalpinus.

Conrad Geſner, the greateſt naturaliſt the world had ſeen ſince Ariſtotle, was born at Zurich in 1516, and died of the plague in 1565. Notwithſtanding his conſtitution was feeble and ſickly, and his life by no means a long one, he applied himſelf to the ſtudy of nature with ſuch aſſiduity, that he not only made more new obſervations than had been made by any modern writer, but alſo firſt reſtored the ſcience he cultivated to the dignity of philoſophy, of which it had almoſt loſt ſight ſince the days of Ariſtotle and Theophraſtus. Geſner cultivated medicine with equal ſucceſs, proceeding always on the ſure ground of obſervation and experience. His health, naturally weak, is ſaid to have frequently ſuffered by the

experiments he made on himſelf. But his infirmities did not deter him from taking frequent and laborious alpine journeys, any more than his very confined circumſtances prevented his being at conſiderable, and at that time very uncommon, expences, in the advancement of his darling purſuits. He founded and ſupported a botanic garden, kept a painter and engraver in his ſervice, had a very conſiderable library, and, according to Haller, was the firſt who ever formed a muſeum of Natural Hiſtory. But his greateſt honour is his having firſt ſuggeſted the idea of a methodical arrangement of plants according to claſſes, orders and genera, from the different ſtructure of the flowers; an idea which all true botaniſts ſince his time have purſued, and to which the very exiſtence of botany as a ſcience is owing.

Aldrovandus reſembled Geſner in his indefatigable induſtry and zeal for the advancement of Natural Hiſtory. Like him he devoted his life to travelling and ſtudy, and like him eſtabliſhed a muſeum and undertook works whoſe immenſity aſtoniſhes as much as their erudition. But he did not poſſeſs the ſyſtematic genius of Geſner, nor had he the prudence along with the liberality of his great contemporary. Although he had a fortune of his own, and was aſſiſted by many of the rich and powerful of his time, he was reduced to indigence towards the end of life. He lived to the age of 80, dying in 1605. His memory has been always much honoured at Bologna. The great zoological work which he left imperfect, was finiſhed after his death, and his muſeum laid the foundation of that which at preſent is one of the ornaments of that univerſity. Many ſpecimens ſtill exiſt there marked with the venerable hand-writing of their firſt poſſeſſor.

Neither had Cluſius that genius for arrangement for which Geſner was remarkable. Botany is however very much indebted to him for the publication of a vaſt number of new plants, with excel-

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lent figures which atone for the imperfections of his deſcriptions. His amiable diſpoſition, ſays Haller, procured him a great number of friends, whoſe diſcoveries enriched his own works. He always acknowledged their favours, and gave to every body their due praiſe. A number of the plants diſcovered by Geſner were firſt publiſhed by Cluſius. This illuſtrious botaniſt died in 1609, at the great age of 84. He was profeſſor of botany at Leyden, where a palm tree (a cauleſcent variety of Chamærops humilis) planted by him, ſtill exiſts in great perfection.

I am now to ſpeak of Cæſalpinus; but if I ſhould enter into a full diſcuſſion of his character and merits, it would lead me a great deal too far. His ardent attachment to Ariſtotle led him into the depths of metaphyſics, and into many errors relating to the nature of man, and the firſt cauſe of all things, which the dogmas of the court of Rome where he lived were not likely to correct, in a philoſophical mind like his. He has left evident proofs of his knowing the circulation of the blood at leaſt through the lungs, and the ſervices he has rendered to botany entitle him to be ranked among its moſt able promoters. I need not enter into the particulars of his method, which is chiefly founded on the fruit. He has made ſome miſtakes, which Haller has taken care to point out; but it muſt not be forgotten that Cæſalpinus has thrown more light on the ſtructure and affinities of vegetables than any one before his time, and has diſtinctly mentioned the ſexes of plants. He died in 1603.

While theſe great men were flouriſhing on the continent, botany began to be attended to in our own country. Turner publiſhed his Herbal in 1551; ſoon after Lyte gave a tranſlation of Dodonæus; and in 1597 was printed the firſt edition of Gerard's Herbal. It is ſufficient that I mention the names of theſe authors. Lobel, who began to publiſh in London in 1570, and who is the author of many

good obſervations, has been often miſtaken for an Engliſhman; but although he ſpent the greater part of his life here, he was born in Flanders.

It would be unpardonable if I were to finiſh this period of the hiſtory of our ſcience without mentioning Fabius Columna, who firſt gave copper plates of plants; and thoſe of an almoſt unrivalled degree of accuracy, drawn and engraved by his own hand. In his Phytobaſanos, publiſhed at Naples in 1592, and again at Florence in 1744, he has taken infinite pains, and ſhown great ſagacity, in determining ſome plants of the ancients, and has detected innumerable errors in Pliny and other authors. His Ecphraſis publiſhed ſeveral years afterwards is a larger work, and contains a large number of new plants, diſtinguiſhed and figured with the greateſt accuracy. He is likewiſe the author of a curious and learned work on the Purpura of the ancients. All theſe books, eſpecially the firſt, are very rare. Columna, an able critic himſelf, was criticiſed in his turn by one far inferior, Aldinus in his Hortus Farneſianus, printed at Rome 1625; a work in which however there are ſome good figures of rare plants, and which is not commonly to be met with.

The inſtitution of the academy of the Lyncæi at Rome in 1603 deſerves to be remarked, as that ſociety was the firſt of the kind, and has been in ſome meaſure the model of all the preſent literary ſocieties in Europe. Its chief promoter and perpetual preſident was Frederick Caeſius, a young Roman nobleman of great ſcience. Among the names of thoſe who compoſed it we find Fabius Columna and the great Galileo, a circumſtance perhaps more likely to immortalize its memory than the medals which were ſtruck upon its eſtabliſhment. This inſtitution died with its noble founder in 1630.

The number of authors who had written on plants without any ſyſtem or method in the ſixteenth century, and the confuſion of

names

names which had been introduced, ſeemed to render it at length neceſſary for the preſervation of the ſcience that ſome great ſyſtematic genius ſhould undertake to digeſt the confuſed maſs, and profiting of the hints of Geſner and Cæſalpinus, reduce into order the vaſt materials, with which botany was in a manner overwhelmed, rather than enriched. But this event, ſo much to be deſired, was not yet to take place in its full extent. An eminent ſervice was however rendered to botany by the two illuſtrious brothers John and Caſpar Bauhin, with whom I ſhall cloſe the hiſtory of the ſixteenth century, and enter on that of the ſeventeenth.

John Bauhin was in a great meaſure formed as a botaniſt under Geſner, but not having a turn for ſyſtem, he did not in that reſpect learn much from his great teacher. He devoted a life of more than 70 years to a critical inveſtigation of all that had been written before him, and made many valuable obſervations as well as many original diſcoveries. But he opened no new path in botany. His labours were conducted on the ſame plan as thoſe of his predeceſſors. The fruit of his ſtudies is nothing leſs than an Univerſal Hiſtory of Plants, which being left in MS. at his death in 1613, was not publiſhed till 1650, when it appeared in three volumes folio. Like all poſthumous works it has defects, which probably it would not have had if publiſhed by its author. It is a monument of labour and erudition, and contains ſo much information and ſo many elucidations of preceding authors, as to be ſtill in great eſtimation, notwithſtanding its want of order and the rudeneſs of the figures.—— This work paved the way for Caſpar Bauhin in the much more important and original one which he undertook and happily perfected, the publication of which forms one of the moſt remarkable æras in botany, and which was firſt printed in 1623, under the title of Pinax Theatri Botanici. This was meant, as its name imports, as an index to all the botanical knowledge then in the world,

and its author exultingly ſtyles it the labour of 40 years. In this work about 6000 plants are arranged in twelve books, with ſome ſlight traces of ſyſtem, and each plant is diſtinguiſhed by a kind of deſcriptive name, under which are placed the names given it by every preceding author. Ray has very juſtly remarked, that beſides errors and repetitions incident to the moſt wary in ſo vaſt an undertaking, Bauhin's Pinax contains ſome hundreds of plants there mentioned as ſpecies, which have ſince been found to be only varieties; and if this was true in the time of Ray, it is much more ſo at preſent. Notwithſtanding ſuch imperfections, this work has been found ſo uſeful, and indeed ſo neceſſary, that it continued the general dictionary of botaniſts, till ſuperſeded by the publications of Tournefort and Linnæus, and is even now the only reſource of thoſe who wiſh to ſtudy the authors whoſe works are prior to it. But this is not all which the active mind of Caſper Bauhin undertook. He publiſhed an excellent edition of Matthiolus with many additions; and has illuſtrated about 600 new or heretofore miſtaken plants in his Prodromus, publiſhed firſt in 1620, and afterwards with an improved edition of his Pinax, in 1671, which is that moſt in uſe. He likewiſe meditated a complete hiſtory of all the plants mentioned in his Pinax, and finiſhed, as it is ſaid, three books, of which the firſt only was publiſhed by his ſon in 1658, with figures. It contains graſſes and ſome liliaceous plants. Beſides all theſe botanical labours, Caſpar Bauhin practiſed medicine with great ſucceſs, and was ſo eminently ſkilled in anatomy as to have been ſtyled in his time the prince of anatomiſts. He died in 1624, aged 64, being about 20 years younger than his brother. I have ſeen a great part of his herbarium at Baſil, in the hands of Mr. De la Chenal, profeſſor of botany there. This herbarium is ineſtimable on account of the difficulty of determining many of Bauhin's plants by his deſcriptions alone, and its worthy poſſeſſor devotes it to the purpoſes

poſes of public utility, to which indeed all treaſures of ſcience ought to be devoted.

We muſt now make a pauſe in the hiſtory of botany. Notwithſtanding the labours of the Bauhins ſeemed to promiſe new vigour to this lovely ſcience, it languiſhed for nearly half a century after the time in which they lived. Not that there were no botanical writers, nor any collectors of plants in all that period, for there were a conſiderable number of both, as well as ſeveral writers on the materia medica. Hernandez was ſent to South America by Philip II. at a vaſt expence, but the fruit of his labours is one of the worſt books in botany. The Italians puzzled themſelves and their readers about opobalſamum and the ingredients of the mithridate; and a number of inferior writers appeared in different parts of Europe, eſpecially in Germany, whoſe names and merits I might be excuſed mentioning, even if on this occaſion I had much more time allowed me.

I muſt only except Jungius, who in his Doxoſcopiæ Phyſicæ Minores has given great proofs of botanical ſagacity, and has thrown out ſome hints, of which following botaniſts, and among them Linnæus himſelf, has profited with great advantage. Jungius died in 1657.

Our countryman Parkinſon was alſo an author of great originality and obſervation, much ſuperior in this reſpect to Gerard, or his commentator Johnſon, although his figures are inferior to theirs.

I ſhall profit of this interval to review the progreſs of zoology from the middle of the ſixteenth to the end of the ſeventeenth century.

It is remarkable that a part of natural hiſtory, ſo evidently the moſt important and the moſt intereſting to man, who is himſelf at the head of the animal creation, ſhould have lain ſo long uncultivated. From the time of Ariſtotle to Geſner and Aldrovandus, little or no improvements were made in the knowledge of animals, nor with reſpect to claſſification was any alteration attempted till the time of Ray. The Ariſtotelian diviſion of animals into viviparous

parous and oviparous is well known. In the former claſs were arranged all quadrupeds, and in the latter birds, fiſhes and inſects. Ariſtotle was himſelf ſenſible that this ſyſtem muſt be taken with ſome latitude, there being ſeveral quadrupeds, as lizards, which are not viviparous, and ſome inſects and fiſhes viviparous, although not quadrupeds. By inſects he and all other naturaliſts down to Linnæus underſtood ſuch of the ſmaller kinds of animals as have the body divided into ſegments, ſo that many worms and even fiſhes were included in this diviſion.

Geſner arranged his voluminous hiſtory of animals upon the principles of Ariſtotle, ſeparating the oviparous from the viviparous quadrupeds; and Aldrovandus collected all that others had written, indeed without ſufficient diſcrimination of truth from fiction, and diſpoſed it much in the ſame order. With reſpect to Ornithology, Geſner cultivated that ſcience with peculiar ſucceſs, and is the author of many very valuable obſervations. Aldrovandus copied him in many things, and Johnſton is hardly worth mentioning, as he has done little elſe than copy both. Beſides what the authors above mentioned have given us relating to fiſhes, that branch of natural hiſtory was ably handled by Paul Jovius, an Italian phyſician of great taſte and learning in the beginning of the ſixteenth century; afterwards by the accurate Bellonius, who wrote alſo on birds; by Salvianus in his ſuperb book on aquatic animals, printed at Rome in 1554; and by Rondeletius, profeſſor at Montpelier, who publiſhed the ſame year. Inſects were alſo particularly treated of in a work the joint labour of ſeveral able men, among whom was the indefatigable Geſner; this book was publiſhed by Dr. Mouffet, an Engliſh phyſician, in 1634.

This was the ſtate of Zoology when our own immortal Harvey firſt dared to controvert one of the doctrines of Ariſtotle, which, although really unworthy of ſo great a philoſopher, nobody had hitherto

hitherto oppoſed, I mean that of equivocal generation. The metaphyſical quibbles which had ſo long diſgraced the ſchools, began now to give way to a ſpirit of enquiry and obſervation; but not in the ſchools themſelves, for from thence light ſeldom ſprings. The propoſition of Harvey, "*omnia ex ovo*," was not received without oppoſition; but this was forgotten in the much more furious oppoſition given to his other more important and intereſting doctrine, of the circulation of the blood. No ſooner was this publiſhed than a crowd of adverſaries beſet him. After in vain endeavouring to refute his opinion, they had recourſe to the common ſubterfuge of denying its originality; taking upon themſelves the greater reproach, of having been blind to the evidences already exiſting of ſo indiſputable a truth, rather than allow their illuſtrious cotemporary any merit in the diſcovery.

With Harvey begins what may be called the phyſiological period of Natural Hiſtory. His hypotheſis of generation was confirmed by the experiments of Redi and Malpighi, two very philoſophical naturaliſts, who have diſencumbered ſcience from many prejudices, and thrown much light on ſome of the moſt abſtruſe parts of phyſiology. The experiments of Redi to diſprove equivocal generation, are truly admirable, and Malpighi's inveſtigations, relating to the anatomy and transformation of ſilkworms, and the developement of the chick in the egg, are too celebrated to need any freſh eulogium. About the middle of the ſeventeenth century a new and very intereſting propoſition in phyſiology was ſtarted, that of the ſexes of plants, the honour of which is given to our countryman Sir Thomas Millington. It is to be wiſhed however that he had written ſomething himſelf upon the ſubject, or that we knew whether the idea were really originally his own. Nearly about the ſame time the diſcovery of the lymphatic veſſels in animals was made, either by Rudbeck or Thomas Bartholin, or rather by both

at once. All which I think juſtifies me in calling the period of which I am ſpeaking, a phyſiological age. In it was laid the foundation of almoſt every doctrine which has ſince been cultivated and enlarged upon, and on which all following medical and phyſiological ſyſtems have been built.

It is no wonder that ſyſtematic Zoology ſhould derive advantage from all theſe diſcoveries. Towards the end of the laſt century appeared two great naturaliſts, amply qualified to profit by them, and to whom the ſcience is infinitely indebted, our countrymen Willoughby and Ray. Theſe illuſtrious friends laboured together with uncommon ardour in the ſtudy of nature, and left ſcarcely any of her tribes unexplored. But death, which ſo often diſappoints the faireſt hopes, cut off the former in the prime of life, before he had digeſted the materials to the acquiſition of which he had devoted his youth; and they might all have been loſt to the world and his name have periſhed with them, but for the faithful friendſhip and truly ſcientific ardour of Ray. So cloſe was the intercourſe between theſe two naturaliſts, that it is not eaſy to aſſign each his due ſhare of merit. Indeed Ray has been ſo partial to the fame of his departed friend, and has cheriſhed his memory with ſuch affectionate care, that we are in danger of attributing too much to Mr. Willoughby, and too little to himſelf. Certainly however it is by no means a fair ſtatement of the caſe to ſay with Dr. Derham, that Mr. Willoughby had taken the animal kingdom for his taſk, as Mr. Ray had the vegetable one. The Ornithology and Ichthyology ſufficiently ſhew that Ray was not a mere editor of thoſe noble works, and the Synopſes Avium & Piſcium, publiſhed ſome time after, in which he has made many improvements, and ſome important changes as to arrangement, prove with how much attention he had ſtudied thoſe two branches of Zoology. I need not add that the Synopſis of Quadrupeds is, as to method, entirely

his own, although Willoughby is there often quoted for many excellent obſervations; and the ſame may be ſaid of the Hiſtoria Inſectorum, publiſhed in 1710, after the death of Ray. All theſe works are excellent in their kind, admirably methodized, and exhibit ſuch proofs of accurate obſervation, ſuch a candid love of truth, and ſuch penetration in diſcovering it, as muſt ever rank their authors among the firſt and moſt philoſophical naturaliſts.

Ray, being diſſatisfied with Ariſtotle's claſſification of animals, was the inventor of a new one, founded on the ſtructure of the heart. The Harveian experiments and doctrine of the circulation had called the peculiar attention of philoſophers to every organ which has a ſhare in that phænomenon, and to this cauſe probably we owe the method of Ray. Taking therefore the diviſion of animals into Sanguinea and Exanguia, which was a very ancient one, he ſubdivides the firſt claſs into ſuch as are furniſhed with lungs and ſuch as breathe by gills; and the former of theſe he again ſeparates into thoſe which have an heart with two ventricles, and thoſe whoſe heart has only a ſingle ventricle. The latter diviſion contains Reptiles, the former viviparous Quadrupeds, Whales and Birds. The Animalia branchiis reſpirantia include all Fiſhes properly ſo called, the Whale kind and all the Exanguia being of courſe excluded. The Animalia Exanguia are divided into greater and leſſer. The latter diviſion contains Inſects; the former is again ſubdivided into three genera, the firſt of which includes the Mollia, or Molluſca, as Cuttle-fiſh and Polypi; the ſecond Cruſtacea, as Crabs and Lobſters, which are properly Inſects; and the third Teſtacea, or ſhell-fiſh. This ſyſtem, although liable to a great many objections, which I ſhall not now ſtay to enumerate, is deſerving in many reſpects of great praiſe: its author has ſhewn great ſkill in the characters by which he has choſen to diſcriminate the ſubordinate diviſions, and in ſhort the Linnæan ſyſtem of Quadrupeds is

little more than a reformation of that of Ray. I ſhall ſoon ſpeak of the botanical merit of this great man; but before we take leave of this period of Zoology, it may be expected I ſhould ſay ſomething of Leeuwenhoek, and his theory of generation, which has made ſo much noiſe; nor may it be uſeleſs to mention him, if only as a *memento* to future theoriſts. What a pity it is, that ſo excellent an obſerver, to whom the world is indebted for ſo much ſolid phyſiological information, ſhould have produced an hypotheſis, whoſe celebrity ſeems but to have haſtened its refutation, and conſigned it to more abſolute neglect! The ſpermatic worms of Leeuwenhoek may perhaps be the jeſt of philoſophers many ages to come, while others ſhall profit of his genuine diſcoveries, without knowing to whom they are obliged.

Let us now take a general view of the ſtate of Natural Hiſtory at the end of the laſt century.

In England the flattering aſpect which this ſcience had worn under the auſpices of Charles I. was blaſted by the turbulent times which followed; but in the peaceful days of Charles II. natural hiſtory, as well as all the different branches of philoſophy, received a degree of cultivation and advancement hitherto unknown in this country; and this led on to the golden age of ſcience in England, which was crowned by the poſſeſſion of a Newton.

The Royal Society, which, from a ſmall beginning at Oxford about the year 1645, made rapid advances when removed to the metropolis, was eſtabliſhed under the protection of the king in 1662, very ſoon after his reſtoration. This learned body beſtowed great attention from the beginning, as they have ever ſince done, upon the phyſiological part of natural hiſtory. The names of Boyle, Evelyn, Hook and Needham, are among the firſt members of this ſociety; and how much they have laboured in the advancement of natural ſcience is well known. Mr. Willoughby was one of the original

original fellows of the Royal Society, although his friend Ray was not admitted till the year 1667. Dr. Liſter, the great conchologiſt, was very early aſſociated with it, as well as that admirable vegetable phyſiologiſt Dr. Grew.

Nor was France behind-hand with England in attention to the ſciences, and among the reſt natural hiſtory. Henry IV. that great name which ſcience delights in joining with humanity to bleſs, had endeavoured long ago to promote literature and uſeful knowledge throughout his dominions. Among other inſtitutions the botanic gardens of Paris and Montpellier are owing to his munificence. But his untimely death, and the ſubſequent diſturbances, for a while put a ſtop to all farther cultivation of the arts of peace. About twenty years afterwards, by the indefatigable perſeverance of De la Broſſe, ſuperintendant of the Paris garden, the Cardinal de Richlieu was induced to grant it his protection; but this garden firſt roſe to any conſiderable degree of eminence towards the end of the laſt century under Louis XIV. This munificent prince encouraged learning with that ſplendid liberality which diſtinguiſhed all his actions. For the purpoſe of promoting botany, and enriching the royal garden, the illuſtrious Tournefort was ſent to the Levant, and the accurate and indefatigable Plumier made three voyages to America, and died as he was about undertaking a fourth. An Academy of Sciences was inſtituted at Paris in 1666, and another ſome years after at Montpellier, very ſimilar to the Royal Society of London, with which the greateſt men in Europe have always been proud to be aſſociated.

Many ſimilar inſtitutions were ſet on foot throughout Europe, as the Imperial Academy Naturæ Curioſorum, begun in 1652. A number of botanic gardens were alſo eſtabliſhed in Germany; but Linnæus has truly obſerved that they have never been rich in exotic plants, on account of the ſmall intercourſe of that country with

with the Indies; whereas the gardens of Holland were at this time overflowing with riches from the moſt diſtant parts of the globe.

The Amſterdam garden under the care of the Commelins was now one of the firſt in Europe, and that of Leyden was rendered celebrated by the catalogue publiſhed by Herman. Holland had moreover the glory of producing at this time that moſt ſumptuous and excellent work, the Hortus Malabaricus; by which a new world was in a manner laid open to the botaniſts of Europe, and from which they learned with ſurpriſe, that the knowledge of plants had made almoſt as much progreſs in the remote regions of Aſia, as in their own part of the world.

But the ſtudy of nature was no where making ſuch an uniformly ſteady progreſs as in Sweden. At Upſal, under the auſpices of the great Rudbeck, was laid the foundation of what Mr. Stillingfleet has juſtly called an unrivalled ſchool of natural hiſtory, and which was deſtined afterwards to give laws to the reſt of the world. Rarely has ſuch a variety of profound and extenſive learning been united as in Rudbeck. I have already mentioned his anatomical merit in diſcovering the lymphatics. In antiquities, eſpecially thoſe of the northern nations, and in the learned languages, his knowledge was unbounded. In botany he had erected to himſelf what might reaſonably have been thought a "monumentum ære perennius," in one of the greateſt undertakings of the kind, a collection of fine wooden cuts of all the plants then known. They were to have been arranged and named according to Bauhin's Pinax, in 12 large volumes folio. But two volumes were ſcarcely printed, when in 1702 a dreadful fire reduced almoſt all Upſal to aſhes, and with it the work of Rudbeck, and many thouſand wooden blocks already cut, beſides almoſt all the materials of an hiſtory of Lapland compoſed by his ſon, who indeed had a principal hand in the great work of which I am ſpeaking. It can ſcarcely be thought an impeachment

peachment of the venerable old man's philoſophy, that ſo cruel a diſappointment ſoon brought him with ſorrow to the grave.

All that remains of this work are a few copies of the ſecond volume, and three only of the firſt, one of which is in the Sherardian library at Oxford. Linnæus was poſſeſſed of about 120 of the wooden blocks of this firſt volume, as well as 8 or 10 unpubliſhed blocks belonging to ſome intended one; all which came with his collection into my hands: they are for the moſt part admirable figures of graſſes *.

Having been now inſenſibly led back to Botany, I ſhall take a comprehenſive view of the ſyſtematic æra of that ſcience, when ſo many new methods of claſſification were invented, moſt of which were ſtrenuouſly ſupported by their reſpective authors, who little thought that in the ſpace of half a century, oblivion would nearly level all diſtinctions between them.

The firſt who revived the idea of a claſſical arrangement of plants, ſince the time of Cæſalpinus, was Moriſon, who has been juſtly cenſured for neglecting to acknowledge how much he owed to his ingenious predeceſſor, and who has in his turn received ſimilar treatment from his followers. His method was founded chiefly on the fruit, to which, as well as the external habits of plants, he paid too much regard, and too little to the other parts of fructification. The only work claſſed according to the method of Moriſon is his own Hiſtoria Univerſalis Plantarum, an uſeful compilation, which is daily uſed as a book of reference, by thoſe who never think of his ſyſtem.

But the three principal ſyſtematic authors were Ray, Tournefort and Rivinus, between whom was much warm controverſy on the ſubject; and it muſt have been an intereſting matter indeed that

* Publiſhed under the title of Reliquiæ Rudbeckianæ, folio, 1789.

could

could ſo agitate the candid peaceable ſpirits of Ray and Tournefort. Of Ray it may be ſaid that his method was the moſt abſtruſe and ſcientific, while that of Rivinus was at firſt ſight more ſimple, but liable to as great difficulties in the execution. The former was principally founded on the fruit, the latter on the corolla, and in both were the other parts of fructification too much neglected. The ſyſtem of Tournefort, which was likewiſe formed chiefly upon the corolla, was undoubtedly far ſuperior to all the reſt then extant; yet I doubt whether that alone would have procured its author his extenſive reputation, had he not inveſtigated and diſcriminated the *genera* of plants in ſo maſterly a manner, that this alone is ſufficient to rank him above all preceding botaniſts. It is true he did not invent a mode of ſyſtematically defining theſe genera by words; this was reſerved for Linnæus: but it has been well obſerved by Monſieur Delamarck, that Tournefort was no leſs ſenſible of the diſtinctions of his genera, and he has cauſed them to be figured in ſo able a manner that they cannot be miſtaken.

This great botaniſt, chiefly unfortunate in having had ſome injudicious advocates, is the glory of the French nation. His countrymen are with reaſon proud of him, and his merits as a botaniſt and a traveller are ſo well known, that no commendation of mine can add to his fame. Yet I muſt not omit to do juſtice to his ſucceſſor Vaillant, whoſe merit I think is hardly ſufficiently known. In profiting of the indulgence granted me when at Paris of conſulting the Herbariums of theſe two eminent botaniſts, I was aſtoniſhed at the inſtances of profound knowledge and acuteneſs of judgment which I met with in that of Vaillant, both with reſpect to the genera, ſpecies, and ſynonyma of plants; whereas it is well known that Tournefort was leſs ſolicitous about the ſcientific diſtinctions of ſpecies. Vaillant is alſo one of the firſt who was well acquainted with the ſexes of plants. His academical oration on that ſubject is full of good obſervations, though not without ſome errors. In this

this work he laughs without reſerve at Leeuwenhoek's peculiar theory of generation, and ſpeaks rather too diſreſpectfully of Tournefort; for this he has never been forgiven.

There were at this time ſeveral botanical ſyſtems invented beſides thoſe above mentioned; but few being remarkable for originality or uſe, I cannot dwell long upon them. Herman's was one of the beſt. It was entirely founded on the fruit, and not very different from thoſe of Ray and Moriſon. Boerhaave's had great merit, in being founded more or leſs on all the parts of fructification. The method of Chriſtopher Knaut is an alteration of that of Ray, without any improvement. The paradoxical Chriſtian Knaut, who thought the eſſence of a flower conſiſted in its corolla, was never very famous, and would now probably make no proſelytes at all.

A ſingular ſyſtem was invented by Profeſſor Magnol of Montpellier, founded on the calyx, to which Linnæus was very partial, and he even formed a ſimilar method of claſſification himſelf: happily, however, this was not the only one he ever invented.

Nor was this æra of botany merely a ſyſtematic one. Linnæus has not ſcrupled to aſſert, that within the ſpace of 20 years, at the end of the laſt century, twice as many plants were diſcovered as had been made known by the joint labours of all preceding botaniſts. Beſides thoſe which were collected by Tournefort, Plumier and Ray, a noble collection was brought from Jamaica by Dr. Sloane, afterwards Sir Hans, of which the hiſtory in two volumes folio is well known. Mr. Sherard conſul at Smyrna, who cultivated botany with princely munificence and with the ardour and diſcernment of a true philoſopher, has been the means of making known a very great number of plants. His vaſt herbarium and library are now among the literary treaſures of Oxford. The indefatigable Plukenet procured and publiſhed an immenſe number from all parts of the

world, many of them very rare. His book is in every body's hands, and it would be ſuperfluous here to ſay any thing of its utility. Petiver was no leſs perſevering in making collections, not only of plants, but of all kinds of natural objects. His works are of a very peculiar character, and exhibit more zeal than genius or accuracy. His rough criticiſms of his contemporary Plukenet have hurt nobody but their author. The acquiſitions of Dr. Herman in Ceylon were very conſiderable. They lay a while dormant, only to appear with greater celebrity from the pen of Linnæus. In ſo brilliant a period of the hiſtory of this ſcience I am obliged to paſs over many leſs illuſtrious, although great names; and ſhall only mention Rumphius, whoſe ardour was not to be damped even by the greateſt misfortune which can befal a naturaliſt, the loſs of ſight. The rich treaſures of Amboina were made known to us by this laborious man. His book on ſhells is in high eſtimation; and his Herbarium Amboinenſe might vie with the Hortus Malabaricus, if all concerned in the publication of it had performed their parts as well as he has done his: but the figures are by no means comparable to thoſe of that ſtupendous work. The courage of Rumphius in purſuing natural hiſtory after he had loſt his ſight, reminds me of a ſimilar inſtance, I believe very little known, of a Provençal phyſician named Reboul, who undertook a manuſcript hiſtory of plants in ſeveral large folio volumes, and, becoming blind, actually completed many of the unfiniſhed chapters with his own hand after that accident. This curious manuſcript was ſhewn me in the publick library at Parma.

While Botany was making this great progreſs, Entomology began to be cultivated with an aſſiduity, which was amply repaid by the curious and aſtoniſhing facts it brought to light. The notion of equivocal generation having been refuted by Harvey, Redi and Malpighi, the propagation and metamorphoſes of inſects became an

interesting object of enquiry with several able men, among the first of whom were Goedart and Swammerdam. The discoveries of Goedart were received with laudable caution by his contemporaries, especially what relates to the history of Ichneumones; but following observers have confirmed the accuracy of his relations. The works of Swammerdam are full of curious information, and will sufficiently reward those whose patience is not to be exhausted by his tedious heavy style. Nor must I forget Madam Merian, whose excellent work on the Surinam Insects, one of the most splendid in natural history, is a monument of female perseverance and enthusiasm.

Other admirers of nature have turned their attention to shells and marine productions; and the facility with which these bodies are preserved in cabinets, has made the collecting them very general. A few authors had written on shells about the beginning of the last century, as Aldrovandus, Columna, Imperati, &c. but about the end of the century two very eminent writers were particularly distinguished in Conchology, Bonanni and Lister. Their works are in daily use. In the different publications of the latter are many curious anatomical observations, and Bonanni has treated the formation of shells in a very philosophical manner. Some interesting hints on the same subject are to be found in Steno's "De Solido intra Solidum Dissertationis Prodromus," printed at Florence in 1669.

Of all the parts of Natural History, Mineralogy for a long time made the slowest progress. From the time of Theophrastus to the end of the seventeenth century few improvements were made in the knowledge of Fossils. What little was written in all that time contained only repetitions of old erroneous superstitious opinions. Even at the period of which I am speaking, a striking idea of the darkness of this science may be formed, from

Tournefort's having maintained the vegetation of ſtones, and Liſter's having poſitively aſſerted that all extraneous foſſils, as petrified ſhells, &c. are only luſus naturæ, and never were the real ſhells they repreſent. Afterwards Mineralogy was cultivated with a little more care, but ſtill on wrong principles, the external figure of foſſils being principally attended to, and not their component parts; nor was it till very lately that the ſcience was eſtabliſhed on its true foundation, that of chemical analyſis.

For about fifteen years after the beginning of the preſent century nothing very conſiderable was printed in botany. But the year 1718 is remarkable for the publication of Ruppius's excellent Flora Jenenſis, and the following for the appearance of Scheuchzer's inimitable Agroſtographia and Dillenius's Flora Giſſenſis. Ruppius being cut off early in life, diſappointed the hopes which were formed of him. Dillenius is one of the moſt illuſtrious names in botany; not ſo much indeed for ſyſtematic or phyſiological merit, as for accuracy of obſervation and judicious criticiſm. About this time alſo flouriſhed Pontedera at Padua, who although a great Tournefortian, and ſtrangely prejudiced againſt the ſexes of plants, was a ſcientific botaniſt, and is very liberally praiſed by Linnæus, againſt whom he is ſaid nevertheleſs to have written ſomething, which was never publiſhed.

The removal of Dillenius to England, who publiſhed here his excellent edition of Ray's Synopſis Stirpium Britannicarum in 1724; the aſſiſtance and encouragement given to the ſcience by thoſe two diſtinguiſhed brothers William and James Sherard, as well as by Sir Hans Sloane, ſeemed to promiſe the eſtabliſhment of the botanic ſceptre in this country; eſpecially as the inſufficiency of Tournefort's ſyſtem became every day more obvious, and Boerhaave was too much occupied by medicine, to devote any conſiderable ſhare of his powers to any other purſuit. The phyſick garden at Chel-

ſea was in a very flouriſhing ſtate under the care of the celebrated Miller, and that of Mr. Sherard at Eltham contained one of the choiceſt collections in Europe. But botaniſts were almoſt at a ſtand about arrangement. All the different ſyſtems which had been propoſed, however ſpecious in univerſity lectures, having been found very inſufficient for the purpoſes of practical botany, the ſcience was again in danger of relapſing into anarchy and confuſion, and botaniſts were almoſt overwhelmed with the riches which daily flowed in upon them.

In this ſtate of things a new turn was given to the ſcience of botany, and indeed to all natural hiſtory, by the publication of the Syſtema Naturæ and Fundamenta Botanica of Linnæus in 1735. Nor were the learned world determined how they ſhould receive theſe extraordinary productions, when in 1737 the ſame author, without any other ſupport than his own tranſcendent merit, fixed the attention of all Europe, by his Critica Botanica, Genera Plantarum, Hortus Cliffortianus, Flora Lapponica and Methodus Sexualis; five works, the produce of one year, each of which would alone have been ſufficient to have immortalized its author, and in the compoſition of which a man's whole life might have been thought uſefully employed!

Having by a number of original obſervations, added to thoſe of former writers, demonſtrated the ſexes of plants, and conſequently the importance of their ſtamina and piſtilla; Linnæus founded his ſexual ſyſtem on the differences in number, ſituation and proportion of theſe organs: a ſyſtem which, although profeſſedly merely *artificial*, is really in many reſpects more agreeable to nature than many which had preceded it, and which, for facility and univerſality, has a decided ſuperiority over all hitherto invented. But this was only a part of the praiſe of this riſing genius. Having new modelled and ſyſtematically defined all the known genera of plants, he endeavoured

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in like manner to define the ſpecies upon philoſophical principles; a thing hitherto unknown, or at leaſt but faintly attempted by ſome old botaniſts. Of the ſucceſs of Linnæus in this undertaking, as well as his judgment and accuracy in collecting ſynonyms, the Hortus Cliffortianus and Flora Lapponica afford ſufficient proofs. In them may be ſeen the dawning of thoſe talents which afterwards produced the Species Plantarum; while the didactic preciſion and critical acuteneſs of the Fundamenta and Critica, gave a foretaſte of that perfection which was hereafter to appear in the Philoſophia Botanica.

Nor were the abilities of Linnæus leſs conſpicuous in his diſtribution of the animal kingdom. Of this the firſt edition of the Syſtema Naturæ was but a ſketch, which was afterwards corrected and much enlarged. It is unneceſſary here to enter upon the particulars of his ſyſtem, which has been familiar to all naturaliſts for theſe 50 years. I ſhall only ſay, that what in my opinion are the beſt parts of it, the claſſes of birds and inſects, were altogether original. For the detection of the eſſential character of the latter in their antennæ, we are entirely obliged to Linnæus; and his ſubordinate diſtinctions were not only the firſt, but long experience has proved them the beſt, that have ever been invented.

His arrangement of foſſils, the beſt at the time it was firſt publiſhed, is now generally neglected. Although in ſome inſtances founded on chemical principles, in others the moſt obvious laws of chemiſtry were ſacrificed to external figure; and the ſcience having been of late years ſo totally reformed, it is no wonder that Linnæus's Regnum Lapideum is become obſolete.

This illuſtrious man, returning in 1739 to Sweden his native country, there fixed the throne of Natural Hiſtory. Soon after his arrival he helped to lay the foundation of the Academy of Sciences at Stockholm, of which he was the firſt preſident. His diſtinguiſhed

guiſhed merit and amiable manners procured him the favour of the rich and powerful, as well as the attention and admiration of the ſcientific; and his medical and botanical lectures at Upſal ſoon attracted a number of ſtudents from all parts of the world, and exalted that univerſity to a degree of fame hitherto unknown.

It is true, he did not eſcape the attacks of envy and jealouſy; nor can any exalted character, however inoffenſive and prudent, hope to eſcape them. But they never put him ſo much off his guard as to waſte his time in controverſy, nor would he give his adverſaries immortality, by tranſmitting their names to poſterity with his own. I ſhall on the preſent occaſion follow his example; nor drag from obſcurity works long ſince forgotten, or authors who never were noticed. I cannot but obſerve, however, that profeſſor Siegeſbeck, notwithſtanding his intemperate zeal in attacking the ſexes of plants and Linnæus's ſyſtem with all the arms he could muſter, both ſacred and profane, was by no means the moſt contemptible of all the authors on that ſide the queſtion. He has been unfortunate enough to be always held forth as the botanic Zoilus; but I think there have been ſome critics, even in our own country, who for futility, ignorance and malevolence, would have much greater claims to that title, if they were of conſequence enough to claim any title at all.

We muſt now conſider ſome of the moſt eminent naturaliſts who were contemporaries with Linnæus in the beginning of his literary career, and whoſe labours tended eſſentially to the advancement of the ſcience. It would be endleſs to enumerate all who have cultivated or written upon natural hiſtory during this golden age; we can only notice a few of the moſt diſtinguiſhed.

His moſt intimate companions at this time were Artedi and Gronovius; the former of whom has in his Ichthyology diſcovered ſuch talents

talents for natural hiſtory, that his premature death cannot be ſufficiently regretted. Gronovius has contributed in various ways to the advancement of the ſcience. His Flora Virginica and his zoological works are conſtructed upon Linnæan principles. He was always in amicable correſpondence with Linnæus; as conſtant in the offices of friendſhip as deaf to the impulſes of envy and jealouſy. It was Gronovius who had the honour of naming the Linnæa after his illuſtrious friend.

One of the greateſt and moſt extenſive geniuſes of this or any age was Haller, that great phyſiologiſt and unwearied obſerver, who, though at firſt the friend, afterwards became the rival, and the only reſpectable rival, of Linnæus, compared with whom all his other criticks ſink into nothing. What a pity it is theſe illuſtrious men were not always friends! What a pity the memory of Haller ſhould have been diſgraced by the publication of thoſe confidential letters, the reviſal of which one would have thought ſufficient to diſarm the moſt inveterate mind!

——— "Tantæne animis cœleſtibus iræ?"

I muſt however reſcue the name of Haller as much as poſſible from this foul ſtain. On a careful enquiry among thoſe who alone could ſatisfy me on the ſubject, I am inclined to think his powers of body and mind were ſo enfeebled that he may be ſaid to have been not himſelf at the time theſe letters were publiſhed, and probably never reviſed them. Elſe can we ſuppoſe a character like his would ſo groſsly have violated, not only the confidence of friendſhip, but even the laws of paternal affection? for in that collection are letters of one of his ſons, then no more, which no father ought to have made publick. Perhaps the temptation of

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producing ſuch teſtimonies of his own celebrity was, in the weakneſs of old age, too flattering to that vanity from which Haller is acknowledged not to have been free. Neither was Linnæus himſelf without his ſhare of it; and if vanity were never found but with ſuch pretenſions, who would not almoſt forget that it were a weakneſs?

I cannot attempt to enumerate all the works of Haller, much leſs to diſplay their merits. His hiſtory of the Switzerland plants is one of the moſt excellent and complete Floras the world ever ſaw, and is only deprived of the general applauſe it deſerves, by the author's unconquerable diſlike to the Linnæan claſſification and nomenclature, by which his work is rendered extremely unfit for common uſe. His Phyſiology, Bibliotheca Anatomica and Bibliotheca Botanica, are among the moſt ſtupendous monuments of human knowledge as well as of human labour. They defy imitation, and ſtrike criticiſm dumb.

Another diſtinguiſhed name alſo claims our attention, that of Reaumur. I know none more worthy to ſtand next to Haller. Beſides the various diſcoveries of this great French naturaliſt which were of immediate uſe in improving the arts and manufactures of his own country, the philoſophical world at large will ever be indebted to him for his inveſtigations of ſome of the moſt intricate parts of natural hiſtory. His experiments on digeſtion, on the fructification of marine plants and on corals, are all celebrated, although with reſpect to the latter he was miſtaken in denying their animal nature; but his immortal work is his "Memoires pour ſervir à l'Hiſtoire des Inſectes," in 6 volumes, quarto; and he has publiſhed a variety of detached pieces relating to the ſame ſubject.

The Italians poſſeſſed a ſimilar genius to Reaumur in Valliſneri, whoſe experiments relating to generation, and his candour in giving

up his firſt opinion on that ſubject, merit great commendation, as well as his inveſtigations of inteſtinal animalcula. Valliſneri was profeſſor of the practice of medicine at Padua, and died in 1730. His works, being only in Italian, are not ſo much read as they deſerve to be.

The ſame country had the honour of producing another moſt excellent obſerver in Micheli of Florence, whoſe Nova Genera Plantarum, publiſhed in 1729, is a fundamental book in botany; it has the rare merit of being a work of original and accurate obſervation in the moſt difficult of all plants, graſſes, moſſes and fungi. If Dillenius and Linnæus had paid due regard to his obſervations, they would not have ſo totally miſunderſtood the fructification of moſſes as to take the capſule for the anthera. The world may ſtill hope for more information from this excellent man, on the publication of his manuſcripts, now in the hands of Mr. Targioni Tozzetti, the worthy poſſeſſor of all his remains.

This leads me to mention the Hiſtoria Muſcorum, publiſhed by Dillenius in 1741, that matchleſs work which, for the accurate delineation and determination of ſpecies, has never been rivalled in any department of botany, much leſs in that which it illuſtrates. This author has made the intricate tribe of moſſes and algæ comparatively eaſy; without ſuch a writer they would all probably have continued the opprobrium of botany, as fungi and confervæ are ſtill.

A work worthy to be compared with this of Dillenius, for the more than Herculean labour which was employed in its compoſition, is the Hierobotanicon of Olaus Celſius, profeſſor of divinity at Upſal, and one of the firſt and warmeſt patrons of Linnæus. He travelled to the Eaſt on purpoſe to enquire into the plants of ſcripture, the determination of which was his darling object for more than 50 years. His book was not eſteemed as it deſerved till its

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author was no more. There having been but 200 copies printed, it is now very rare, and is one of thoſe works which are oftener talked of than read.

I ſhall only at preſent mention the names of two more writers, who chiefly diſtinguiſhed themſelves in vegetable phyſiology, Du Hamel and Hales. One of them was the ornament of France, and the other of our own country, about the period of which I have been ſpeaking, and both have rendered great ſervices to philoſophical botany.

In the mean while Linnæus was daily advancing in ſcience and reputation. His Fauna Suecica appeared in 1746, and his Materia Medica in 1749; the former is a model of deſcriptive zoology, as the latter of methodical arrangement and conciſeneſs. They were both afterwards very much improved and enlarged, but the Materia Medica was never republiſhed by Linnæus; all the new editions of it are by Profeſſor Schreber, and the alterations are his own.

In 1751 appeared the Philoſophia Botanica, and two years afterwards the firſt edition of the Species Plantarum; two works which it were equally vain and ſuperfluous to attempt to praiſe as they deſerve. I ſhall only remark that the introduction of *trivial names*, which firſt took place in the Species Plantarum, was one of the moſt happy inventions of Linnæus, and I am perſuaded it has contributed more than any thing elſe to make his works of general uſe. Even thoſe botaniſts who from envy would never openly adopt them, have given the moſt convincing proofs of the importance of which they thought them, in labouring to deprive Linnæus of the honour of their invention; and I could mention inſtances of people, who have written againſt theſe trivial names, being obliged to recur to them daily in ſpeaking and writing of plants.

The fame of Linnæus was now ſo widely diffuſed that, as his

excellent biographer Dr. Pulteney has obſerved, he began ſcarcely to feel the diſadvantages of his northern ſituation. He had diſciples in every part of the world who vied with each other in ſending him all the objects of natural hiſtory they could procure, ſo that his cabinet and his garden were equally enriched. At the ſame time moſt of the learned ſocieties in Europe were proud to enrol him among their members, and even kings contended for the poſſeſſion of him. He was amply indemnified for declining the generous offers of the Spaniſh monarch, by the honours and advantages heaped upon him by his own ſovereign. He received the rank of nobility, which in Sweden is neither a trifling nor a barren honour, and was made a knight of the Polar Star. This was the firſt inſtance of that order having been conferred upon literary merit; certainly it could never have been beſtowed with greater propriety on any one than on Linnæus, who was himſelf that bright polar ſtar to which the ſcientific world looked up for aſſiſtance and direction.

This then may be reckoned the moſt flouriſhing period of Natural Hiſtory, when diſputes about methods and ſyſtems being for the moſt part laid aſide, every admirer of Nature's works was employed in practical obſervations and diſcoveries; while Linnæus, whom nothing eſcaped, and to whoſe deciſion all doubts and difficulties were referred, ſuperviſed and methodized the whole. His improvements had ſo much facilitated the ſtudy of botany, that it was no longer an abſtruſe ſcience confined to the ſchools, but became an agreeable amuſement to perſons of leiſure in all ranks and ſituations.

About this time ſome moſt ſuperb works in natural hiſtory were given to the public which, although not very ſyſtematic, were of uſe to the ſcience; as Seba's Theſaurus Rerum Naturalium, the firſt volume of which appeared in 1734, and the ſecond in 1735,

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the two following ones not having been publiſhed till many years after; Cateſby's Natural Hiſtory of Carolina, Florida, &c. of which the firſt volume was printed in 1731 and the ſecond in 1743; Edwards's Hiſtory of Birds, begun in 1743; and ſome others of leſs note. A work of a ſuperior kind was publiſhed at Florence in 1742, entitled Gualtieri Index Teſtarum Conchyliorum, which is remarkable for the perfection of its ſpecific differences of ſhells, in which the author ſeems cloſely to have imitated the ſtyle of the botanical works of his countryman Micheli. This is one of the moſt uſeful books of reference that we have in conchology, and in my opinion is far preferable to the work of d'Argenville printed the ſame year, although perhaps leſs complete than the new and enlarged edition of that book lately publiſhed.

In England horticulture ſeems now to have made great progreſs. Few have improved that art ſo much as the celebrated Miller; and it is hardly fair to reproach him with not having perfected it. Bartram was ſent to America for the purpoſe of ſupplying our gardens with plants, and we are much indebted to him, as well as to Houſtoun, who diſcovered many rare vegetables in South America and the Weſt Indies, and whoſe remains, long neglected, are now reſcued from oblivion.

In Holland botany was ably ſupported by the labours of the two profeſſors Van Royen at Leyden, and the aſſiduous Burman profeſſor at Amſterdam. The Theſaurus Zeylanicus and Decades Plant. Africanarum of the latter are excellent books; ſome of the figures in this laſt which I find Linnæus ſuſpected to be erroneous, or even fictitious, have ſince been found faithful. Burman had alſo the honour of publiſhing a large volume of the figures of Plumier, from copies of the original drawings, which had long lain buried at Paris, as the greater part of that admirable author's works ſtill do, eclipſed by more ſplendid productions.

In Germany Profeſſor Ludwig of Leipſic was now in great reputation; and he has ſhewn himſelf an able phyſiologiſt and accurate obſerver. He profeſſed to differ in many points from Linnæus, but oppoſed him with decency; and indeed it appears, as a noble author of our own country has lately remarked, that Ludwig, as well as Haller, were only "Linnæans in diſguiſe;" they profited of the lights they had received from him to build ſyſtems to rival his own.

No where have the Linnæan improvements been more ſlowly received than in France, which is to be attributed not only to the jealouſy of that nation for the fame of her immortal Tournefort, but alſo to her poſſeſſing ſome conſummate botaniſts, of ſufficient conſequence to ſupport for a time any ſyſtem they ſhould chooſe to eſpouſe. Among theſe the family of the Juſſieus claim the firſt place, and eſpecially Bernard de Juſſieu, a name never mentioned without reſpect. Even at Paris however Linnæus had early an illuſtrious protector in the Duke d'Ayen, now Marechal de Noailles, who correſponded with him long, procured him the notice and favour of the late king, and occaſioned his majeſty to ſend him a preſent of ſeeds from his own garden at Trianon. The work of Adanſon has alſo done ſervice to the Linnæan cauſe, although certainly that was what its author leaſt intended; but this is one of thoſe books every reader of which muſt diſſent from the author's opinions. In the ſouth of France Linnæus had more admirers. Profeſſor Gouan of Montpellier has adopted his principles both in his ichthyological and botanical works; and the excellent Gerard in his Flora Galloprovincialis, although he has not followed the ſyſtem of Linnæus, is every where cloſely attached to his principles, and has ever been an enthuſiaſtic admirer of his merit. Nor muſt I forget Profeſſor Sauvages of Montpellier, who generouſly preſented Linnæus with his whole herbarium, rich in the plants of

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that delightful country; nor his friend Monſieur Le Monnier, one of the warmeſt admirers of the illuſtrious Swede. This gentleman was ſent to the ſouth of France as a botaniſt in 1740, with ſome other philoſophers who went there for aſtronomical purpoſes. Afterwards he became firſt phyſician to Louis XV. and now enjoys his "*otium cum dignitate*" in a delightful retirement near Verſailles, where he pays particular attention to the cultivation of trees and ſhrubs, and poſſeſſes one of the richeſt herbariums in France.

At Berlin botany and Linnæus had long a noble ſupport in Profeſſor Gleditſch, who firſt principally diſtinguiſhed himſelf by anſwering Siegeſbeck's criticiſm of the Linnæan ſyſtem; and his victory was decided indeed when Siegeſbeck publiſhed his *Vaniloquentiæ Gleditſchianæ Specimen*, in the firſt paragraph of which that writer gives him what may almoſt be called "the lie direct." But Gleditſch was better employed than in returning it. He applied himſelf to the inveſtigation of the obſcure phyſiology of Fungi and other orders of the Cryptogamia, and in 1753 publiſhed an able and elaborate work, entitled Methodus Fungorum. The Memoirs of the Berlin Society abound with excellent treatiſes of this author relating to agriculture and rural œconomy. Nor did he neglect ſyſtematic botany. By no means a ſervile follower of Linnæus, he publiſhed in 1764 a ſyſtem founded on the ſituation of the ſtamina, the principle of which is good, and muſt always be kept in view by all botaniſts; but the claſſes of Gleditſch being ſolely founded on this circumſtance, are neceſſarily too few: his orders are borrowed from the claſſes of Linnæus.

Botanical works were daily multiplying in various parts of Europe. In 1745 appeared Leche's Primitiæ Floræ Scanicæ, and Seguier's rich catalogue of the Plantæ Veronenſes. It has been alledged by ſome faſtidious people, that the preſent century, and eſpecially the Linnæan age, has been overburthened with ſuch kind of catalogues,

which require no abilities in their compoſition, and anſwer no purpoſe when done. A French writer, whom I am tired of naming, has declared himſelf of this opinion; and his own practice has been ſo conformable to it, that he has never favoured the world with an account of the plants of Senegal, a country which he went purpoſely to inveſtigate. Happily all good botaniſts have not imitated him, or we ſhould never have ſeen Scopoli's ineſtimable Flora Carniolica, the various Floras of Allioni, De Gorter, Gunner, Hudſon, Gouan, Leers, Pollich, Weis and many others, which have been of great uſe to local, and indeed general botany; and even if every one of the valuable works juſt mentioned had been uſeleſs, who would not have thought them ſufficiently atoned for by the Flora Lapponica and Flora Suecica of Linnæus?

I am now led to conſider the ſervices rendered to natural hiſtory by the various diſciples of this eminent man, and others, who have undertaken hazardous and laborious journeys, on purpoſe to examine the productions of countries hitherto not at all or but ſlightly inveſtigated. And what praiſe does not the ardour of ſuch active promoters of ſcience deſerve? As no one ever felt more of this ardour than Linnæus, when the humble attractions of an arctic flora incited him to undertake his painful Lapland tour; ſo I think none has been ſo ſucceſsful as this great man in exciting the ſame ſpirit in others. Before I ſpeak of his pupils, however, the order of time obliges me to mention Buxbaum and Gmelin. The former may be ſlightly paſſed over. He was ſent by the Peterſburg Academy to collect plants in the Levant. The fruits of his labours are publiſhed in five Centuriæ, with wretched plates and very indifferent deſcriptions. The ſame ſociety were much more fortunate in their choice of Gmelin to undertake the examination of Siberia. That country had before been viſited by Gerber and ſome other botaniſts, but their acquiſitions were

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trifling compared with thoſe of Gmelin, who ſpent 10 years, viz. from 1733 to 43 in Siberia. His Flora Sibirica, now increaſed to four volumes quarto, with an immenſe number of figures, and excellent deſcriptions and ſynonyms, is one of the beſt works of the kind, and contains many very rare plants. Philip Frederick, the brother of this author, has written *Otia Botanica* and ſome other things. Samuel Gottlieb Gmelin, ſon of the laſt mentioned, is celebrated for his hiſtory of the genus Fucus, printed at Peterſburg in 1768.

The expedition of Ternſtroem, one of the firſt of Linnæus's diſciples whom the ſpirit of curioſity led to viſit countries far remote from his own, was an unfortunate one. This young man undertook a voyage to China in 1745, but died at Poulicandor. We have no hiſtory of his voyage. His memory is honoured with a plant in the Supplementum Plantarum at the inſtigation of Mutis, for Linnæus himſelf had not an high opinion of his merit.

Kalm, who viſited North America in 1747, was more fortunate. His travels are ſo well known, from the account of them tranſlated into Engliſh, that I need ſay little about them. His botanical diſcoveries very materially enriched the Species Plantarum of his great maſter, and the Linnæan Herbarium abounds with ſpecimens brought home by him, diſtinguiſhed by the letter K. His own collection of dried plants is ſaid to be mouldering away in Sweden, in

"The lumber garret of his *wiſer* heir."

Haſſelquiſt viſited Egypt and the Holy Land in 1749. No one has ſhewn greater zeal or activity than this ingenious young man, whoſe premature death cannot be too much regretted. He was alike ſkilful in zoology and botany, as the account of his travels publiſhed by Linnæus, and ſince tranſlated into Engliſh, ſufficiently ſhews. In vain has an invidious author, who has himſelf long en-

joyed an unſubſtantial reputation, endeavoured to blaſt the memory of Haſſelquiſt. His calumnies have been refuted by Dr. Sparrman, who has juſtly defended his countryman.

Oſbeck, another traveller well known in England from the tranſlation of his voyage, went to the Eaſt Indies in 1750, as chaplain to a Swediſh ſhip. He ſpent ſome time in China, of the natural hiſtory of which he has told us much, and has made known many new plants, among which is the Oſbeckia.

Loefling, a favourite diſciple of Linnæus and an excellent botaniſt, undertook the examination of Spain in 1751, where he found many new and rare plants, and probably would have made many more diſcoveries, had his ſtay been longer in that rich, and hitherto almoſt unexplored country; but he left it for one ſtill more intereſting, South America, where he would, no doubt, have made a rich harveſt, had his life and health been continued; but he was ſoon cut off at the age of 27. His letters and botanical deſcriptions have been publiſhed by his illuſtrious maſter, who, in this inſtance, as well as on every other occaſion, has given proofs of that ſenſibility which muſt ever make him as dear to humanity as to ſcience.

I forbear to enlarge upon other expeditions of leſs note, as thoſe of Montin and Solander to Lapland, Bergius and Falk to Gothland, &c. although each contributed to the general ſtock of natural knowledge very much. It is to be regretted we have not had more information from Rolander, who viſited Surinam and St. Euſtatia in 1755. He ſent home indeed ſeveral curious inſects, mentioned in the Syſtema Naturæ; but I find, by a letter of Linnæus to Gerard, that he eſteemed Rolander the firſt entomologiſt after Reaumur. A pupil of Linnæus, named Martin, viſited Spitzbergen in 1758: he muſt not be confounded with Martens, who went to the ſame country in 1671, and whoſe rude figures are quoted by Linnæus. I muſt not omit Toren, who went twice

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to the Eaſt Indies, and deſcribed his whole voyage in letters to Linnæus, enriched with many obſervations relating to natural hiſtory, all which were publiſhed with Oſbeck's voyage, and tranſlated into Engliſh by Dr. Forſter.

I am led to conſider ſome of the moſt illuſtrious naturaliſts of the preſent age, whoſe works and whoſe diſcoveries have been long ſo generally known as almoſt to preclude the neceſſity of mentioning them, were it not neceſſary to the uniformity of my plan. Of theſe Profeſſor Jacquin claims the firſt place. He was firſt known by his Hiſtoria Plantarum Americanarum, publiſhed in 1763, in folio, with many figures, and which contains deſcriptions of a vaſt number of plants of South America, ſcarcely ever ſeen by any body elſe. This book has lately been republiſhed, without any material addition, except that the plates are coloured; for its illuſtrious author has of late years applied himſelf to the improvement of botanical ichnography in the moſt eminent manner. Who has not ſeen and admired his Hortus Vindobonenſis and Flora Auſtriaca? And we have now no longer to regret the want of *differentia ſpecifica* in the works of Jacquin; for, with a degree of candor which does him the higheſt honour, he has deigned to liſten to the remonſtrance of the younger Linnæus on this ſubject, and has given the eſſential characters of all the plants figured in his Icones Plantarum rariorum.

Another celebrated work is Brown's Hiſtory of Jamaica, publiſhed in 1756, and now very rare, as the copies remaining at the bookſeller's, after the firſt ſale of the book, were burnt. Its elegant plates were drawn by Ehret, the beſt botanical draftſman of his time. The herbarium of Dr. Browne, who is ſtill living in Ireland, was bought by Dr. Solander many years ago, and ſent to Linnæus: the ſpecimens are not ſplendid, but important for the determination of many obſcure plants.

Two ſuperb publications were ſet on foot by royal munificence in Denmark, Regenfuſs's hiſtory of ſhells, and the Flora Danica. The former has, I think, the ſuperiority in point of execution over moſt works in natural hiſtory, except, perhaps, Baron Born's account of the ſhells in the Imperial Muſeum at Vienna. The Flora Danica, while under the direction of Oeder, was equally well executed; but Profeſſor Muller, more of a zoologiſt than a botaniſt, continued it with leſs care and perfection. Its reputation will, I doubt not, ſoon be abundantly reſtored by the abilities of Profeſſor Vahl, to whoſe care it is now entruſted.

We muſt now look back a little to endeavour to do juſtice to ſome great names in zoology. The age of Linnæus has been no leſs brilliant in this branch of natural hiſtory than in botany: but before I enter upon the works of his immediate diſciples or followers, I muſt ſpeak of his adverſary Klein, who objected to ſeveral of his alterations in zoology, with more reaſon on his ſide than any of the botanical opponents of Linnæus ever had; ſtill his remarks have not been much attended to. He alſo, like all the other adverſaries of our great teacher, laboured to find out contradictions in his works; as if the irregularities of Nature were to be laid to the charge of him, whoſe works and whoſe ſyſtem are often obſcure, merely from their conſonancy with Nature. Klein deſerves great praiſe for his multifarious works in zoology; he has left ſcarcely any part of the ſcience untouched, and has treated it both ſyſtematically and phyſiologically.

I haſten to a bright ornament of our own country, the ingenious, accurate and patient Ellis, whoſe diſcoveries relating to corallines form one of the moſt intereſting events in the natural hiſtory of the preſent century, and whoſe name will ever be revered while ſcientific or perſonal merit are held in eſteem. Nor is it poſſible for me, in paying this tribute to the memory of Mr. Ellis, to forget his friend

friend and very counterpart Dr. Garden, to whom Linnæus was ſo much obliged in his laſt edition of the Syſtema Naturæ that I think no name occurs there more frequently. This gentleman, long reſident in Carolina, is celebrated for his diſcovery of the Siren lacertina, that ſingular animal, for which Linnæus was obliged to form a new order in his ſyſtem. Dr. Garden is now returned to this country. Long may it be before I am at liberty to pay that unreſerved tribute to his merit which I have given to the departed Ellis!

It is well known that Mr. Ellis was one of the firſt who clearly made out the animal nature of corallines, and his opinion on the ſubject is now univerſally adopted. In the beginning, however, he had an opponent in Dr. Baſter, a Dutch naturaliſt, who maintained a contrary opinion, and argued with great ingenuity for the vegetable nature of theſe bodies, aſſerting that the polypes were merely accidental inhabitants of them, and not a part of their ſubſtance. The ſame author has publiſhed ſeveral other works on different marine inſects, worms and plants, under the title of *Opuſcula Subſeciva*, which are elaborate and curious: they are the performances of a real obſerver.

This intricate part of natural hiſtory has been inveſtigated by ſeveral other writers, as Bohadſch and Muller; but by none more ably than the celebrated Pallas, whoſe ſyſtematic work on Zoophyta is neceſſary to all who apply themſelves to this ſtudy.

No branch of natural hiſtory, after botany, has for ſome years paſt had more attention paid to it than entomology. Nor is this to be wondered at. Botany neceſſarily leads to the ſtudy of inſects; for it is impoſſible to inveſtigate plants in their native ſituations, without having our attention perpetually awakened by the infinite variety of thoſe active little beings, employed in a thouſand different ways in ſupplying themſelves with food and lodging, in

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repulſing the attacks of their enemies, or in exerciſing a more than Aſiatic deſpotiſm over myriads below them. Thus many of the moſt ſyſtematic botaniſts of the preſent age, as Scopoli, Hudſon, Allioni, have been led to the ſtudy of entomology. Another claſs of authors have undertaken to publiſh figures of inſects, as Sultzer and Friſch, ſometimes accompanied with their hiſtory at large, as in the excellent works of Roeſel and Sepp. I doubt whether the coloured plates of the latter have ever been excelled in any department of natural hiſtory. A moſt elaborate work, conſiſting only of coloured plates of inſects, was undertaken under the inſpection of Linnæus, by Clerck, the author of which dying ſoon after it was publiſhed, had time to colour a very few copies only, and theſe are much valued by the curious. In my opinion this work is more remarkable for labour than ſkill, and is far excelled by that of our countryman Mr. Drury, which I hope I may, without being accuſed of partiality, rank among the very firſt of its kind. I need ſay nothing of Albin and Wilkes, whoſe plates were admired in their time, but are now eclipſed by many. The Entomologia of Schæffer, the celebrated naturaliſt of Ratiſbon, ſo well known by his figures of Fungi, and other works, are very ably and carefully executed. I have only two more entomological writers to mention at preſent, but thoſe are very illuſtrious ones, Geoffroy and De Geer. The work of the former is an hiſtory, in French, of the inſects found about Paris, with a few excellent plates, chiefly as examples of the different genera. This with the Entomologia Carniolica of Scopoli, and the works of Linnæus, are the claſſical books indiſpenſably neceſſary to every ſyſtematic ſtudent of European inſects. Thoſe who wiſh to ſtudy their hiſtory and metamorphoſes more fully, will find ample ſatisfaction in the ineſtimable work of De Geer, which is a counterpart of that of Reaumur, and equally extenſive and accurate. Its author, a Swediſh nobleman, deſerves to

be ranked among the moſt able promoters of the ſcience which he cultivated.

I have before mentioned that the botanical ſyſtem of Linnæus was not readily received in France. Still leſs regard was paid there to his zoological works; and this is principally to be attributed to the ſucceſs of his great opponent the Count de Buffon, whoſe ſplendid publications and captivating ſtyle of writing, ſo well calculated to dazzle the multitude and to charm the people among whom he lived, engroſſed all the attention of his countrymen, and have been admired throughout Europe. Indeed thoſe who are leaſt partial to this celebrated writer muſt allow that he has contributed much to encourage and promote the ſtudy of nature, has made many valuable obſervations, and collected a variety of intereſting facts. We muſt remember however that the facts of ſo theoretical a writer are always to be received with caution: not that I would ſuſpect any philoſopher of wilful miſrepreſentations, but a prudent theoriſt will ſcarcely truſt his own eyes; and the world are pretty well agreed that the hypotheſes of Buffon are, for the moſt part, the very eſſence of futility; though ſeveral have laughed at them, few have taken the pains to refute them.

The French have long poſſeſſed a more ſyſtematic writer in Briſſon, whoſe *Regne Animal* has great merit, and whoſe excellent and elaborate hiſtory of birds, none who purſue that part of zoology can be without.

England too has produced a genius, at leaſt equal to the latter, in Mr. Pennant, who has almoſt exhauſted the three firſt claſſes of the zoology of Great Britain, and whoſe name and works are too celebrated to need my commendation here.

Before I return to Linnæus I muſt mention the illuſtrious Mr. Bonnet of Geneva, an enthuſiaſtic admirer of the works of nature, whoſe candour and ingenuity cannot but obtain our eſteem, whether

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we adopt his theories or not. This author is ſo remarkably inattentive to nomenclature and ſyſtematic arrangement, that an acrimonious enemy of Linnæus has quoted him as aſſenting to his own illiberal ſentiments of that great man; but I am ſure nothing could be more unjuſt than to make Bonnet a partiſan of ſuch animoſity. Happy are thoſe true philoſophers, who, by an attention to the works of the Creator, are led, like this amiable man, to make themſelves better as well as wiſer, and to diffuſe not only knowledge but happineſs on all around them!

Linnæus, whoſe powers were beginning to decline, publiſhed in 1771 the *Mantiſſa altera*, which may be conſidered as his botanical teſtament. It is partly a collection of remarks and corrections made at different times, and contains, beſides, deſcriptions of a number of new plants, of which the rich communications of Dr. Mutis, from the continent of South America, make a conſiderable part. This gentleman, and ſome other Spaniſh botaniſts his friends, have had the good fortune of inveſtigating the countries of Mexico and new Granada, hitherto little known to botaniſts; and the fruits of their induſtry were all ſent to Linnæus. Among them, the great variety of beautiful and very extraordinary new plants of the claſs Syngeneſia are remarkable. The fineſt of all was honoured with the name of Mutiſia, and publiſhed by the younger Linnæus in his Supplementum Plantarum, a work the foundation of which was laid by his illuſtrious father not long before his death. I forbear to enlarge upon this melancholy period of the hiſtory of our ſcience, which deprived it of its brighteſt ornament. The circumſtances of the death of Linnæus, with the honours paid to his memory, are known to all; nor need I on the preſent occaſion make any artificial diſplay of his merits, or of the loſs which ſcience ſuſtained by his death. I am convinced none of my hearers has any thing to learn on this ſubject, and I would

rather prefer the more cheerful taſk of tracing the ſucceſs of his labours, and the effect of the ſpirit he had raiſed, in the enterpriſes and diſcoveries of many eminent naturaliſts, ſeveral of them his immediate pupils, whoſe deſerved fame reflected ſuch diſtinguiſhed honour on the laſt years of their great teacher.

Here however a new difficulty preſents itſelf. In the former part of this diſcourſe, having principally had occaſion to ſpeak of authors no longer living, and known to us chiefly by their works, I have, to the beſt of my judgment, given an impartial and unreſerved account of their merits. Glaring defects have been generally pointed out, but I have more frequently indulged in the more agreeable office of praiſing merit of all kinds wherever it occurred. In ſo doing I have not been actuated by a ſenſeleſs veneration for former times, nor have I prepoſterouſly aimed by a vain and uſeleſs homage to

——"ſoothe the dull cold ear of death."

To excite laudable emulation has been my only intention. But now that I find myſelf either treading (to uſe Dr. Johnſon's words) on aſhes not yet cold, or am to ſpeak of naturaliſts with whom I am perſonally connected, and of others whoſe approbation and eſteem I cannot but be anxious to obtain, even the juſt tribute of applauſe might appear like ſervile adulation. This conſideration, added to my having already extended my diſcourſe to an immoderate length, will I hope juſtify me in touching now but ſlightly on many great names and many arduous undertakings, eſpecially as I could but repeat facts and circumſtances familiar to all, and ſhould run the riſque of exhauſting the patience of my hearers without giving them any information. I am perſuaded no one whom I have now the honour of addreſſing needs to be informed of the merits of a Thunberg, Sparrman, Pallas, Fabricius, Swartz, or Hedwig, of the vaſt phyſiological diſcoveries of a Camper or Hunter, much leſs of the liberality and extenſive knowledge of a Banks, or the genius

and worth of the ever to be lamented Solander. Who is not acquainted with every circumſtance of that celebrated voyage round the world, which has enriched every branch of natural knowledge in ſo eminent a degree? Who has not obſerved with pleaſure the laudable emulation of a neighbouring country in promoting ſimilar undertakings, to which we are indebted for the botanical acquiſitions of Commerſon, Sonnerat, Aublet and Dombey? When I conſider all theſe, added to the diſcoveries of Pallas in Siberia, of Sparrman, Maſſon and Thunberg at the Cape, and eſpecially the acquiſitions which the latter, undiſmayed by the moſt formidable difficulties, made in Japan; when I contemplate the diſtinguiſhed abilities of many other living naturaliſts, the excellent publications of Schreber, Rottboll, Retzius, Allioni, Scopoli, Brouſſonet, L'Heritier, the philoſophical Herman, and many others, not to mention ſome in our own country which may vie with any of theſe, I am induced to conſider the preſent age as one of the moſt propitious to the ſtudy of nature, on the moſt ſolid and philoſophical principles; and when I look around me at home, and ſee how very much the love of botany in particular, and the cultivation of plants, is increaſing among perſons of rank and fortune, as well as the treaſures which are daily enriching our gardens and cabinets, I cannot help indulging the moſt flattering hopes that my own country will ſoon in an eminent manner be diſtinguiſhed above the reſt of Euope in theſe uſeful and pleaſing purſuits. But the degree of credit we have already acquired muſt not lull us into a torpid ſecurity. We muſt keep in mind that France, our rival in power, is alſo our rival in ſcience, and even at Paris Linnæus has now his followers, who deſpiſing all national prejudices, dare to admire truth and genius wherever they find them. Let this excite in us a laudable ſpirit of emulation; not the narrow jealouſy which diſtinguiſhes thoſe, who, conſcious of their own weakneſs or undeſerved reputa-

tion, dread every approach towards perfection in others. All who purſue the ſame ſtudies ſhould labour together for the common good: every degree of aſſiſtance, every deſerved commendation which they give to each other, is the moſt probable means of advancing their own fame; while every atom of uſurped honour, if it does not immediately cover its vain poſſeſſor with opprobrium, is almoſt certain to be deducted with intereſt from his character by a diſcerning and impartial poſterity.

It now only remains for me to point out what I conceive to be the peculiar objects of our preſent inſtitution. I need not enforce the propriety of each of us endeavouring to promote as much as poſſible the main ends of our undertaking, and to contribute all in our power to the general ſtock of knowledge. Theſe are indiſpenſable obligations upon all who aſſociate themſelves with any literary ſociety. Thoſe who do not comply with them incur diſgrace inſtead of honour, for a title is but a reproach to thoſe who do not deſerve it; nor can they have a ſhare in the reputation of a ſociety, who never in any manner contributed to its advancement.

Beſides an attention to natural hiſtory in general, a peculiar regard to the productions of our own country may be expected from us. We have yet much to learn concerning many plants, which authors copy from one another as the produce of Great Britain, but which few have ſeen; and our animal productions are ſtill leſs underſtood. Whatever relates to the hiſtory of theſe, their œconomy in the general plan of nature, or their uſe to man in particular, is a proper object for our enquiries. Of the productions of our own country we ought to make ourſelves perfectly maſters, as no natural object can any where be ſtudied half ſo well as in its native ſoil. This however not being always practicable, botanic gardens and cabinets of natural hiſtory have been invented, in which the productions of the moſt diſtant climes are brought at

once before us. No country that I know of can bear a compariſon with England in this reſpect. The royal garden at Kew is undoubtedly the firſt in the world, and we have a number of others, both public and private, each of which may vie with the moſt celebrated gardens of other countries. Nor have we a leſs decided ſuperiority in Cabinets. That of the Britiſh Muſeum, which contains among other things the original herbariums of Sloane, Plukenet, Petiver, Kæmpfer, Boerhaave, of many of the diſciples of Ray, and ſeveral others, beſides innumerable treaſures of zoology, claims the firſt place. That of the late Sir Aſhton Lever ſtands I believe unrivalled in birds and quadrupeds; not to mention many others. But is it not a reproach to the naturaliſts of Great Britain that ſo many rarities ſhould remain in their hands undeſcribed? that foreigners ſhould eagerly catch at one or two plants obtained from our gardens, which we for years have been trampling under foot unnoticed? Yet how, till now, could ſuch nondeſcripts have been made publick? Large works in natural hiſtory are expenſive and of hazardous ſale; few private people can undertake them; nor has there hitherto been any ſociety to which detached deſcriptions could be communicated. It is altogether incompatible with the plan of the Royal Society, engaged as it is in all the branches of philoſophy, to enter into the minutiæ of natural hiſtory; ſuch an inſtitution therefore as ours is abſolutely neceſſary, to prevent all the pains and expence of collectors, all the experience of cultivators, all the remarks of real obſervers, from being loſt to the world. The ſlighteſt piece of information which may tend to the advancement of the ſcience we ſhould thankfully receive. However trifling in itſelf, yet combined with other facts, it may become important. Whatever relates to the determination of ſpecies, even in the loweſt and ſeemingly unimportant tribes of nature's works, ought never to be neglected. Nor let the

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humble and patient ſtudent of this very difficult part of natural hiſtory be diſcouraged by the ſneers of the ſupercilious coxcomb, or of the ignorant vulgar. He who determines with certainty a ſingle ſpecies of the minuteſt moſs or meaneſt inſect, adds ſo far to the general ſtock of human knowledge, which is more than can be ſaid of many a celebrated name: no one can tell of what importance that ſimple fact may be to future ages; and when we conſider how many millions of our fellow creatures paſs through life without furniſhing a ſingle atom to augment this ſtock, we ſhall learn to think with more reſpect of thoſe who do.

But nothing will be with more reaſon expected from the members of this ſociety than a ſtrict attention to the laws and principles of Linnæus, ſo far as they have been found to be good. No where have his works been more ſtudied and applied to practice than in this country, nor can any other be ſo competent to eſtimate his merits or correct his defects. I am perſuaded nothing can be done more uſeful to the ſcience of natural hiſtory than, working on the publications of this illuſtrious man as a foundation, to endeavour to give them that perfection of which they are capable, and to incorporate with them all new diſcoveries. We who have it in our power to give real information, ſhould deſpiſe the ſilly vanity of making new ſyſtems or arrangements, merely for the ſake of being talked of. An artificial method like that of Linnæus may be changed a thouſand different ways, and each ſeem beſt to its inventor. If any one, deſpairing of getting immortality by any other means, ſhould pleaſe to name Cryptogamia the firſt claſs and Monandria the laſt, I ſhould rank him but with Chriſtopher Knaut, who made about as wiſe an attempt upon the method of Ray.

Whatever we may think of the ſyſtem of Linnæus, there are certain great principles laid down by him, the excellence of which is now ſo well known, and ſo generally admitted, that none who

pretends to the name of a naturaliſt can avoid conforming to them. The laws, for inſtance, according to which he conſtructed his *generic names* and *ſpecific differences*, which we ſhould do well to imitate, although leſs ſtrictly, in the application of *trivial names*. I hope never to ſee any deſcriptions ſent into the world by this ſociety without ſpecific differences; they are what diſtinguiſh a true ſcientific naturaliſt from an empiric, and nothing but incapacity in an author can make us pardon the want of them. Without a ſtrict attention to this maxim, the ſcience will ſoon relapſe into its original barbariſm, nor can any thing but another Linnæus reſtore it. Let not the excellent work of my friend Mr. Latham be here cited againſt me; for that ingenious author is too judicious to have neglected this material point; he is poſſeſſed of the eſſential characters of all his birds, and means to publiſh them in a ſyſtematic form as a ſupplement to his great work. I wiſh I could make the ſame apology for ſome other eminent writers. But how would their works ſhrink if reduced to Linnæan conciſeneſs and preciſion!

A kind of knowledge which naturaliſts have a right to expect from us in a ſuperior degree, is the accurate determination of the ſpecies deſcribed by Linnæus, and indeed thoſe of many other authors. Our acceſs to the ſeveral original collections I have mentioned, to the immenſe herbarium of Sir Joſeph Banks, which contains the entire collections of ſeveral celebrated botaniſts, but more eſpecially to the very herbarium and muſeum of Linnæus himſelf, muſt give us means of knowledge not to be had elſewhere. This is a ſubject on which I ſpeak with peculiar pleaſure, as in this reſpect I may hope to be infinitely more uſeful to the preſent inſtitution, than could have been expected from any abilities of my own. A train of events, which I cannot help calling moſt fortunate, having brought into my hands every thing which Linnæus

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poſſeſſed relating to natural hiſtory or medicine, his entire library, manuſcripts, and the correſpondence of his whole life, as well as all the acquiſitions made by the younger Linnæus in his tour through Europe, after his father's deceaſe, but which his own premature death prevented him from communicating to the world; all theſe will be a never failing reſource to us in every difficulty, as well as a fund of information not eaſily to be exhauſted. For my own part I conſider myſelf as a truſtee of the public. I hold theſe treaſures only for the purpoſe of making them uſeful to the world and natural hiſtory in general, and particularly to this ſociety, of which I glory in having contributed to lay the foundation, and to the ſervice of which I ſhall joyfully conſecrate my labours, ſo long as it continues to anſwer the purpoſes for which it is deſigned.

II. *Obſervations on ſome Extraneous Foſſils of Switzerland, by* M. TINGRY, *Foreign Member of the Linnæan Society, Demonſtrator of Chemiſtry and Natural Hiſtory at Geneva, &c.*

Read July 1, 1788.

L'ETUDE de la minéralogie diſſipe les doutes qu'on pourroit avoir ſur les cataſtrophes qui ont bouleverſé le globe et ſillonné ſa ſurface. Les blocs de granit detachés de leur maſſe et tranſportés ſur des terrains calcaires, les vegetaux, les animaux, les pierres roulées qu'on trouve dans ſon ſein à une grande profondeur, ſont des temoins irréfragables qui dépoſent ſur le travail des eaux et ſur les effets d'immenſes courants.

Mais ces materiaux épars que l'activité des naturaliſtes raſſemble de toute part et qui invitent le philoſophe à remonter aux cauſes premières de leur deplacement, n'ont point encore redreſſé nos incertitudes ſur leur état primitif, ni ſur les époques des révolutions qui les ont altéré, modifié ou tranſporté ſur un ſol qui leur eſt étranger. A cet égard, malgré tant d'hypothèſes ingénieuſes, dont quelques unes plus d'accord avec les vraiſemblances, ont pu ſéduire, l'eſprit humain paroit reduit à n'enfanter que de merveilleuſes chimères; tant nous ſommes éloignés de connoître tous les corps qui ſont ſubordonnés aux loix de notre ſyſtème, de ſuivre leur marche et de calculer leur influence ſur ceux qui n'ont point échappé à nos inſtrumens.

Cependant les ſoins employés à recueillir ces materiaux diſſéminés n'ont pas été infructueux. S'ils nous paroiſſent inſuffiſans pour nous éclairer ſur les cauſes éloignées qui les ont tourmenté, du-moins peuvent-ils en démontrer des effets certains relativement à notre planette. Ses quatre parties renferment dans leur ſein des ſubſtances végétales et animales qui ſont abſolument étrangères au ſol qui les enfouit. L'Amérique et notre Europe préſentent aux recherches du naturaliſte des dépouilles de corps organiſés dont les analogues paroiſſent appartenir à l'Inde. Il eſt à préſumer que ſi l'Aſie et l'Afrique etoient mieux connues, quant à l'hiſtoire naturelle, elles ajouteroient de nouvelles démonſtrations aux faits déjà en évidence. Les collections deviennent donc à cet égard des monumens précieux où ſont inſcrits, en caractères ineffaçables, les preuves les moins équivoques des anciennes révolutions qui ont tourmenté le globe.

On a ſenti que les corps organiſés, enfouis à une profondeur indéterminée, ont du éprouver des altérations plus ou moins achevées, à raiſon de leur maſſe, de leur organiſation particulière et de l'influence plus ou moins grande des matières avec leſquelles ils ont été confondus. C'eſt de ce principe qu'on eſt parti pour expliquer la formation des charbons foſſiles, du bitume, de la poix, du pétrole, du naphte et des autres matières minerales inflammables denuées de traces d'organiſation.

Mais ſur tous les points qui tiennent à l'hiſtoire du globe la ſcience ne fait que des pas bien lents. Avant qu'on ait pu admettre une théorie raiſonnable ſur une matière qui demandoit une longue ſuite d'obſervations, on croyoit implicitement que les bitumes etoient dus aux exhalaiſons de la terre, que l'élément terreux ſeul étoit le principe de leur formation, et qu'ils étoient à la terre et aux autres mineraux ce que l'huile eſſentielle, l'huile par expreſſion ſont aux végétaux et la graiſſe aux animaux.

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On n'a pas tardé à eſtimer à ſa juſte valeur cette opinion ſingulière. Un ſeul raiſonnement ſuffiſoit pour en dévoiler le ridicule. L'huile eſt un produit de l'organiſation : les corps privés d'organiſation ne pouvoient donc entrer pour rien dans leur formation ; auſſi s'eſt-on accordé à regarder le *detritus* des corps organiſés enſevelis dans la terre par des cauſes éloignées, comme étant la vraie matrice des bitumes ſecs et liquides, en admettant néanmoins, que les principes de ces corps organiſés peuvent prendre, par la ſeule influence des vapeurs minérales, des caractères qui s'éloignent plus ou moins de la nature des ſubſtances productrices.

Ce ſont ces variétés obſervées dans la nature des produits analytiques des bitumes, charbons foſſiles, &c. qui ſervent de baſe à l'hypothèſe adoptée par Mrs. Parmentier, de Fourcroi et autres naturaliſtes. Suivant cette hypothèſe les animaux ont autant et peut-être même plus contribué à la formation des matières bitumineuſes que les végétaux. Les argumens qu'on oppoſe en preuves ſont, que l'on trouve frequemment ſur les premières couches qui recouvrent les filons de charbon foſſile, des dépouilles d'animaux marins, et que ces dépouilles y ſont plus abondantes que les débris de végétaux.

Mais ces argumens ne ſont pas d'un auſſi grand poids qu'on pourroit, peut-être, ſe le figurer, ſi l'on fait attention à la nature de ces dépouilles et aux eſpèces de coquillages qui s'y rencontrent. Ce ſont des univalves, bivalves, et multivalves, de grandeur ordinaire, et faiſant partie des bancs calcaires dont l'accumulation paroit poſterieure à celle des végétaux, puiſqu'on les retrouve dans la continuation des bancs, et dans des directions oppoſées à celles des filons de houille. Rarement, très rarement rencontre-t-on des fragmens de ces grands oſſemens de cétacées qui, abondants en huile, pourroient juſtifier l'hypothèſe en empruntant les caractères de la probabilité.

Quand les méditations les plus profondes ſur cette partie de l'hiſtoire naturelle auroient refuſé à la ſagacité des obſervateurs la démon-

ſtration des preuves tirées de la ſeule inſpection des charbons foſſiles, pour faire dépendre leur formation des ſeuls végétaux, il ne faudroit, pour s'en convaincre, que ſe repréſenter ce qui doit ſe paſſer dans une révolution telle que le célèbre Pallas la ſuppoſe. Les débris de la ſurface du globe, ces forêts immenſes arrachées de leur ſol par la rapidité et la maſſe des courants, confondues et entrainées avec les animaux marins et terreſtres, ont du occuper les bas-fonds et s'y précipiter dans l'ordre de leur peſanteur ſpécifique. Les grands végétaux ont ſans doute conſtitué les lits inferieurs, ou garni les bords de la mer. Les teſtacées comme plus legers, ainſi que les pierres roulées et les ſables ont formé les lits ſuperieurs. Ces derniers lits peuvent être contemporains ou poſterieurs, et tenir par cela même à des époques differentes : mais, dans tout état de cauſe, ſi les teſtacées ſe ſont conſervés, l'immenſe groſſeur des cétacées, et la ſolidité de leur parties oſſeuſes devoient auſſi contribuer à leur conſervation : il ſeroit donc très-aiſé d'en rencontrer des indices ; mais ſi on en trouve, ils ſont ſi rares qu'ils ne peuvent guères balancer la théorie qui repréſente les végétaux comme étant les principaux matériaux des houilles, charbons foſſiles, &c.

Cependant, quoiqu'il n'y ait aucune preuve apparente que les animaux ayent concouru à la formation des bitumes, il ſeroit abuſif d'en rejetter la poſſibilité. Ils peuvent bien y avoir part dans certains circonſtances : peut-être même auroit-on quelque raiſon de regarder l'aſphalte comme bitume mixte, ſi, pour ſe déterminer, on s'étayoit des argumens tirés de ſon analyſe ; nous penſons néanmoins que ces cas doivent être très bornés.

Mais par quelle puiſſance, par quel agent les corps organiques, enfouis par une cauſe quelconque, ſe trouvent-ils réduits à cet état de dureté, de glutinoſité ou de liquidité qui caracteriſent les houilles, le malte, le bitume et les huiles de petrole ? On ne peut voir ici que l'effet des décompoſitions ſpontanées et des nouvelles combinaiſons

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operées par les vapeurs minérales et ſurtout par la préſence d'une certaine quantité d'eau. Ces débris ainſi renfermés dans le ſein de la terre par l'accumulation ſimultanée ou ſucceſſive des terres, des pierres et des coquillages, auront éprouvé des changemens en raiſon compoſée de leur maſſe, de la nature de leurs principes et de la quantité d'eau dont ils ſont pénétrés. A ces cauſes il s'en peut-être joint d'autres qui nous ſont inconues, mais dont l'effet aura été plus ou moins prompt et dont les réſultats ſont, que ces matières, ramollies par l'eau, ſubiſſent pendant la révolution des ſiècles, et dans le ſilence de la nature, une analyſe comparable à celle qui a lieu dans des vaiſſaux fermés; qu'elles s'échauffent par l'effet des décompoſitions lentes et des nouvelles combinaiſons, et ſe reduiſent en une matière charbonneuſe qui offre ſouvent la forme entière ou, au moins, des indices marqués des corps organiſés. Cette ſimple carbonification ne peut être vraiſemblablement attendue que dans les cas où la maſſe des matières combuſtibles n'eſt pas trop conſidérable *. Il n'eſt pas rare de rencontrer à quelque diſtance des filons de grands végétaux qui conſervent leur forme extérieure, parcequ'ils ont été ſéparés de la maſſe : pour l'ordinaire ils ſont minéraliſés.

On peut raiſonnablement conjecturer que les débris de végétaux, réunis en plus grandes maſſes, et expoſés à l'action des combinaiſons particulières qui donnent la chaleur à certaines eaux thermales, ou enfin à l'influence des foyers volcaniques voiſins, ſubiſſent une vraie diſtillation, dont les produits, entrainés par l'eau qui s'oppoſe à leur décompoſition, paroiſſent à la ſurface de la terre ſous l'état de naphte.

* La préſence d'une mine de fer diviſée ou ſa formation locale accélèrent ſans doute cette opération de la Nature. Le Derbyſhire fournit un mélange de fer et de manganaiſe qui prend feu ſpontanément lorſqu'on le détrempe avec de l'huile de lin. Aux cauſes admiſes par les phyſiciens pour expliquer les inflammations ſouterraines on pourroit peut-être ajouter celle des effets reſultants d'un mélange naturel d'huile de petrole avec une mine de fer analogue à celle du Derbyſhire.

Dans

Dans d'autres circonſtances ces mêmes huiles détachées des bois par leur décompoſition ſpontanée, s'infiltrent inſenſiblement dans des couches de ſable et d'argille, et donnent origine aux houilles ſéches et aux ſchiſtes bitumineux. Enfin, dans d'autres circonſtances encore et qui ne ſeroient qu'une ſuite des précédentes, ces huiles ramaſſées dans les ſciſſures intérieures de la terre y ont pris la conſiſtence qu'on remarque à la poix minérale.

Les méditations les plus ſérieuſes ſur l'origine des charbons foſſiles et des matières qui leur ſont analogues ou identiques ne peuvent guères diſpoſer le naturaliſte à des opinions contraires à la doctrine qui nous repréſente les végétaux comme les matériaux des charbons foſſiles, &c. Le concours des animaux doit y avoir eu peu d'influence, parceque leur diſperſion a du s'oppoſer à cette opération ſecondaire de la Nature ; la condition eſſentielle pour la bituminiſation étant que les corps qui y ſont deſtinés faſſent maſſe. Par cette diſperſion les corps ſe deſſèchent ou ſe minéraliſent. En effet les teſtacées qui rempliſſent ou qui conſtituent les couches ſupérieures qui recouvrent certains filons ne contiennent rien de charbonneux, parceque la matière animale ne faiſoit point maſſe ; et dans les cas où les grands cétacées auroient contribué à la formation des filons combuſtibles, la préſence de leurs oſſemens, qui devoient s'y conſerver auſſi bien que les dépouilles des teſtacées, ſeroit un temoignage qui prononceroit ſur la queſtion.

Nous croyons d'ailleurs que quand il ſe préſenteroit quelques faits en faveur de la nouvelle hypothèſe, les réflexions particulières qui en ſeroient la ſuite ne pourroient influer que très foiblement ſur l'opinion générale, par cette ſeule conſidération, que les animaux marins et terreſtres ne peuvent jamais balancer, par leur effet ſuppoſé, l'immenſe quantité de végétaux entrainés et engloutis par les convulſions de la terre.

Les obſervations que j'ai faites dans les mines de houille de la Tarentaiſe ainſi que dans quelques mines de France et de Suiſſe ne m'ont

préſenté

préſenté aucun fait coincidant avec l'hypothèſe Francoiſe*: dans toutes ces mines j'ai apperçu des dépouilles de teſtacées, comme cames, peignes, moules, gryphites, huitres, térébratules, &c. renfermées dans les couches ſupérieures des filons et même dans le corps de la montagne; mais je n'y ai vu aucune de ces dépouilles animales ayant des indices de bituminiſation. Les débris de végétaux ſont plus ou moins ſenſibles dans la maſſe même du charbon.

Si dans ces recherches particulières il ne s'eſt préſenté que quelques fragmens appartenant à la claſſe des végétaux, celles que je viens de faire dans de nouveaux filons ouverts depuis peu en Savoye ont été plus heureuſes. Les plantes enfouis y ſont carboniſiées ſans avoir rien perdu de leur forme organique. Deplus, les échantillons que j'en ai tirés confirment une opinion qu'on doit à la ſagacité du célèbre Bernard de Juſſieu, relativement aux empreintes végétales et aux inſectes qu'on trouve dans certaines mines d'Europe; c'eſt que leurs analogues appartiennent à l'Inde et à l'Amérique.

Ces filons de houille ont été apperçus un peu au-deſſus de Taninge, bourg de la province de Faucigni en Savoye. Ils ſont ouverts ſur les flancs d'un torrent qui deſcend des montagnes d'Abondance, et qui, après avoir traverſé le bourg, verſe ſes eaux dans le Giffre. Leur élévation au-deſſus du lac de Genêve eſt de 168 toiſes, ſuivant les meſures priſes par M. le Prof. Pictet. C'eſt dans les déblais du chapeau des filons que j'ai trouvé les empreintes carboniſiées dont je donne ici la deſcription. J'en enverrai des échantillons à la première occaſion.

* Si la ſubſtance animale avoit pu influer d'une manière ſenſible ſur la formation des charbons foſſiles, c'eſt dans ces maſſes énormes de coquillages altérés ou détruits qui conſtituent les montagnes de St. Pierre, près de Maſtricht, ainſi que dans les immenſes falunieres de la France que nous en devrions chercher les preuves les moins équivoques. Cependant il ne s'y trouve pas de charbon foſſile; et s'il s'en rencontre, on y reconnoit bientôt les traces de l'organiſation végétale.

La montagne que recele ces filons eſt du genre des calcaires ; mais elle renferme des mélanges de pierres que les bornes de ces obſervations ne permettent pas de décrire, et que le célèbre lithologiſte Genevois mettra ſans doute à la ſuite de ſes précieuſes obſervations ſur les parties compoſantes de nos montagnes.

1. Tronçon d'un grand roſeau carbonifié, de 4 pouces de diamètre et dont les ſillons intérieurs ſont imprimés dans le noyau pierreux. On y remarque quatre articulations, dont les lames rentrantes, également carbonifiées, ſe prolongent aſſez avant dans l'intérieur du noyau et ſemble le diviſer en autant de parties. Ce noyau, qui eſt comprimé par l'effet de la peſanteur des couches ſupérieures, eſt un mélange d'argille durcie, de ſable et de mica blanc.

2. Une portion d'une large feuille carbonifiée appartenant, ſans doute, à l'eſpèce de roſeau décrit ci-deſſus, et dont les nervures ſont fortement exprimées. Cette feuille, dont je crois pouvoir déterminer toute la largeur, à raiſon de la dépreſſion des deux bords, a ſix pouces de diamètre. Sa longueur eſt indéterminée, le morceau que je poſſede n'ayant qu'un pied de longueur ſans indiquer cette decroiſſance qui conduit à l'*apex*. La baſe de la pierre eſt de la même eſpèce que la précédente, et préſente aſſez le caractère de celles que le célèbre Kirwan deſigne ſous le nom de *Killa*.

3. Des lames d'un ſchiſte noir mêlé de calcaire, ſur leſquelles on voit de larges feuilles de roſeaux et d'autres feuilles de la même famille, mais plus étroites ; des variétés de fougères ; des portions inégales de longs pédicules. Une partie de ces lames n'offre que des empreintes ordinaires, tandis que d'autres échantillons les preſentent entièrement carbonifiées et entières. On y diſtingue auſſi l'*equiſetum* et une eſpèce de *chara*.

4. D'autres empreintes de feuilles de roſeaux également carbonifiées et mineraliſées par des pyrites martiales en lames ſuperficielles ſur une gangue de grès ſchiſteux.

5. D'autres

5. D'autres feuillets ſchiſteux noirs, avec quelques unes des empreintes précédentes confondues avec des follioles en apparence réniformes et les pédicules deſignés (N° 3.) Quelquefois l'union de ces pédicules eſt tellement diſpoſée à l'égard de ces follioles qu'on ſeroit tenté de les regarder comme leur appartenant.

La première idée que préſente l'aſpect de ces follioles, c'eſt qu'elles ont été fournies par l'*Oſmunda regalis*; mais la nervure de ſes feuilles qui eſt plus apparente que dans nos ſchiſtes, et qui, outre cela, ſe termine par un bord *ſerré* qu'on ne voit pas dans nos empreintes, augmentoit nos incertitudes ſur leur véritable eſpece. Un ſeul morceau qui m'eſt tombé ſous la main, et qui montre huit à dix follioles oppoſées et attachées à leur pédicule commun, nous a découvert l'*Aſplenium nodoſum, frondibus pinnatis, pinnis oppoſitis, lanceolatis, integerrimis*, de Linné. C'eſt la *Filix latifolia nodoſa* de Plumier, Plantes d'Amérique, p. 4. tab. 6.

Cette plante eſt abſolument étrangère à notre climat, et elle ne croit que dans l'Amérique Meridionale. Il en eſt de même de quelques fougères et de nos feuilles de grands roſeaux, dont on ne trouve point les analogues dans les endroits où on les découvre.

6. Je peux joindre à la deſcription de ces échantillons celle d'un morceau de bois pétrifié que j'ai ramaſſé dans les environs d'Annecy, petite ville de Savoye. La matière lapidifique eſt de nature quartzeuſe; et elle eſt tellement diſtribuée que la contexture du bois n'eſt nullement alterée dans ſa forme. Ce morceau a cela d'intéreſſant qu'une partie eſt convertie en vrai charbon foſſile très-noir, luiſant, et ayant en un mot tous les caractères qui le ſpécifient. Ce charbon, diviſé par baguettes qui ſuivent la direction des fils du bois, eſt tellement contigu à la maſſe lapidifiée, que le paſſage du charbon à la pierre eſt marqué par des nuances très-ſenſibles dans ſa dureté et dans ſa couleur, qui ſe confondent enfin avec celles de la pierre. A l'une des extrémités du morceau on obſerve une belle criſtalliſation de ſpath peſant en lames rhomboïdales aſſez tranſparentes.

Quelqu'iſolées que paroiſſent ces obſervations, nous avons néanmoins eſperé qu'elles pouvoient être conſignées dans le dépôt des matériaux qui peuvent ſeuls prononcer ſur les cataſtrophes qui ont tourmenté notre globe, et ſur la nature des ſubſtances qui ſemblent concourir le plus à la formation des charbons foſſiles, des bitumes, pétroles, &c.

Genève, le 26 Avril 1788.

III. *Obſervations on the Phalæna Bombyx Lubricipeda of Linneus, and ſome other Moths allied to it.* By *Thomas Marſham, Eſq. Secretary to the Linnean Society.*

Read Auguſt 5, 1788.

WITH a view to promote the intereſts of that ſcience which we profeſs to cultivate, I take the liberty of offering to the conſideration of the Linnean Society a few remarks, made with a deſire of correcting an error into which the celebrated Linneus has fallen in deſcribing his Phalæna Bombyx Lubricipeda; which, although a very common inſect, has been by him confounded with three other ſpecies; an error in which he has been followed by Fabricius and others. But before we enter on this ſubject, I cannot help expreſſing a wiſh, that entomology were more ſtudied as a ſcience; from a conviction that many intereſting obſervations and diſcoveries have frequently been made, which are concealed, or totally loſt, for want of a proper mode of communicating them to the public. Few of the Engliſh names of inſects being generally known, and many of them very local indeed, ſcarcely any two obſervers, who confine themſelves to theſe names, can always underſtand each other. If the ſtudy of inſects be of any utility, clearneſs and preciſion in its purſuit are well worthy our attention. To enumerate the uſes of this ſtudy, would be only to repeat what has been often ſaid before. Yet if the appearance of an harmleſs caterpillar

in greater numbers than uſual could cauſe ſo ſerious an alarm to the inhabitants of London and its environs, as happened in the year 1782, when the churchwardens and overſeers of the neighbouring villages, after ordering rewards for collecting theſe caterpillars, attended to ſee them burnt by buſhels; ſurely much praiſe was due to the author of that curious and well-timed Eſſay on the Brown-tail Moth, in which, by a circumſtantial and faithful hiſtory of the little innocent animal, he reſtored tranquillity to a terrified multitude.

It is from ſuch accurate and critical inveſtigations of the nature and œconomy of theſe lower orders of animals, and a mutual communication of our diſcoveries, that we muſt expect profit. For although the labours of an individual taken ſeparately may afford little; yet when collected, compared, and digeſted, they may very much enrich the general ſtock of knowledge. Could we with certainty attain a true hiſtory of the different ſtates of each particular inſect, we might be enabled to form a complete ſyſtem, and alſo a method of claſſification more natural, eaſy, and leſs liable to error and confuſion than thoſe now in uſe; but this, if ever accompliſhed, muſt be a work of time. In the mean while let us try how much is to be gained from a careful attention to ſpecific diſtinctions. It is abſolutely neceſſary to conſider the different ſtates of the inſect, becauſe many ſpecies that appear ſimilar in their larvæ are totally different in their perfect ſtates, and vice verſa. Few people diſcover any difference between the maggot of a nut and that of an apple; and yet there are ſcarce any two inſects more unlike when arrived at perfection: the one a beautiful little moth, and the other a remarkable beetle of the genus Curculio. They are however eaſily diſtinguiſhed, even in their firſt ſtate, by an attentive obſerver. An entomologiſt ſhould always endeavour to be acquainted with his inſect in all its changes, as a good botaniſt always deſires to know his plant in every ſtage of its growth. Varieties in the ſame ſpecies of inſect

are

are certainly not ſo numerous as many have conjectured; for though Nature frequently ſports in this way in the Lepidoptera Claſs, where we ſee different markings and ſhades of colour in the ſame ſpecies, as in Phal. Geom. Prunaria, Defoliaria, &c.; yet an accurate eye will ſoon diſtinguiſh ſome conſtant characteriſtic mark which never fails to run through and unite them: for example, the long comma-like mark in the firſt inſtance, and the roundiſh dark ſpot in the ſecond; neither of which ever vary. The diſtinction of ſex is indeed variouſly marked, and requires peculiar attention. Some larvæ produce winged males and apterous females, which are ſo totally different in their appearance, that it would be impoſſible to determine them to be the ſame ſpecies, if we were not acquainted with their hiſtory. Some females again have ſmall, or as it were only rudiments of, wings; and others differ from the males ſo much in colour as not to appear ſimilar. In ſome claſſes the diſtinction is ſtrongly marked by the antennæ; in others one ſex is furniſhed with horns, of which the other is deſtitute. So that a conſiderable degree of attention is requiſite before we attempt to determine; and therefore thoſe entomologiſts are moſt to be depended upon, who are at the pains to trace their inſect through its different changes from the egg to its perfect ſtate; thus acquiring truth from the fountain head. And to ſuch I would particularly recommend a ſcientific arrangement, that their obſervations may be more diffuſed, and become generally uſeful. In the courſe of my own obſervation, I have never ſeen moths bred from the ſame eggs ſo different as to be miſtaken for diſtinct ſpecies, except in the before-mentioned caſes, where the females were apterous, or differed from the males in the colour of their wings. In the latter inſtance, indeed, the markings are generally ſimilar in form, and only differ in ſhade and colour. If we reflect on the wonderful labours of the great Linneus, and the immenſe numbers of objects which he has arranged and deſcribed, comprehending the three kingdoms of Nature,

we ſhall not be ſurpriſed that he has ſometimes erred: "*humanum eſt errare.*" But our aſtoniſhment will be increaſed when we carefully examine for ourſelves, and obſerve how ſeldom he did ſo. For we find, that ſeveral errors that have been imputed to him ariſe from the ſimilarity of many ſpecies to each other, and our not having ſeen the true ſpecies of Linneus. The truth of this obſervation has been proved in many inſtances, ſince the arrival of his valuable cabinet in this country. Inſects of various ſpecies are ſo nearly connected, that it is, as I have before obſerved, impoſſible to diſcriminate them without attending to their different ſtates: and this could never be expected from a man who was deſcribing all the animals on the habitable globe; as in many caſes he was obliged to deſcribe from bad ſpecimens, and often to depend on the repreſentations of others. Many authors, fearful of multiplying ſpecies, appear to have fallen into the contrary extreme; and Linneus himſelf has either conſidered different Phalænæ in many inſtances as the ſame, or he was a ſtranger to many of the moſt common in this country. I ſhall however at preſent confine myſelf to his Phal. Bom. Lubricipeda and Mendica, and hope that others will endeavour to make ſimilar remarks on thoſe ſpecies that appear to be erroneouſly united. To render the matter as clear as poſſible, I have ſubjoined a drawing of four different Phalænæ, that appear to have much affinity, in their three ſtates, and have added a ſpecific deſcription of each, together with the ſynonyms of various authors; by which it will appear how much they have been miſquoted and miſapplied.

PHALÆNA BOMBYX.

ERMINEA. *Tab.* 1. *f.* 1. *Cream Ermine.*

B. Alis albis punctis nigris ſparſis, abdomine quinquefariam nigro punctato.

Linn. Syſt. Nat. 829. 69. lubricipeda. *Faun. Suec.* 1138. fœm. *Fab.*

Fab. Syſt. Ent. 576. 68. *Sp. Inſ.* 190. 93.
Gæd. Inſ. vol. 1. *tab.* 23. *fig.* 38. *Liſt. Gæd.* 96. *Rai. Inſ. fig.* 195. *n.* 40. *Albin. Inſ.* 24. *f.* 36. g—k. *Wilkes* 20. *t.* 3—5.
De Geer. Inſ. 1. *t.* 11. *f.* 8. *Roeſ. Inſ.* 2. *t.* 46. *Eſper. tom.* 3. *tab.* 66. *fig.* 6—10 Menthaſtri. *Harris Aur. pl.* 38. g—b. *Ernſt. Pap. d'Europe, pl.* 158. *n.* 204.

Habitat in arboribus pomiferis, urticâ, atriplici, quercu.
Expanſio alarum 1 unc. 6 lin.

Deſcrip. *Femora*, præſertim antica, lanugine ferrugineâ veſtita; *Corpus* album; *Alæ* adſperſæ punctis nigris plurimis in ſuperiorum paginâ ſuperiore; *Abdomen* luteum quintuplici macularum nigrarum ordine, quorum unus dorſalis, duo utrinque laterales—Ano albo quo certo certius, a Ph. lubricipeda differt.

LUBRICIPEDA. *Tab.* 1. *f.* 2. *Cream Dot Stripe.*

B. Alis luteſcentibus punctis nigris plerumque ordine oblique-tranſverſo poſitis.

Linn. Syſt. Nat. 829. 69. β. *Faun. Suec.* 1138. mas. *Fab. Syſt. Ent.* 576. 68. *Sp. Inſ.* 190. 93.
Gæd. Inſ. vol. 1. 38. *Liſt. Gæd.* 93. *Rai. Inſ.* 196. *n.* 155.
Merian Eur. 1. *t.* 46. *f.* 65. *Alb. Inſ.* 24. *f.* 35. a—d. *Friſch. Inſ.* 3. *t.* 8. *Ammiral. t.* 6.
De Geer. Inſ. 1. *t.* 11. *f.* 7. *Roeſ. Inſ.* 2. *t.* 47. *Wilkes* 20. *t.* 3.—6. *Eſper. vol.* 3. *tab.* 66. *fig.* 1—5.
Harris Aur. pl. 16. h—l. *Ernſt. Pap. d'Eur. pl.* 157. *n.* 203.

Expanſio alarum 1 unc. 6 lin.

Deſcrip. Variat colore alarum albido et luteſcente. Maximè affinis Ermineæ, a quâ differt punctis pleriſque ſerie obliquâ poſitis; quod

quod in illâ omnino deſideratur—Anus variat pro re nata flaveſcentior; neque unquam albus.

MENDICA. *Tab.* 1. *f.* 3. *Spotted Muſlin.*

B. Alis maſculis fuſcis obſcuris. } utriſque nigro-punctato.
—— fœmineis niveis pellucidis. }

Linn. Syſt. Nat. 822. 47. *Faun. Suec.* 1127. mas. *Pet. Gaz.* 44. *fig.* 8. fœm.
Rai. Inſ. 196. *An.* 97. 6. fœm. *Reaum. Inſ.* 2. *t.* 1. *fig.* 1—9.
Eſper. vol. 3. *tab.* 42. *fig.* 1—9. *Harris Aur. pl.* 35. m.

Expanſio alarum { Mas, 1 unc. 1 lin. / Fœm. 1 unc. 5 lin.

Deſcrip. Mas. Alæ anticæ fuſcæ, maculâ albidâ, mediâ, obſoletâ, et punctis circiter 9 nigris, ſparſis—poſticæ concolores punctis 4 ſeu 5 nigris marginem verſus.

Fœmina. Alæ omnes pellucidæ, ſuperiores punctis circiter 9 nigris, ſparſis; inferiores circiter 7, marginalibus.

In utrâque antennæ nigræ, femora lutea.

PAPYRATIA. *Tab.* 1. *f.* 4. *Water Ermine.*

B. Alis niveis, punctis ad apicem nigris, abdomine quinquefariam nigro punctato.

Albin. Inſ. 21. *f.* 30. e—h.

Expanſio alarum 1 unc. 6 lin.

Deſcrip. Maximè affinis Ph. Ermineæ, at alæ punctis ſolummodo ad apicem circiter ſex nigris; ſcilicet quatuor confertis in ipſo apice, longitudinaliter poſitis, et duobus intra hæc tranſverſim ductis, diſtantibus. Caput, thorax et abdomen ut in Ph. Erminea.

Larva habitat in plantis aquaticis.

Fig. 1. to which I have given the name of Erminea, appears to be the moth which Linneus deſcribes in the Syſt. Nat. as Lubricipeda, and to that moth is the name affixed in his cabinet. In the Fauna Suecica the particular deſcription is, " Mas alis flaveſcentibus ordine oblique tranſverſo punctorum nigrorum," which is an exact deſcription of fig. 2. to which I have retained the name of Lubricipeda; not only becauſe that name, taken from the motion of the caterpillar, agrees better with this ſpecies than the other, but becauſe every author who has figured it ſince Linneus has conſtantly ſo applied it, though they have given different names to fig. 1. Notwithſtanding Linneus has united theſe two ſpecies of Phalæna, and mentioned them as male and female of each other, it is but juſtice to obſerve, that it appears done contrary to his own opinion; for, in quoting the ſynonyms of Wilkes and Rœſel, he makes one a variety at leaſt, with his uſual mark β, and then adds, " Varietatem β non diſtinctam eſſe ſpeciem docuit De Geer." That accurate author has written a long paper upon the ſubject of theſe moths, in which he has endeavoured to prove that theſe two ſpecies are the ſame. He however deſcribes but one kind of caterpillar, from which he had males yellow, and females white. This is in ſome reſpects the fact; for the female of fig. 2. is much lighter in colour than the male, and ſometimes approaches to white. He refers to Reaumur to prove this aſſertion: but I am clearly convinced, that in the ſecond memoir of the ſecond volume of that illuſtrious author, it is the Mendica of Linneus which is deſcribed; and that the others are not mentioned. For with that moth his deſcription perfectly coincides; the female of which has ſome reſemblance to that of Erminea, as may be ſeen in fig. 3.; but will be found totally diſtinct, not only on account of the colour of its male, which, as Reaumur obſerves, is the " colour of a rat," but alſo from the ſemi-tranſparency of the wings of the female, from whence Engliſh collectors have named it the *ſpotted muſlin.*

Linneus himſelf appears to have been unacquainted with the female Mendica; and the ſpecimen of the male in his cabinet being a bad one, with the black ſpots obliterated, he deſcribes it, cinerea tota, femoribus luteis. This however is not the caſe; for the male is ſpotted like the female, as may be ſeen in the drawing, fig. 3. 6. There is indeed a bad ſpecimen of the female of this moth in his cabinet; but it is placed indiſcriminately with Lubricipeda and Erminea. I have endeavoured to give to each the ſynonyms quoted by Linneus; to which I have added many that have been publiſhed ſince his work was printed, omitting ſeveral that appeared only copies of Linneus. But even to them I am under ſome obligation, as they have referred me to ſynonyms which others had overlooked. As the ſimilarity of the colour in the bodies of the two firſt ſpecies appears to have been the occaſion of their having been placed together, I have added another (vide fig. 4.), and named it Papyratia, exactly agreeing with them in that particular, although perfectly diſtinct, as the larva and mode of living teſtify. This moth is more rare than either of the others, and I find but one figure of it, which is in Albin, and well executed. As almoſt every author who has given figures of the two firſt inſects in their different ſtates, makes them diſtinct ſpecies, it may with ſome propriety be aſked, where is the neceſſity of adducing further proof on the ſubject? The neceſſity will appear evident, when we conſider, that as the Syſtema Naturæ and Fauna Suecica of Linneus, and Syſt. Ent. of Fabricius, the moſt valuable and uſeful ſcientific books, agree in uniting them, and quote ſuch reſpectable authority as Reaumur and De Geer; and as I am ignorant of any ſpecific deſcriptions having been given, it appears abſolutely neceſſary for the young entomologiſt to have them ſeparated and clearly diſtinguiſhed; and the more ſo, as Ernſt, in his admirable work, *Papillons d'Europe*, after having

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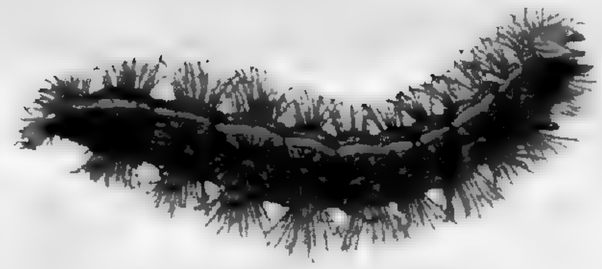
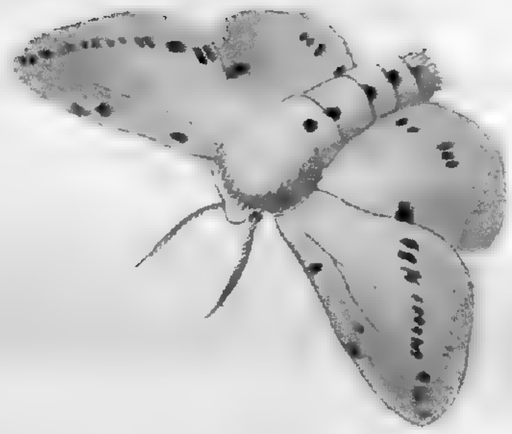
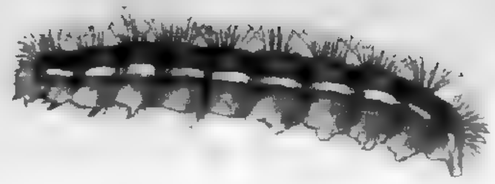


Phalæna B. Erminea.

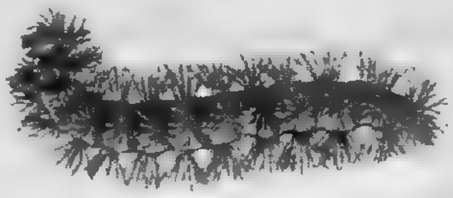
2





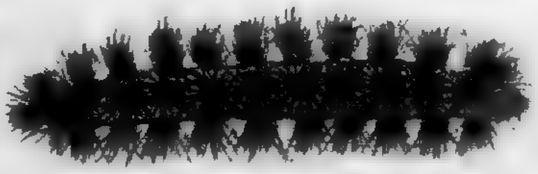
Phalæna B. Lubricipeda.

3



Phalæna B. Mendica.

4



Phalæna B. Papyratia.

Mackenzie sc.

taken great pains to prove them diſtinct ſpecies, and combating the objections of others, adds, that in the midſt of the different teſtimonies which appear ſo contradictory, he wiſhes not to decide the queſtion, but invites other naturaliſts to raiſe them from the egg, and give the reſult of their obſervations.

IV. *Deſcriptions of four Species of Cypripedium, by Richard Anthony Saliſbury, Eſq. F. R. S. Fellow of the Linnean Society.*

Read October 7, 1788.

CYPRIPEDIORUM aliquorum icones necnon deſcriptiones Societati Linneanæ oblaturus, characterem eſſentialem hujus generis minime labio inferiori corollæ calceiformi, potius autem ſtructura genitalium conſtare, quæ in omnibus orchideis diſtinguendis maximè valent, præmittere vellem.

CYPRIPEDIUM CALCEOLUS. t. 2. f. 1.

Cypripedium Calceolus. *Linn. Sp. Pl. p.* 1340. Calceolus, &c. *Hall. Hiſt. Helv. v.* 2. *n.* 1300. *t.* 42. Calceolus marianus. *Dod. Pempt. p.* 180. *p.* 1, 2.

Corolla labio ſuperiore ovali concavo ſubtus carinâ late canaliculata, inferiore petalis breviore compreſſo.

Sponte naſcentem in *Oſtro-Bothniæ* ſylvis abunde legit C. Linné—prope *Bern* declivibus montium umbroſis legit A. Haller—in Monte *Saleve* legit J. Ray—in *Pedemontii* ſylvis legit C. Allioni.

Floret fine Maii, Junio.

Planta 8-10 pollicaris. Radix fuſca, horizontalis, tuberoſa—Fibræ craſſæ, faſciculatæ—carnoſa, perennis. Caulis viridis, erectus, ſimplex, teres, articulatus, hirto-pubeſcens, ſolidus, herbaceus, marceſcens.

ceſcens. Folia 5 vel 6, viridia, alterna, ſeſſilia, baſi amplexicaulia, patenti-recurva, lanceolata, integerrima, obtuſe acuminulata—Nervi paralleli, longitudinales, ſupra depreſſi—hirto-pubeſcentia præcipue ſubtus, paululum undulata, herbacea, marceſcentia. Flores nutantes, ſolitarii, rarius duo. Pedunculus foliis brevior, e caule continuatus, ſtructura omnino ſimilis. Bractea ſolitaria ſub germine, ſtructura foliorum ſed minor, magiſque ovato-lanceolata. Germen viride, incurvulum, anguſte pyriforme, 6-angulum, hirto-pubeſcens. Petala ſaturate fuſca: ſupremum erectum, infimum æquale, dependens; ovato-lanceolata: lateralia multo anguſtiora, parum longiora, patenti-deflexa, lineari-attenuata, baſi intus barbata: integerrima, obtuſa, tenuiſſime hirto-pubeſcentia præſertim extus, tortuoſa—Labium ſuperius flavum maculis fuſcis, ultra lobos laterales ſtyli inſertum, ellipticum, integerrimum, obtuſum, utrinque læve, ſupra concavum, ſubtus carinâ late canaliculatâ. Labium inferius flavum, petalis breviùs, calceiforme, compreſſum, ore ſuborbiculare, extus læve, intus baſi barbatum lineis macularum fuſcarum. Stylus flavus, lævis—Lobi; laterales apice incurvuli, anguſte cuneiformes, obtuſi; medius oblongus, baſi latior, medio anguſtatus, obtuſus. Antheræ flavæ, paulo infra apicem loborum quibus multo latiores, orbiculares, biloculares. Pollen flavum. Stigma pallide flavum, baſi triangulo umbilicatum, minute papilloſum.

a Labium ſuperius.
b ——— inferius.
c Styli lobi laterales.
d Styli lobus terminalis.
e Antheræ.

Iiſdem literis in omnibus tabulis notantur eædem partes.

CYPRIPEDIUM PARVIFLORUM. t. 2. f. 2.

Helleborine Calceolus dicta, mariana, caule folioſo, flore luteo minore. *Plukn. Mantiſſ. p.* 101. *t.* 418. *f.* 2. *peſſima.*

Corolla

Corolla labio superiore sagittæformi basi deflexo subtus carinâ angustè canaliculatâ, inferiore petalis breviore compresso.

Sponte nascentem in *Virginiâ* legit H. Marshall.

Floret fine Maii.

Petala sordide viridia lineis macularum ferruginearum: supremum erectum; infimum paulo brevius, dependens; ovato-lanceolata: lateralia multo angustiora, 1-4ta parte longiora, patentideflexa, lineari-attenuata, basi intus barbata: integerrima, obtusa, tenuissime hirto-pubescentia præsertim extus, tortuosa—Labium superius flavum maculis fuscis lobos laterales styli obducens basi deflexum, late sagittæforme, integerrimum, obtusum, utrinque læve, supra versus apicem concavum, subtus carinâ angustè canaliculatâ—Labium inferius flavum maculis fuscis circa apicem, petalis brevius, calceiforme, compressum, ore suborbiculare, extus læve, intus basi barbatum. Stylus flavus—Lobi; laterales apice ipso levissime incurvuli, angustè cuneiformes, obtusi; medius semi-ellipticus, obtusus—lævis. Antheræ flavæ, infra apicem loborum quibus multo latiores, orbiculares, biloculares. Pollen flavum. Stigma flavum, basi triangulo umbilicatum, minute papillosum.

Herbâ gaudet præcedentis, sed Folia remotiora et ovalia.

CYPRIPEDIUM SPECTABILE*. t. 3. f. 3.

Helleborine flore majore purpureo, &c. *Moris. Hist. v.* 3. *p.* 488. *s.* 12. *t.* 11. *f.* 17. *pessima.* Helleborine Calceolus dicta, mariana, flore gemello candido, venis purpureis striato. *Plukn. Mantiss. p.* 101. *t.* 418. *f.* 3. *pessima.*

Corolla labio superiore ovali basi retuso concavo subtus carinâ obtusâ, inferiore petalis longiore grosso.

Sponte nascentem in *Pensylvaniæ* sylvis legit I. Bartram.

Floret fine Maii, Junio.

* C. album. *Aiton Hort. Kew. V.* 3. 303.

Planta

Planta pedalis, vel plus. Radix congenerum. Caulis pallide viridis, erectus, ſimplex, teres, articulatus, hirſutus, ſolidus, herbaceus, marceſcens. Folia 6 vel 7, pallide viridia, alterna, ſeſſilia, baſi amplexicaulia, patenti-recurva, ovali-lanceolata, integerrima, obtuſe acuminulata—Nervi paralleli, longitudinales, ſupra depreſſi—hirſuta præſertim ſubtus, paululum undulata, herbacea, marceſcentia. Flores, Bractea, Pedunculus, Germenque ut in Cypripedio Calceolo. Petala alba: ſupremum erectum; infimum paulo brevius, dependens; ovalia: lateralia longitudine ſupremi, multo anguſtiora, lineari-lanceolata, baſi intus barbata: integerrima, obtuſa, hirto-pubeſcentia præſertim extus, plana—Labium ſuperius album maculis rubris, lobos laterales obducens, ovale, baſi retuſum, integerrimum obtuſum, utrinque læve, ſupra concaviuſculum, ſubtus carina obtuſa—Labium inferius pallide roſeum vittis ſaturatioribus, petalis longis, groſſe calceiforme, ore tranſverſe ovale, extus læve, intus baſi barbatum lineis macularum rubrarum. Stylus albus—Lobi; laterales recurvi, falcati, obtuſi; medius ſuborbicularis, obtuſiſſimus, lævis. Antheræ dilute flavæ, ovales, vix infra apicem loborum quibus parum latiores. Pollen flavum. Stigma dilute flavum, baſi triangulo umbilicatum, minute papilloſum.

CYPRIPEDIUM HUMILE*. t. 3. f. 4.

Calceolus flore maximo rubente, &c. *Cateſb. Hiſt. Car. Append. p.* 3. *t.* 3. *mediocris.* Helleborine Calceolus dicta, mariana, foliis binis e radice ex adverſo prodeuntibus, &c. *Plukn. Mantiſſ. p.* 101. *t.* 418. *f.* 1. *peſſima.*

Corolla labio ſuperiore rhomboideo acuminato lateribus deflexo ſubtus carina anguſtiſſima obtuſa, inferiore petalis longiore antice fiſſo.

Sponte naſcentem in *Novâ-Scotiâ* legit A. Menzies.

Floret fine Maii, Junio.

* C. acaule. *Aiton Hort. Kew. V.* 3. 303.

Planta

Planta 6-8 pollicaris. Radix congenerum. Folia duo, viridia, radicalia, oppoſita, patentia, lanceolata, integerrima, obtuſa—Nervi paralleli, longitudinales, ſupra depreſſi—utrinque hirto-pubeſcentia, planiuſcula herbacea, marceſcentia. Flores nutantes, ſolitarii. Pedunculus viridis, foliis ſæpe longior, erectus, ſimplex, teres, hirto-pubeſcens, ſolidus, herbaceus, marceſcens. Bractea ſolitaria ſub germine, ſtructura foliorum ſed longe minor et ovato-lanceolata. Germen viride, breve incurvum, obſolete pyriforme 6-angulum, hirto-pubeſcens. Petala pallide fuſca: ſupremum erectum; infimum æquale, dependens; ovato-lanceolata: lateralia anguſtiora pauloque longiora, patenti-deflexa, lineari-attenuata, latere inferiore baſi paululum auriculata, inferne intus barbata: integerrima, obtuſa, utrinque hirto-pubeſcentia, tortuoſa—Labium ſuperius pallide fuſcum, ultra lobos laterales ſtyli inſertum, lateribus deflexum, verſus apicem paululum incurvum, rhomboideum, acuminatum, utrinque hirto-pubeſcens, ſubtus carina anguſtiſſima obtuſa—Labium inferius purpureum vittis ſaturatioribus, petalis longis; baſi recte deflexum, intus barbatum; dein exporrectum, groſſe calceiforme, ore antice fiſſum, utrinque hirto-pubeſcens. Stylus flavus—Lobi; laterales apice ipſo læviſſime incurvuli, anguſte cuneiformes, obtuſi; medius late cuneiformis baſi anguſtiore, obtuſus—hirto-pubeſcens. Antheræ flavæ, lobis multo latiores, orbiculares, 2-loculares. Pollen flavum. Stigma dilute flavum, baſi longe attenuatum, triangulo umbilicatum, papilloſum.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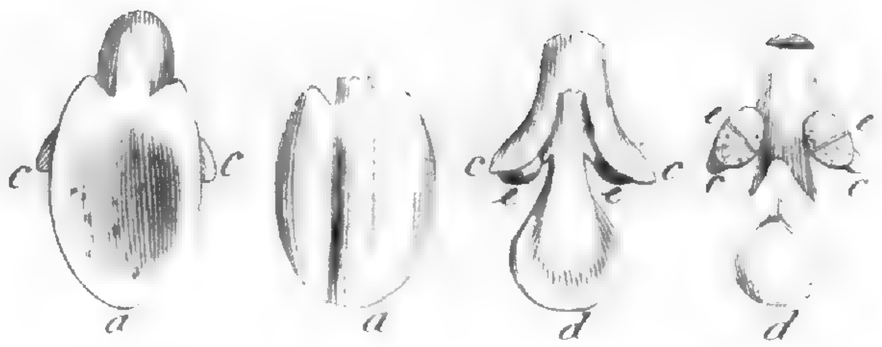
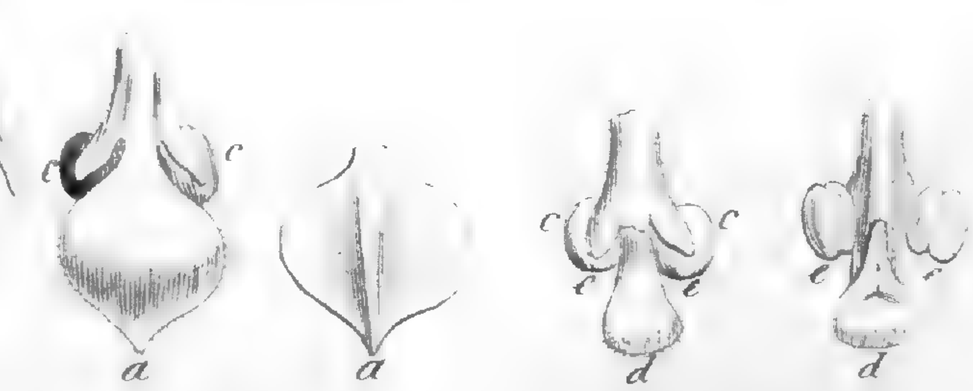




Mackenzie sc.

V. *Deſcriptions of ten Species of* Lichen *collected in the South of* Europe.

By James Edward Smith, M.D. F.R.S. Preſident of the Linnean Society.

Read November 4, 1788.

1. Lichen exanthematicus. *t.* 4. *f.* 1.

L. Leproſus cinereus, ſcutellis minutiſſimis carneis immerſis in cruſtæ foveolis albis. Confer Lichenem 2077, 2078, *Hall. Hiſt.*

Habitat in rupibus calcareis Galliæ auſtralis, non longe ab Avenione.

Cruſta tenuiſſima, vix palpabilis, cinerea, adſperſa punctis albis, e foveolis parvis, integumento albo, rugoſo, clauſis, quo poſtea e centro ſe diſpandente, ſcutella prodit exigua, carnea, proprio margine concolori inſtructa, in centro foveolæ recondita. His ſcutellis ætate diſſilientibus, foveolæ reſtant albæ, vacuæ, et quaſi ipſo lapide excavatæ, ut in *L. immerſo* Weberi.

2. L. gypſaceus. *t.* 4. *f.* 2.

L. cruſtaceus lobatus; interne albus; ſuperficie virenti, ſcutellis difformibus flaveſcentibus.

L. fragilis. *Scop. Carn. No.* 1402, ut ex deſcriptione patet, excluſo ſynonymo Seguieri.

L. pulmonarius, ſaxatilis, farinaceus, major, foliis craſſis ſubrotundis, e cinereo vireſcentibus, inferne albis, receptaculis florum ſubrufis. *Mich. Nov. Gen. Plant.* 94, *t.* 51. *ord.* 30. *f.* 1.

Habitat in rupibus Monſpelii & Genuæ.

Cruſta craſſiſſima, gypſacea, lobata, intus margineque albiſſima, ſupra viridis. Scutellæ numeroſæ, magnitudine & figura valde variantes, teſtaceo flaveſcentes, ætate rimoſæ. Affinis L. *lentigero*, ſed ſpecie diſtinctus.

3. L. tumidulus. *t.* 4. *f.* 3.

L. cruſtaceus albus lobatus: lobis deflexis tumidis, tuberculis atris difformibus.

Habitat in fiſſuris rupium Galliæ auſtralis.

Cruſta alba, lobata; lobi rotundati, valde deflexi, ut farcti vel inflati apparent, ſupra minute teſſellato-rimoſi. Tubercula in interſtitiis loborum, atra, irregularia.

4. L. faxifragus. *t.* 4. *f.* 4.

L. cruſtaceus lobatus longiſſimè radicatus cæſius, tuberculis rubris.

Habitat in fiſſuris rupium Monſpelii.

Radices albæ, ramoſæ, in fiſſuras rupium longiſſimè deſcendunt. Cruſta lobata, ſubfoliacea, craſſiuſcula, cæſii vel glauci coloris. Tubercula magnitudine feminis Sinapios, rubra.

5. L. chryſoleucus. *t.* 4. *f.* 5.

L. imbricatus, foliolis lobatis obtuſis: ſupra pallide ſulphureis; ſubtus atro-viridibus, ſcutellis aureis.

Habitat in montis Ceniſii rupibus.

Similis *L. craſſo* Hudſoni Fl. An. ſed tenerior, magiſque foliaceus, neque ſubtus albus. Singularis nempe eſt color atro virens paginis inferioris foliolorum, ſine ulla hirſutie vel pubeſcentia. Scutellæ numeroſæ, aureæ, margine foliis concolori, qui poſtea evaneſcit, & inde ſcutellæ tubercula evadunt.

6. L. tiliaceus.

L. imbricatus, foliolis ſinuatis lævibus cinereo albidis, ſcutellis badiis margine albido lævi *.

L. tiliaceus. *Hoffman Faſc.* 2. ex auctoritate D. Zeir.

Habitat in corticibus olearum Gallo-provinciæ et Genuæ.

Affinis L. *ſaxatili* & *omphalodi*, ſed differt quod foliola ſupra glaberrima ſunt (minime ſcabra, incana, vel lacunoſa), pallide cæſia, nitida; ſubtus vero, ut in L. *ſaxatili*, atra et hirſuta. Scutellæ numeroſiſſimæ & frequentiſſimæ (nec raræ), badiæ, nitidæ, margine lævi, albo, baſi externe atræ & valde hirſutæ, ut in affinibus.

7. L. encauſtus. *t.* 4. *f.* 6.

L. imbricatus, foliolis linearibus dichotomis: ſupra albis nitidis; ſubtus nigris opacis, ſcutellis badiis.

Habitat in rupibus alpinis Sabaudiæ. In ſummitate montis *Montanvert* prope *Chamonix*.

Frondes valde implexæ, ramoſiſſimæ, late diffuſæ, magis vel minus anguſtæ, marginibus ſubrevolutis, ſupra albæ, nitidæ, quaſi encauſto ornatæ, apicibus fuſcis; ſubtus nigræ, opacæ, apicibus pallidis. Scutellæ nitidæ, fuſcæ, marginibus albis, ætate ſæpe lobatis.

8. L. corrugatus.

L. foliaceus repens lobatus viridis, ſcutellis teſtaceo-ferrugineis concavis extus rugoſis folio concoloribus †.

L. acetabulum. *Necker Meth. Muſc.* 94, nomen ineptum.

L. pulmonarius arboreus e cinereo viridis. *Vaill. Paris. t.* 21. *f.* 13.

* L. quercifolius. *Jacq. Coll. V.* 3. 127. *t.* 9. *f.* 2. fig. bona, ſed ſynonyma omnino erronea.

† L. acetabulum. *Jacq. Coll. V.* 3. 125. *t.* 9. *f.* 1. bona.

L. pulmonarius, inferne obſcurus, deſuper e glauco ſubvireſcens, receptaculis florum amplioribus ac denſioribus, atro fuſcis. *Mich. Nov. Pl. Gen.* 90. *t.* 48, *f.* 2.

Lichenoides acetabulis cutaneis & rugoſis. *Dill. Muſc.* 185. *t.* 24. *f.* 79. opt.

Habitat in truncis arborum Galliæ borealis.

Foliaceus, late expanſus, e cortice parum elevatus, rugoſus margine undulatus; madidus ſaturate virens, ſubtus pullus; ſiccus plumbeus. Scutellæ numeroſæ, concavæ, diſco ferrugineo vel pullo; externe folio concolores, varieque corrugatæ, verrucoſæ, & ſæpe farinoſæ, quibus notis ſpecies facile dignoſcenda.

9. L. ſaturninus.

L. foliaceus membranaceus lobatus atro-virens ſubtus villoſus pallidus, ſcutellis atro-ferrugineis ſparſis *.

Habitat in truncis arborum ad ripas Rhodani prope Valentiam, & in Sabaudia.

Simillimus L. *cochleato* Dickſ. Faſc. ſed differt quod ſubtus villoſus, nec utrinque lævis eſt. Folia ſicca obſcure plumbea, villo albido. Scutellæ numeroſæ, ſparſæ, atro ferrugineæ, juniores marginatæ, margine concolori, mox diſco elevato, margineque obliterato, in tubercula abeunt.

10. L. cucullatus. *t.* 4. *f.* 7.

L. foliaceus erectus laciniatus albus, ſcutellis poſticis cucullatis fuſcis.

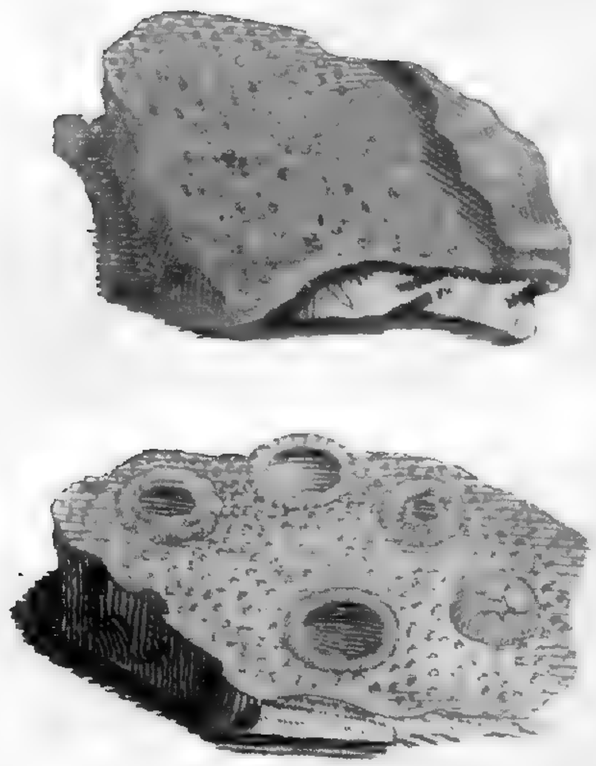
L. cucullatus. *Bellardi Oſſervazioni Botaniche*, 54.

An *Dill. Muſc. t.* 21. *f.* 56. *B?*

An L. ochroleucus. *Lamarck, Flo. Franc. V.* 1. 81 *?*

* L. ſaturninus. *Dickſ. Crypt. faſc.* 2. 21. *t.* 6. *f.* 8.

Habitat



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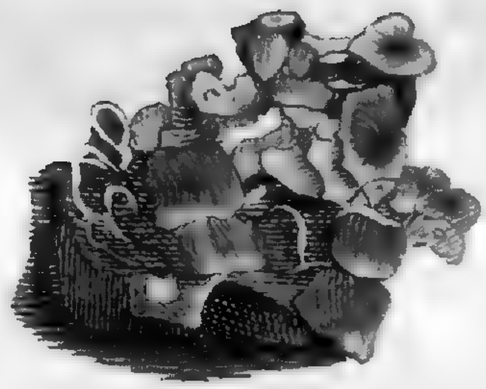

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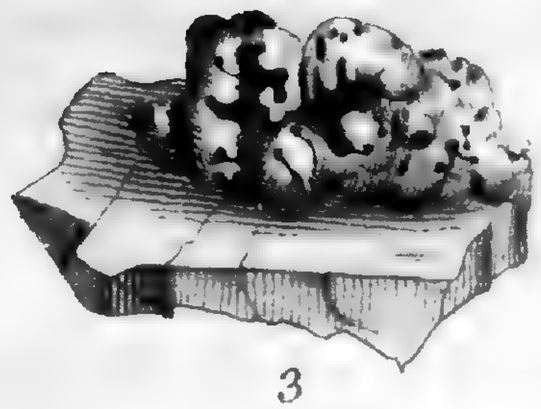

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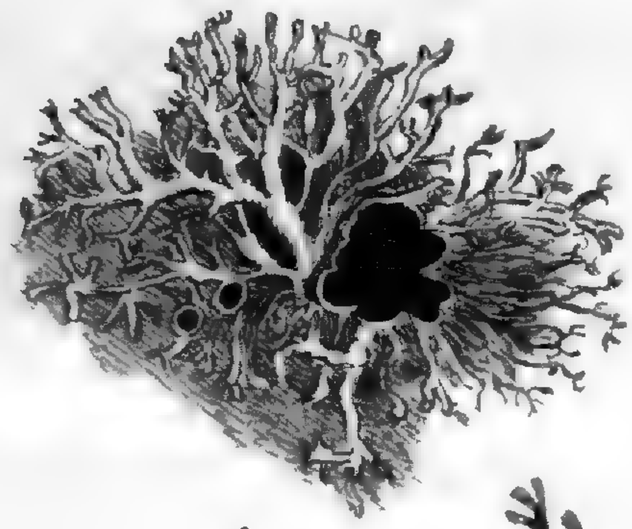

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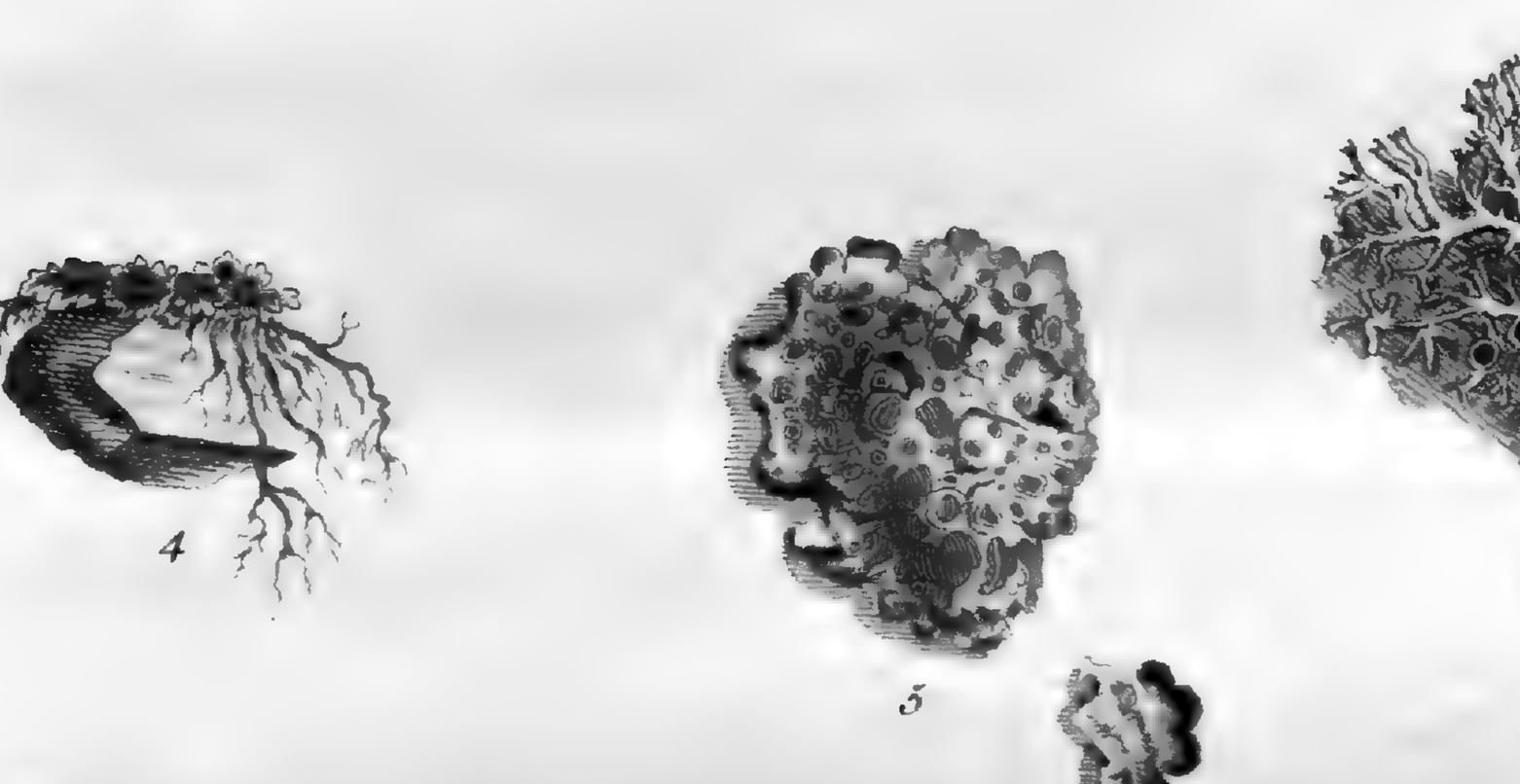

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Habitat in ericetis alpinis Sabaudiæ. Ex monte Ceniſio ad Cl. Bellardum miſi.

Medius quaſi inter L. *iſlandicum* & L. *nivalem*, ab utriſque vero diſtinctiſſimus. Frons erecta, alba, glaberrima, multifido laciniata, marginibus involutis, ut canaliculata, & ſæpe tubuloſa, evadit. Laciniæ fructiferæ ampliatæ, rugoſæ, poſticè cucullatæ. Scutellæ intra cucullum, fuſcæ.

A Dillenio, qui fructificationem non vidit, cum L. *nivali* confundi videtur, uti etiam ab Ehrharto in Phytophylacio, in meo ſaltem exemplario. Sed quantum ſcutellis differt ab illo, ſatis patet ex icone in Flora Lapponica, ubi pelta Lichenis *nivalis* depingitur.

VI. *Some Obſervations on the Natural Hiſtory of the Curculio Lapathi and Silpha griſea. By Mr. William Curtis, Fellow of the Linnean Society.*

Read November 4, 1788.

SEVERAL ſpecies of willow, particularly three of the moſt uſeful and ornamental, the *alba*, the *fragilis*, and the *babylonica*, are well known to be ſubject to the depredations of numerous inſects, and of the larvæ of the *Phalæna Coſſus* in particular, who feed on the ſubſtance of the wood, and prove uncommonly deſtructive to the latter ſpecies; for as the larvæ in each tree are generally numerous, in the courſe of a few years they deſtroy ſo much of the trunk, that the firſt violent gale of wind blows down the tree. So infeſted are the weeping willows in many nurſeries with theſe inſects, that there is ſcarcely one in ten to be ſelected free from them. The willows are infeſted alſo in the ſame way with the larvæ of the *Cerambyx moſchatus*; and we have now the honour of laying before the Linnean Society ſome account of the hiſtory of a ſpecies of *Curculio*, which was little ſuſpected of committing ſimilar depredations, but which in proportion to its ſize is no leſs deſtructive; as alſo ſome obſervations on the hiſtory of a ſpecies of *Silpha*, diſcovered in inveſtigating the economy of the *Curculio*.

In the beginning of June 1780 I obſerved a young tree of the

Salix

Salix viminalis, which had been planted in my garden two years, and which was now about ſix inches in diameter, throwing out from various parts of its trunk a ſubſtance ſomewhat reſembling ſaw-duſt, which fell at its baſe in no inconſiderable quantity. This ſubſtance, on a cloſer examination, was found to proceed from holes about the ſize of a gooſe quill, penetrating deeply into the ſubſtance of the wood, obliquely upwards and downwards. On its firſt coming out it appeared of the colour of the wood, and was moiſt; as it grew dry it became of a browner colour. The whole of the trunk where this internal operation was going forward emitted a ſmell ſomewhat like beer in a ſtate of fermentation; and various inſects allured thereby ſettled on the tree, and ſeemed eagerly to imbibe nouriſhment from it: among others the *Papilio Atalanta*, *Scarabæus auratus*, *Apis mellifera*, *Cantharis livida*, with various ſpecies of *Muſcæ*, were frequent attendants. On the tenth of June I took the *Cerambyx moſchatus* on the trunk, but ſaw only one.

Theſe extraordinary appearances ſtrongly excited my curioſity; I therefore often viſited the tree, and, on minutely examining its bark, I diſcovered ſeveral ſmall coleopterous inſects in its crevices, which at firſt, from their great ſimilitude, I miſtook for the *Cimex lectularius*: a more cloſe inſpection, however, ſoon convinced me that it was a *Silpha*; and on turning to the *Syſtema Naturæ* of Linneus, I had little doubt but it was his *Silpha griſea*. On examining the ſaw-duſt-like ſubſtance in its moiſt and fermenting ſtate, I diſcovered many ſmall larvæ feeding amongſt it, which when fully grown were about a barley-corn in length; the body ſomewhat flattened, of a dirty white colour, having ſix fore feet and two hind ones; the head of a brightiſh brown colour, furniſhed with two jaws; each joint of the body projecting at the ſides, ſo as to give it a kind of ſerrated appearance; the neck of a blackiſh brown colour, with two or more rows of ſmall dots running therefrom

down

down the back to the tail, which was terminated by four ſmall ſetæ, turning a little upwards, the two lowermoſt by much the longeſt. The larvæ were generally found in conſiderable numbers together, and on being diſturbed ran pretty briſkly. From their ſize, and other concurring circumſtances, I had no doubt but they were the larvæ of the *Silpha*, feeding on the ſpoils of the tree's grand internal enemy; which being determined to get a ſight of, I ordered my ſervant with a hatchet to chop out a piece of the tree, ſufficient for the diſcovery; when the large maggots repreſented *tab.* 5. *f.* 1, 2. were found in perpendicularly cylindrical cavities, corroding the ſubſtance of the wood: they were about twice or thrice as large as the maggot of the hazel nut, and very much reſembling it in ſhape, of a yellowiſh white colour, groſs body, apparently without any legs, having a ſhining head of a cheſtnut colour, armed with ſtrong jaws.

I put ſeveral of theſe, June 27th, into a pan, with ſome fragments of the wood; but, the chips becoming dry, they relinquiſhed their abode and pined away.

I ſhould have taken other ſteps to have reared them, had I not been certain that my tree ſtill contained great numbers of them: in hopes therefore of finding them in their pupa ſtate, I waited till the 25th of July, when, on cutting out a piece more of the tree, my expectations were anſwered; I diſcovered ſeveral of them, as repreſented at *fig.* 3: at the ſame time I found on the bark of the tree the Curculio Lapathi, ſee *fig.* 4, 5; and, on cutting farther into the tree, I found the ſame ſpecies juſt broke forth from its pupa.

I was then ſatisfied that all the miſchief which had been done to the tree was effected by this ſpecies of *Curculio*, and which I had ſome years before found in great plenty on the leaves of the ſame ſpecies of Salix. Having ſucceeded in diſcovering the principal circumſtance of the hiſtory of this inſect, I was not a little anxious

to

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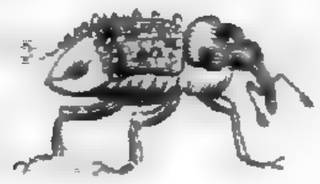

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Curculio Lapathi.

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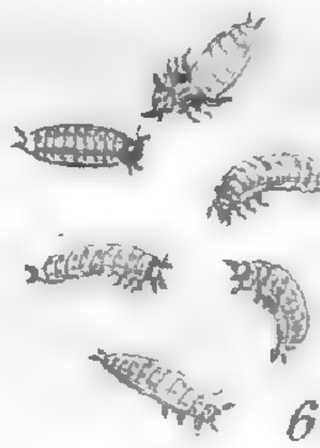

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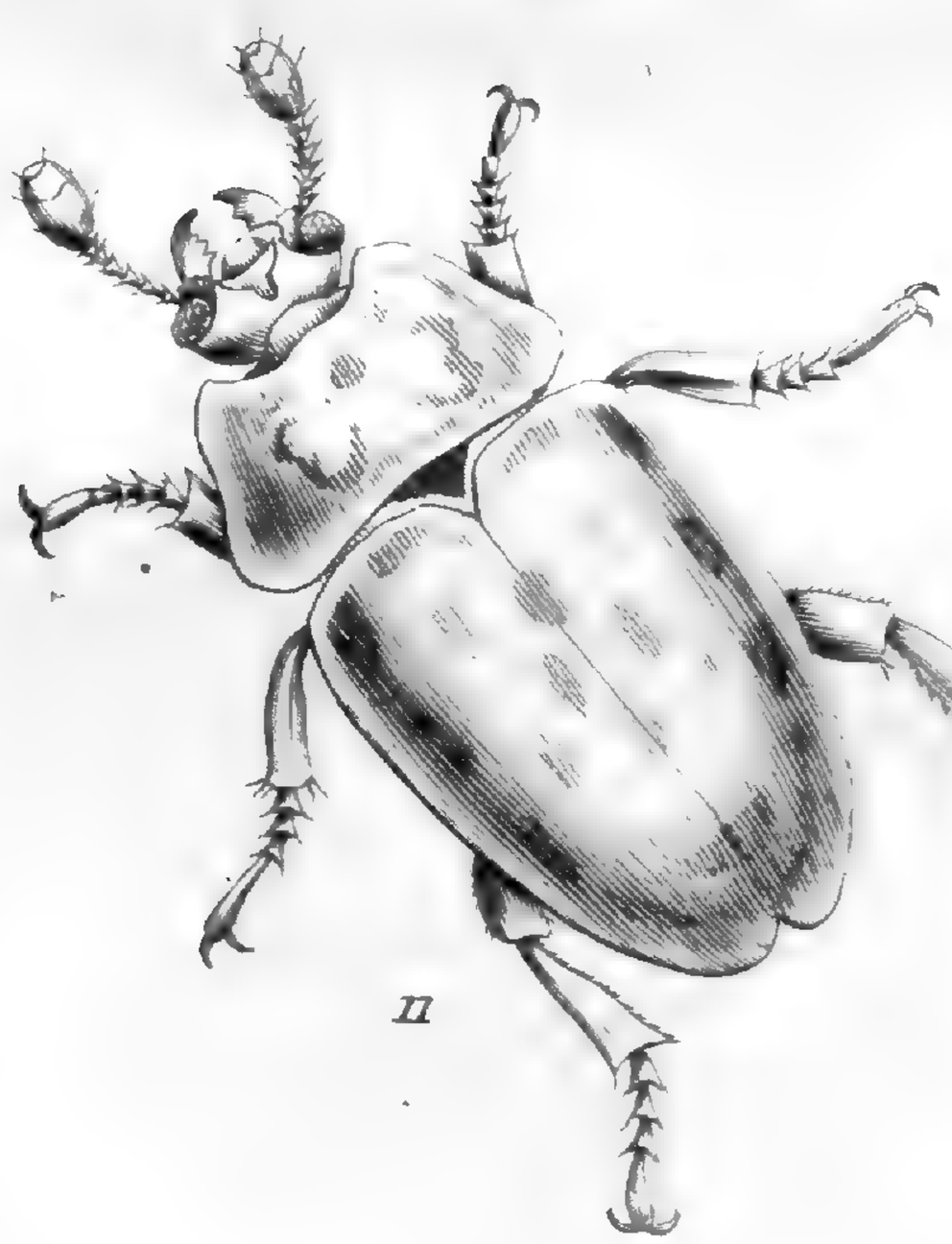

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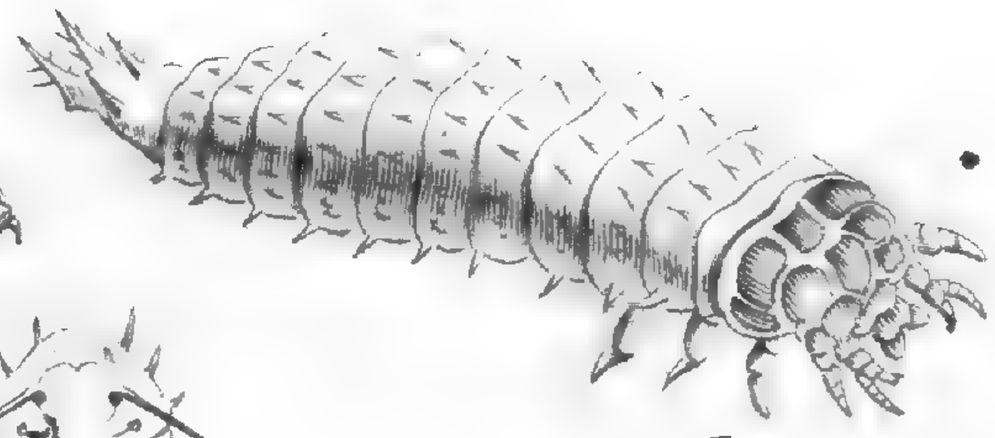

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Silpha grisea.

Nuttall sc.

to find the Silpha in its pupa ſtate; and after ſearching for it in vain, on and under the bark of the tree, I found plenty of them under the ſurface of the ground, among the moiſt earth and ſaw-duſt, and ſeveral alſo of the ſame inſect in its perfect ſtate.

I had no opportunity of obſerving in what manner the female Curculio depoſited its eggs; moſt probably they are laid under the bark at firſt, or in ſome crack or crevice of the tree, ariſing from an injury: at leaſt that is the mode in which the female *Phalæna Coſſus* depoſits its eggs, and to prevent which we cannot be too much on our guard; for, if the larvæ have once entered the tree, we ſhall in vain ſeek a remedy. If the tree therefore ſuſtain any injury from lopping, or from any other cauſe, a piece of canvas, ſpread over with ſome adheſive reſinous ſubſtance, ſhould be applied; or the nurſeryman may find his account in matting over the bodies of his young trees, during the months of June and July, when the moth comes out of its chryſalis; or perhaps bruſhing them over at that period with ſome of the new tar extracted from ſea coal, might anſwer the ſame uſeful purpoſe.

EXPLANATION OF TAB. 5.

Fig. 1, 2. Larva of Curculio Lapathi.
3. Pupa of ditto.
4, 5. The ſame inſect in its perfect ſtate.
6. Larvæ of Silpha griſea.
7. One of the ſame larvæ magnified.
8. Pupa of ditto.
9. Pupa magnified.
10. The perfect inſect.
11. Ditto magnified.

VII. *Deſcription of the Stylephorus chordatus, a new fiſh, by George Shaw, M. D. F. R. S. Fellow of the Linnean Society.*

Read December 2, 1788.

HAVING lately had an opportunity of examining a very uncommon and curious fiſh, which, ſo far as I am able to judge, conſtitutes a new genus, I was induced to compoſe a ſhort deſcription of it; which, together with a figure drawn of the natural ſize, will I hope be ſufficient to give a clear idea of ſo ſingular an animal. The generic characters may I think be deſcribed thus:

OCULI pedunculati (ſeu cylindro craſſo brevi impoſiti).
ROSTRUM productum, ſurſum ſpectans, verſus caput membrana interjecta retractile.
OS terminale, edentulum?
BRANCHIÆ trium parium ſub jugulo ſitæ.
PINNÆ pectorales parvæ; *dorſalis* longitudine dorſi;
CAUDALIS brevis, radiato-ſpinoſa.
CORPUS longiſſimum, compreſſum.

The head of this extraordinary animal bears ſome diſtant reſemblance to that of the genus Syngnathus, and its true ſtructure cannot ſo eaſily be deſcribed in words as conceived by the figure.

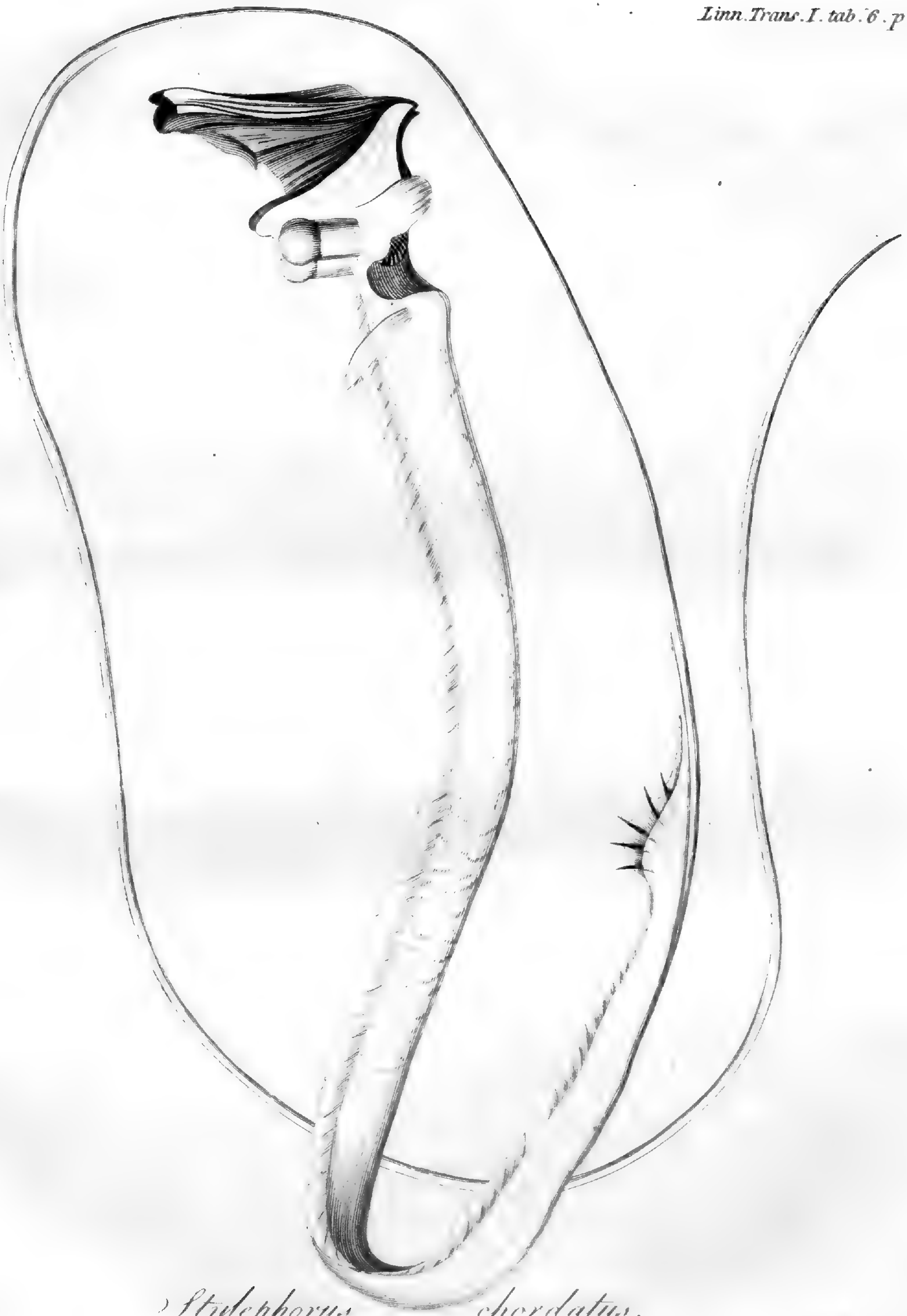
The

The roſtrum, or narrow part which is terminated by the mouth, is connected to the back part of the head by a flexible leathery duplicature, which permits it either to be extended in ſuch a manner that the mouth points directly upwards, or to fall back ſo as to be received into a ſort of caſe, formed by the upper part of the head. On the top of the head are placed the eyes, which are of a form very nearly approaching to thoſe of the genus Cancer, except that the columns, or parts on which each eye is placed, are much broader or thicker than in that genus. They are alſo placed cloſe to each other; and the outward ſurface of the eye, when magnified, does not ſhew the leaſt appearance of a reticulated ſtructure. The colour of the eyes, as well as of the columns on which they ſtand, is a clear cheſtnut brown, with a ſort of coppery gloſs. Below the head, on each ſide, is a conſiderable compreſſed ſemi-circular ſpace, the fore part of which is bounded by the covering of the gills, which ſeems to conſiſt of a ſingle membrane of a moderately ſtrong nature. Beneath this, on each ſide, are three ſmall pair of branchiæ. The body is extremely long, and compreſſed very much, and gradually diminiſhes as it approaches the tail, which terminates in a proceſs or ſtring of an enormous length, and finiſhes in a very fine point. This ſtring, or caudal proceſs, ſeems to be ſtrengthened throughout its whole length, or at leaſt as far as the eye can trace it, by a ſort of double fibre or internal part. The pectoral fins are very ſmall, and ſituated almoſt immediately behind the cavity on each ſide the thorax. The dorſal fin, which is of a thin and ſoft nature, runs from the head to within about an inch and a half of the tail, when it ſeems ſuddenly to terminate, and a bare ſpace is left of about a quarter of an inch; I am however not altogether without my doubts whether it might not in the living animal have run on quite to the tail, and whether the ſpecimen might not have received ſome injury in that part. From this place

commences a ſmaller fin, which conſtitutes part of the caudal one. The caudal fin itſelf is furniſhed with five remarkable ſpines, the roots or originations of which may be traced to ſome depth in the thin part of the tail. The general colour of this fiſh is a rich ſilver, except on the flexible part belonging to the roſtrum, which is of a deep brown; the fins and caudal proceſs are alſo brown, but not ſo deep as the part juſt mentioned. There is no appearance of ſcales on this fiſh. It ſhould be placed in the firſt order of the Linnean diſtribution of Fiſh, or Apodes, from its having no ventral fins. So remarkable is the appearance of the head, that I almoſt doubted whether it might not with greater propriety be placed amongſt the nantes than the fiſhes, properly ſo called; till on conſidering the appearance of the branchiæ, and ſome other particulars relative to the general form of the animal, I was convinced that it clearly and indiſputably belonged to the tribe of Piſces. From the very ſingular figure and ſituation of the eyes in this creature, I have ventured to give it the generic name of *Stylephorus*; and as the trivial name cannot be taken from any circumſtance more properly than from the extraordinary thread-like proceſs of the tail, I have therefore applied that of *chordatus*. The Stylephorus chordatus is a native of the Weſt Indian Sea. It was taken between the Iſlands of Cuba and Martinico, near a ſmall cluſter of little iſlands about nine leagues from ſhore, and was ſeen ſwimming near the ſurface. The whole length of this uncommon animal, from the head to the extremity of the caudal proceſs, is about thirty-two inches, of which the proceſs itſelf meaſures twenty-two.

TAB. 6. repreſents the animal of its natural ſize.

VIII. *De-*



Stylephorus chordatus.

VIII. *Deſcription of the Hirudo viridis, a new Engliſh Leech, by George Shaw, M. D. F. R. S. Fellow of the Linnean Society.*

Read December 2, 1788.

AMONGST the variety of ſmaller animals which I have occaſionally examined, there are ſome which appear to me to have entirely eſcaped the obſervation of naturaliſts; having no place in the Syſtema Naturæ of Linnæus, or in any of the numerous publications which have from time to time added to the ſtock of natural hiſtory; ſo that they may be conſidered as abſolute non-deſcripts, and as ſuch may be thought more deſerving a particular ſurvey.

The animal which I now purpoſe to deſcribe is a ſmall and very elegant ſpecies of *Hirudo* or Leech, which is to be found in ſuch waters as are more than commonly clear and cold, or at leaſt ſuch as do not very eaſily freeze during a common froſt. This ſpecies of *Hirudo* is not much more than the eighth of an inch in length, and I have ſeen it even leſs. In its general ſhape or outline it very much reſembles the ſpecies called *Hirudo complanata*, or the ſmall black leech (except that the extremity of its body is of a ſomewhat ſharper form). The colour of this animal is a deep and beautiful graſs-green; and, when magnified, a tranſparent edge or border appears to ſurround it. The eyes are two in number, and of a deep black.

black. Its motions are in every reſpect analogous to thoſe of the *Hirudo complanata*, *ſtagnalis*, and *octoculata*, which are all three ſufficiently common in this country; but the ſmall ſpecies now deſcribing ſeems to poſſeſs a greater degree of contractile power than the three former, ſince it often aſſumes a ſhape approaching to a circular outline. Its general motion is an uniform ſmooth progreſſion, which is occaſionally varied by a circular motion, as if turning ſlowly on an axis.

This little animal, after being kept for a few days in a glaſs of its native water, ſeldom fails to appear filled with 5 or 6 ova, of a very conſiderable ſize in proportion to the parent animal, and which are of a much ſtronger and tougher nature than one would eaſily imagine; ſince, when taken out of the body, and preſſed on a glaſs, it requires a conſiderable degree of force to break them. Their form is exactly oval, and their colour a deep brown. The larger ſpecies of the genus *Hirudo* are known to be viviparous; but the *H. octoculata* is (according to Linnæus) oviparous, and produces a peculiar ſort of ovum, which it depoſits on the ſtalks of water plants, and from which the young is afterwards excluded. It ſhould ſeem therefore that this very ſmall green *Hirudo* is oviparous alſo, and probably may depoſit its ova in the ſame manner.

The remarkable colour of this diminutive ſpecies is alone ſufficient to diſtinguiſh it at firſt ſight from every other ſpecies yet known: as a trivial name, therefore, *Hirudo viridis* cannot be improper; and its ſpecific character may be compriſed with ſufficient exactneſs in a very few words, viz.

H. viridis oblonga, extremitate acutiuſcula.

To the above account of the *Hirudo viridis*, I muſt beg permiſſion to add the extraordinary power of reproduction which the ſmaller ſpecies of the genus *Hirudo* are poſſeſſed of. This reproductive power is moſt conſpicuous in the *H. ſtagnalis*, *complanata*, and *octoculata*, in which

Hirudo viridis.

which animals it almoſt equals that of the polype. I do not recollect whether Spallanzani, and others who have attended to the ſubject of animal reproductions, have included theſe animals in their liſt. My own experiments were made in the year 1773, during which year theſe animals were divided in every poſſible direction; and the divided parts, after reproduction, were again ſubdivided, and again reproduced, without the failure of one ſingle part.

TAB. 7. repreſents the Hirudo viridis both of its natural ſize and magnified.

IX. *The Botanical Hiſtory of the Canella alba, by Olof Swartz, M. D. Foreign Member of the Linnean Society.*

Read December 2, 1788.

THIS tree, the bark of which has frequently been miſtaken for the real Cortex Winteranus, has, like many other medicinal plants, been hitherto but imperfectly known to botaniſts.

Cluſius is the firſt who has recorded the introduction of this bark from the Weſt-Indies, which ſeems to have been at the beginning of the ſeventeenth century; as he ſays in his *Exot.* lib. iv. cap. 4, de Canella alba quorundam, "Ante paucos annos (before 1605) cœpit exoticus cortex inferri, cui nomen Canellæ albæ indiderunt;" and it conſequently became firſt known about 20 years after Winter's return from the Straits of Magellan; whoſe bark we alſo find to have been firſt mentioned and deſcribed by *Cluſius, in notis in Garciam*, p. 30, under the name of Cortex Winteranus, as a compliment to the diſcoverer.

Caspar Bauhin mentions our bark ſeveral times in his *Pinax*; and calls it, p. 409,

Pſeudo-caſſia cinnamomea Americana.

Canella Peruana.

Canella tubis minoribus alba; and, p. 461,

Caſſia lignea Jamaicenſis laureolæ foliis ſubcinereis, cortice piperis modo acri *.

PARKINSON gave, a ſhort time after (*Theatr.* p. 1581), a prolix detail concerning the difference between theſe two kinds of bark, and tells us it was a common thing in his time to miſtake one for the other.

But JOHN BAUHIN ſeems to have firſt confounded the names, by ſtyling the Cortex Winteranus, Canella alba. *Hiſt.* t. i. l. 4, *p.* 460.

PLUKENET, who probably knew ſomething more of the tree than its bark only, found great difficulty in diſcriminating the ſynonyma; as he ſays, in his Almag. Mant. p. 40, "Varie inter ſe plurimum diverſæ plantæ per illarum ignorationem plane confunduntur." But he does not himſelf correct this fault, as he gives a very falſe repreſentation of a branch from the tree, that yields the true Winter's Bark (*Phytogr.* tab. 81, f. 1), which he certainly never ſaw.

He has however enumerated the former in his Almageſt, p. 89, under the name of Caſſia cinnamomea; ſeu,

Cinnamomum ſylveſtre Barbadenſium, arbor baccifera, fructu calyculato 4 pyreno, folio enervi.

DALE (*Pharmacolog.* p. 296) very preciſely indicates, that Cortex Winteranus is very ſcarce in the ſhops, and that the apothecaries ſupply the want of it with the bark of Canella alba.

* Several authors have formerly given this tree different names; as

Canella Cubane. *Jonſ. dendr.* 165.

Arbor Jucaiæ. *Nieremb.* 294.

Arbor cujus cortex gingiber æmulatur. *Laet.* 24.

Lignum ſeu potius cortex aromaticus. *Ejuſd. in ſcholio ad Cap. de Lignis aromaticis. Monard. p.* 324, &c.

Sir HANS SLOANE, we find, was convinced of the difference between them, as he gave ſeparate deſcriptions of each, in the Tranſactions of the Royal Society. Notwithſtanding this, he ſeems to be in ſome doubt (probably through want of ſyſtematic knowledge) if the difference might not depend upon the place of growth: at leaſt, he ſays, the one may ſerve as a good ſuccedaneum for the other; though he confeſſes that the true Winter's Bark is much the more aromatic of the two.

The Canella alba is to be found as well in the *Tranſactions*, No. 192, p. 462, as in the *Hiſtory of Jamaica*, vol. ii. p. 87; where the author calls it

Arbor baccifera laurifolia aromatica, fructu viridi calyculato.

The botanical diſtinction was afterwards paid very little attention to by ſeveral writers on the Materia Medica; as Lemery, Pomet*, &c. And it is to be ſuppoſed that they have led Linnæus (not attending to the evidence of the old botaniſts) into this error of combining two different genera under the name of Laurus Winterana†: but he ſeparated this ſpecies from Laurus, in the enſuing editions, as a diſtinct genus, and called it Winterania; under which name it has been univerſally but improperly known.

This miſtake has however been fully developed by the late diſcovery of the Cortex Winteranus of Cluſius and Sloane, a production of *Wintera aromatica* (from the neighbourhood of the antarctic regions), whoſe exiſtence has remained in oblivion nearly a century, ſince it made its firſt appearance in the Tranſactions of the Royal Society, in the year 1692.

It is the late Dr. Fothergill who has, with the aſſiſtance of Dr.

* *Lemery, Dict. des Drogues, p.* 170. *Pomet, Hiſt. des Drogues, p.* 147.

† *Spec. Plant. ed.* 1, *p.* 371, *n.* 11. *Hort. Cliff.* 448. *Mat. Med.* 66. 196.

Solander, handed down to poſterity the real marks of that new genus, in vol. v. of Med. Obſ. and Inq. p. 46 & ſeq.

As, however, even of late, * there has been a relation ſuppoſed between thoſe two genera, the following deſcription, taken from a number of perfect ſpecimens, will remove all doubt of their being totally diſtinct.

Canella alba is a tree whoſe ſtem riſes from 10 to 50 feet in height, very ſtraight and upright, and branched only at the top. The bark is whitiſh, by which it is commonly known at firſt ſight in the woods.

The branches are erect, and not ſpreading.

The leaves are petiolated, and grow in an alternate order, but not regularly. They are oblong, pointed at the end, entire in the margin, and without any diſtinct nerves or veins; of a dark green hue, a thick conſiſtence, like thoſe of laurel, and ſhining.

The flowers grow at the tops of the branches in cluſters, but upon divided footſtalks: they are ſmall and ſeldom open, and of a violet colour.

The character of the flowers is as follows in botanical language, which is the moſt proper and expreſſive.

CAL. Perianthium monophyllum 3 lobum.

Lobi ad baſin fere diviſi, ſubrotundi, concavi, incumbentes, virides, glabri, membranacei, perſiſtentes.

COR. Petala 5 calyce longiora, oblonga, ſeſſilia, concava, erecta, duo paulo anguſtiora, conſiſtentia, decidua.

Nectarium urceolatum, longitudine petalorum, antheriferum, deciduum.

STAM. *Filamenta* nulla.

* *Linn. Suppl. p.* 247.

Antheræ 21 lineares parallelæ, diſtinctæ, longitudinaliter nectario extus adnatæ, univalves.
Pollen luteum.

PIST. *Germen* ſuperum, intra nectarium, ovatum.
Stylus cylindricus, longitudine nectarii.
Stigmata duo, obtuſa, convexa, rugoſa.

PER. *Bacca* oblonga unilocularis 2—4 ſperma.
Semina ſubrotundo-reniformia, nauco fragili nitenti tecta.

The diſtinguiſhing marks deduced from this character are,

Calyx trilobus.
Corolla pentapetala.
Antheræ 21, adnatæ nectario urceolato.
Bacca unilocularis, 2—4 ſperma.

This genus, whoſe name is more properly changed to that of Canella, cannot be removed from dodecandria, where it has formerly been, notwithſtanding its flowers bear ſome ſimilarity to thoſe of the ſixteenth claſs. But on the ſame principle, *Melia*, *Trichilia*, *Samyda*, *Erythroxylon*, &c. ſhould alſo change their place, which ſeems not very juſt, as they cannot be ranged among the Columniferæ, the natural tribe of that claſs.

There are various figures given of this plant by ſeveral authors; as by PLUKENET, in the *Phytogr.* tab. 160, f. 1; by SLOANE, in the *Hiſtory of Jamaica*, vol. ii. tab. 191, f. 2, and in the *Philoſophical Tranſact.* 1692, No. 192; by CATESBY, in his *Hiſtory of Carolina*, vol. ii. p. 50, tab. 50; by Mrs. BLACKWELL, in her *Icon.* tab. 206; and, laſtly, by BROWNE, in his *Natural Hiſtory of Jamaica*, tab. 27, f. 2. The laſt is the only tolerable one among them all; but it ſeems ſo little underſtood by Browne himſelf, that he has referred Breynia fruticoſa, fol. ſingularibus oblongo-ovatis ſuperne nitidis, &c. *Hiſt. of Jam.* p. 246, n. 3, to this figure, evidently that of the *Canella alba*,

of whoſe parts of fructification he has annexed another drawing on the ſame plate (fig. 3), though leſs accurate and diſtinguiſhable.

The tree is pretty common in moſt parts of the Weſt-India Iſlands, and is frequently found near the ſea-coaſt, but then ſeldom exceeding 12 or 15 feet: in the inland woods it attains a more conſiderable height.

The whole tree is very aromatic, and when in bloſſom perfumes the whole neighbourhood. The flowers dried, and ſoftened again in warm water, have a fragrant odour, nearly approaching to that of muſk. The leaves have a ſtrong ſmell of laurel. The berries, after having been ſome time green, turn blue, and become at laſt of a black gloſſy colour, and have a faint aromatic taſte and ſmell. They are when ripe, as well as the fruit of ſeveral kinds of laurel, very agreeable to the *White-bellied and Bald-pate Pigeons (Columba Jamaicenſis & leucocephala)*, which feeding greedily upon them, acquire that peculiar flavour ſo much admired in the places where they are found.

This bark, together with the fruit of Capſicum, were formerly common ingredients in the food and drink of the Caraibs, the ancient natives of the Antilles; and even at preſent it makes a neceſſary addition to the meagre pot of the Negroes.

It is not neceſſary to expatiate further upon the medicinal qualities of this bark, as it has been for ages in high repute, and occupies in the preſent Pharmacopœia the room of the old bark of Winter, which by the London Committee was thrown out of the New Materia Medica, as a drug not leſs rare than hitherto imperfectly known; and there is no doubt that *Canella alba* may with advantage be ſubſtituted in its room.

The

The annexed plate (*t.* 8) repreſents a branch of the tree in flower, and the berries of their natural ſize.

a, A flower, with its petals forcibly expanded.

b, The ſame magnified, ſo as to ſhew the inſertion of the nectarium in the middle.

c, The nectarium magnified ſeparately, with the *antheræ* longitudinally inſerted.

d, The ſame cut through on one ſide, and extended, exhibiting twenty-one linear antheræ.

e, The piſtillum ſtanding on the three-lobed calyx magnified, with the two ſtigmata.

f, The bacca of its natural ſize, tranſverſely cut, with one ſeed remaining fixed to the ſide.

g, The ſeeds of the natural ſize.

X. *Deſcrip-*

Canella alba.

X. *Deſcription of the Cancer ſtagnalis of Linnæus, by George Shaw, M. D. F. R. S. Fellow of the Linnean Society.*

Read January 6, 1789.

THE Cancer ſtagnalis of Linnæus being certainly one of the moſt curious animals of the genus to which it belongs, and being not yet ſo generally known as the reſt of the Britiſh ſpecies; I hope the following obſervations, which I have had frequent opportunities of making on this inſect, and particularly thoſe which relate to its infant ſtate, or firſt appearance from the egg, may be not unacceptable to the Linnean Society.

The Cancer ſtagnalis is generally found in ſuch waters as are of a ſoft nature, and particularly in thoſe ſmall ſhallows of rain-water which are ſo frequently ſeen in the ſpring and autumn, and in which the Monoculus Pulex of Linnæus, and other ſmaller animalcula abound. At firſt view this inſect bears ſome reſemblance to the inſect which ſome writers have called Squilla aquatica, or the larva of a Dytiſcus; but when viewed nearly it is found to be of a much more curious and elegant appearance than that animal. The legs, of which there are ſeveral pair (eleven) on each ſide, are flat and filmy, and have the appearance of ſo many waving fins, of the moſt delicate ſtructure imaginable. The whole animal is extremely tranſ-

tranſparent, and the general colour of the males is a very light brown, with a tinge of blueiſh green, particularly on the head and legs. The females have leſs of the blueiſh tinge, and incline more to brown, except on the ſpine of the back, which is of a deep dull blue, and which part in the males is of a deeper brown than the reſt of the body. The head of the male is armed with two fangs of a very ſtrong appearance, and which end in two long hooks bending inwards; and between the fangs lies a very curious apparatus, which will be more particularly deſcribed hereafter. The eyes are very protuberant, and, as it were, furniſhed with a ſtalk, as in the reſt of the genus Cancer. The female is deſtitute of the two long fangs which are ſo conſpicuous in the male, and, inſtead of them, is only furniſhed with a ſtrong, thick, ſhort pair of forceps: but what principally and immediately diſtinguiſhes the female, is a large, oval, ſharp-pointed bag of ova, which is ſituated underneath the lower part of the body where the tail commences. It is remarkable that the ſmaller ſized females are frequently furniſhed with this bag of ova, as well as the larger ones. The tail, which is perfectly alike in both ſexes, is of a red colour, more or leſs deep, from the middle to the very end, which is forked into two very ſharp points. Theſe creatures ſhould ſeem by their appearance to be of a predaceous nature, and I have no doubt that they really are ſo; the ſtructure of their fangs ſeeming to be particularly adapted to the purpoſe of ſeizing their prey: yet I never obſerved thoſe which I kept, to attack any of the animalcules which were in the ſame water: on the contrary, the Monoculus conchaceus very frequently aſſaults them, and adheres with ſuch force to their tails, or legs, as ſometimes to tear off a part in the ſtruggle. The C. ſtagnalis delights much in ſunſhine, during which it appears near the ſurface of the water, ſwimming on its back, and moving in various directions by the ſucceſſive undulations of its numerous fin-like legs, and moving its tail in the manner

of

of a rudder. On the leaſt diſturbance, it ſtarts in the manner of a ſmall fiſh, and endeavours to ſecrete itſelf by diving into the ſoft mud. It changes its ſkin at certain periods, as is evident from the exuviæ or ſloughs being frequently found in the water in which theſe animals are kept.

Linnæus, as appears by his deſcription in the laſt edition of the Fauna Suecica, had obſerved this inſect; but though he particularly mentions the appearance of the ovarium in the female, he propoſes a moſt extraordinary doubt, whether it may not prove to be the larva of ſome ſpecies of Ephemera. He alſo repeats the ſame queſtion in the Syſtema Naturæ.

The only writer who has given a very ample deſcription of the Cancer ſtagnalis, is Schæffer, who has called it Apus piſciformis. He does not allow the parts on each ſide to be genuine legs, but rather a ſort of branchiæ; and as the animal has no other parts which can be called legs, he therefore gave it the name of Apus. He has given a very good magnified view of the male inſect, and figures of both male and female in their natural ſize; but theſe figures ſeem to have been taken from ſmall ſpecimens, and are by no means calculated to give a clear idea of the elegant appearance of the animal itſelf.

I alſo find it figured in the 57th volume of the Philoſophical Tranſactions, for the year 1767; where it is alſo deſcribed, but the figures are inaccurate. In the deſcription it is very judiciouſly obſerved, that ſince they are furniſhed with ovaria replete with eggs, it ſeems not probable that they ſhould ever undergo a further change, but that they are in their perfect or ultimate ſtate.

Schæffer, who is exact enough in his general deſcription, had no opportunity of obſerving the inſect in its firſt ſtate, or immediately from the egg; it is therefore this part of its hiſtory which was ſtill wanting to complete the deſcription of ſo curious an animal.

In March and April the females depoſit their eggs, without any ſettled order, and perfectly looſe in the water. They appear to the naked eye like very minute globules of a light brown colour; ſcarce, if at all, exceeding in ſize the particles of the farina in a mallow: and what makes this compariſon the more juſt, is, that each ovum, when magnified, is extremely like one of the globules of farina in that plant; for it is thickly beſet on every ſide with ſharp ſpines, the length of which is equal to about the fourth part of the diameter of the egg. Beſides theſe ſpines, the egg is coated over with a tranſparent ſubſtance, reaching juſt to the extremities of the ſpines.

This is a particularity of ſtructure which I do not remember to have obſerved in the ovum of any other inſect; and may probably be intended to aſſiſt in cauſing them to adhere to the ſubſtances on which they fall when depoſited in the water, or elſe as a ſecurity from the ſmaller water-inſects.

In the ſpace of a fortnight, or in cold weather rather more, they are hatched; and the young animals may be ſeen to ſwim with great livelineſs by means of three very long pairs of arms, or rowers, which appear diſproportioned to the ſize of the animal: and indeed it bears, in this very ſmall ſtate, not much reſemblance to the form which it afterwards aſſumes; but, in the ſhort ſpace of a very few hours, the body appears conſiderably lengthened, and it begins to acquire the remarkable character of the divided tail-fin, which ſo ſtrikingly diſtinguiſhes the parent animal. In this very young ſtate the eyes do not appear pedunculated, but like a dark ſpot on the middle of the head.

On the ſeventh day after hatching, they approach pretty nearly to the form of the complete animal, except that they ſtill retain the two firſt or long pairs of rowers or arms: the legs however, or fins, are at this period very viſible. After this time it loſes the long rowers,

and appears ſtill more like the inſect in its advanced ſtate. Its growth, however, is but ſlow; and in all probability a very conſiderable time elapſes before the inſect acquires its full ſize: but this I cannot preſume to determine, ſince thoſe which were hatched in the glaſſes in which I kept them, died before they had acquired any conſiderable ſize.

In order to obtain theſe inſects in a young ſtate, nothing more is required than to keep the females ſelected for this purpoſe in ſeparate glaſſes of the ſame water in which they naturally reſided. The glaſſes ſhould be ſmall; and, when the eggs are depoſited, the parent inſects muſt be removed, and the glaſſes kept in a temperate room.

When firſt hatched, they are very little ſuperior in ſize to a common mite.

The three microſcopic views of the young animals were drawn with the greateſt attention, and their accuracy may be ſafely depended upon.

Tab. 9. Fig. 1. Shews the young inſect very ſoon after hatching.

Fig. 2. Repreſents it ſome hours after, at which time the forking of the tail is juſt viſible, as well as the ſegments of the body; whereas, in fig. 1, the body has not yet lengthened itſelf ſufficiently to ſhew the joints of which it conſiſts, or the forking of the tail.

Fig. 3. Shews it on the ſeventh day after hatching.

It is remarkable that the Cancer ſtagnalis, in its complete ſtate, though of the moſt delicate ſtructure, is yet capable of ſupporting a very conſiderable degree of cold, as is evident from the animal making its appearance in the middle of the day in very ſhallow waters, which have been almoſt entirely frozen during the night. Yet Schæffer repreſents thoſe which he found to be exceedingly impatient of cold; and adds that he has known a whole race of them completely killed in their native water by a very ſlight froſt. This is certainly not the caſe in our own country. I have ſeen great num-

bers of them in the months of December and January, even immediately before and after intenſe froſts, ſeemingly as vigorous and lively as in the ſpring and ſummer: they muſt therefore either plunge themſelves to ſuch a depth in the ſoft mud as to be ſecure from the froſt, or elſe they are not injured by being frozen for a time.

MICROSCOPIC DESCRIPTION.

IN an inſect of ſo conſiderable a ſize as this, a microſcopical deſcription might ſeem unneceſſary: this has, however, been given by Schæffer; and moſt of the parts which he has mentioned, are figured in his work with ſufficient accuracy. But it is to the laſt degree aſtoniſhing that he has entirely omitted the deſcription of the moſt curious part in the whole animal; nor does the leaſt trace of it appear in the magnified figure which he has given of the male inſect. This part is the apparatus for ſeizing its prey, and which is peculiar to the male; the female having only a very ſhort beak or mouth in the place of it.

This apparatus conſiſts of two very long flat trunks, proceeding from between the long hooked parts or exterior fangs, ſo conſpicuous in the male inſect. Theſe trunks are generally rolled up ſide by ſide, and carried in the ſame manner as the proboſcis of a butterfly, ſo as not to be externally viſible, except by a ſlight protuberance; but when extended they reach to a very conſiderable diſtance, ſo as to exceed that of the hooks or exterior fangs.

It ſhould be obſerved that, from the part whence theſe trunks proceed, the real mouth of the creature is placed, which conſiſts of two large

large concave ſcales, placed perpendicularly, and furniſhed with toothed edges, meeting each other. It is from each ſide of this mouth that the trunks proceed. The particular ſtructure of the trunks is as follows. The body of each is a long and moderately broad flat part, extended in a ſtraight line when expanded, and ending in a jagged extremity, beſet with very ſharp teeth, like thoſe of a fiſh: it is alſo divided, from the root to the extremity, into a very great number of tranſverſe ſpaces, each of which terminates in a tooth at the edge; ſo that the whole trunk is edged on both ſides with a continued row of teeth. Beſides the teeth, each trunk is alſo furniſhed with three lateral branches, or appendages, ſituated at ſome diſtance from each other, on the outward edge of the trunk. Theſe lateral branches are armed near the ends with ſeveral very ſtrong and exceſſively ſharp teeth, not only on the edge, but on the ſurface itſelf, and on the tips. Laſtly, it muſt not be omitted that the baſes of the fangs themſelves are furniſhed with a double range of extremely ſharp teeth, of a much larger ſize than any of the others: they are placed in ſuch a manner that the points of the teeth of one range look exactly contrary to thoſe of the other; and by this means muſt enable the inſect to commit the moſt ſevere depredations on ſuch animals as are its deſtined food. But why the female ſhould not be provided with a ſimilar apparatus, is an enquiry not eaſily to be anſwered.

The figure marked No. 8, is an exact ſketch of the whole apparatus of the mouth, expanded and magnified; in which the ſet of teeth at the baſe of each of the hooks of the fangs, is very conſpicuous. The upper part of the real maxillæ, or toothed ſcales, compoſing the mouth, is alſo ſeen; and the trunks, with their lateral appendages, are repreſented in their relative proportions.

It is probable that the extremities of the fangs are tubular, for at the tips there is an appearance of a narrow opening; but of this I cannot ſpeak with certainty.

My

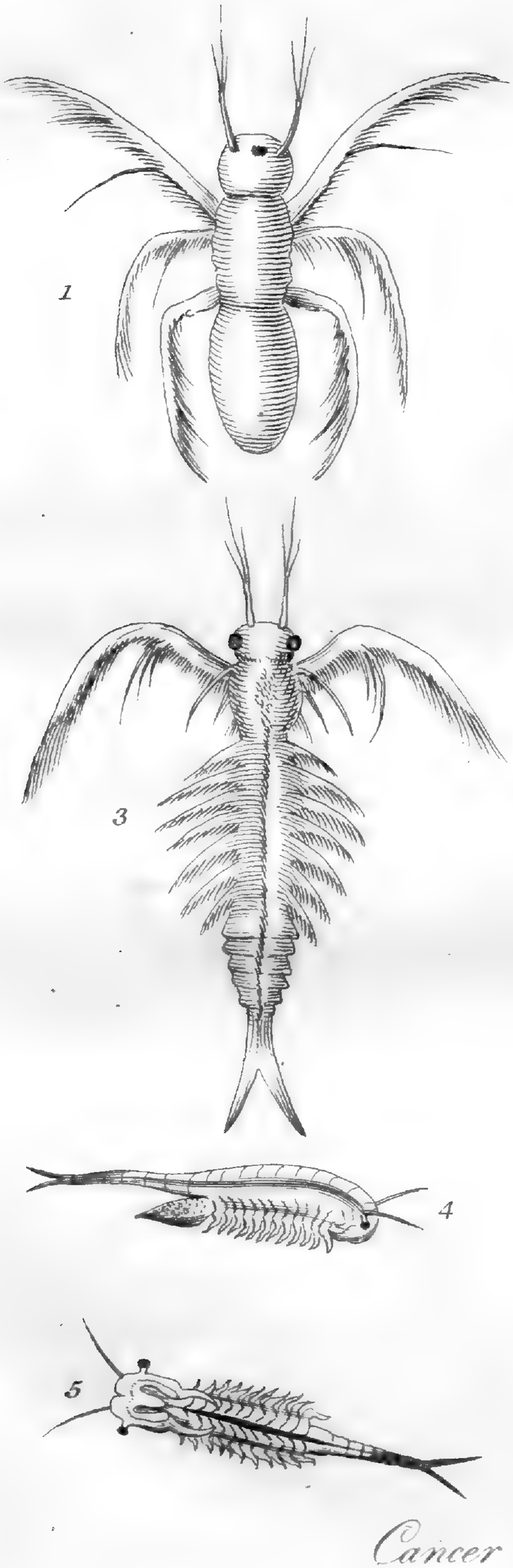
My obſervations on this inſect were made long before I had ſeen Schæffer's work. I then ſketched ſeveral parts by the microſcope, which I afterwards found had been already done by Schæffer. The annexed plate therefore contains only a few particulars which he has omitted, beſides the perfect inſect.

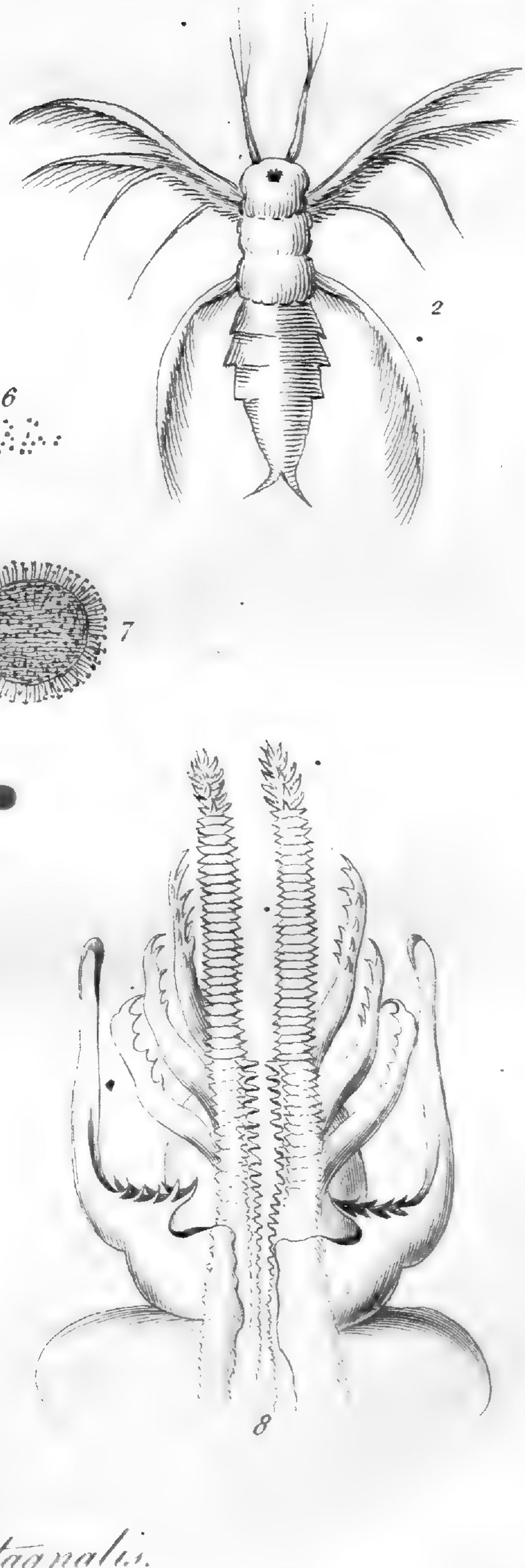
EXPLANATION OF TAB. 9.

Fig. 1, 2, 3. Cancer ſtagnalis in a young ſtate magnified. See page 107.

4. The perfect inſect, female, natural ſize.
5. Ditto, male.
6. Eggs.
7. An egg magnified.
8. The apparatus of the mouth.

XI. *On*





Cancer stagnalis.

XI. *On the Feſtuca ſpadicea, and Anthoxanthum paniculatum, of Linnæus.* *By James Edward Smith, M. D. F. R. S. Preſident of the Linnean Society.*

Read February 3, 1789.

IN the academical diſſertation intitled Plantæ Martino Burſerianæ, publiſhed at Upſal in the year 1745, under the auſpices of Linnæus, mention is made (page 2, No. 13) of a graſs with the following ſynonyms:

GRAMINIS ſpartei ſpecies.
Anthoxanthum floribus paniculatis.
Gramen ſparteum panicula flaveſcente. *Rudb. Elyſ.* 1. *f.* 14.

This was copied in the Amœnit. Academ. and admitted into the firſt edition of Species Plantarum, anno 1753, by the name of *Anthoxanthum paniculatum*, and there ſaid to grow in the ſouth of Europe.

It appears that Linnæus deſcribed this graſs from the ſpecimen in Burſer's Herbarium only; it not being to be found, at leaſt not under that name, in his own collection.

In his interleaved copy of Species Plant. ed. 1, I find the following MS. note upon this plant:

"Facies Anthoxanthi odorati, ſed rigidius. Calyces quadriflori. Flores mutici. Forte diverſi generis. Inquirenda ulterius."

In

In the ſecond edition of that work, the plant appears with the ſame ſynonyms, and the following note:

"Gramen in vivo ulterius examinandum iis quibus adeſt. Facies eſt Anthoxanthi odorati. Calyces quadriflori. Flores mutici." And Linnæus adds, that it grows "in Horto Dei Monſpelienſi," which is a ſpot celebrated for its botanical riches ever ſince the days of Belleval, and which Burſer viſited in the tour which he made through Europe in ſearch of plants.

No one, however, has been able to make out what Linnæus meant by his Anthoxanthum paniculatum. The Montpelier botaniſts have gone many a pilgrimage to the Hortus Dei, without finding any thing which anſwered to the deſcription; inſomuch that profeſſor Gouan, in his Illuſtrationes Botanicæ, page 2, has aſſerted that Anthoxanthum paniculatum ought to be ſtruck out of the Linnæan Syſtem, nothing being to be found in the place where it is ſaid to grow, but the common A. odoratum.

In my viſit to Oxford laſt year, with Sir Joſeph Banks and Mr. Dryander, one great object of my curioſity was the firſt volume of Rudbeck's celebrated Campi Elyſii, which is preſerved in the Sherardian library, and of which there are but three copies extant. I ſought out the figure quoted for the graſs in queſtion, and immediately perceived it to be nothing elſe than the *Poa Gerardi* of Allioni's Flora Pedemontana, a plant I had gathered the preceding ſummer on Mount Cenis. Taking an exact copy of Rudbeck's figure, and on my return to town comparing it with my ſpecimen, I had not a doubt remaining on the ſubject.

It appears likewiſe that profeſſor Gouan himſelf has gathered the plant; for I find in the Linnæan Herbarium an imperfect ſpecimen of it ſent by him, under the name of a Feſtuca, to which genus it really belongs. But this ſpecimen Linnæus omitted to name; nor did he recollect that he had deſcribed the plant already.

The

The accurate Gerard, in his Flora Gallo-provincialis, has given the firſt good deſcription of this graſs, accompanied with an excellent figure of its panicle of flowers, but no ſynonyms. Haller has likewiſe deſcribed it as a Poa, and quotes Gerard: but as it appears rather to belong to the genus of Feſtuca, I beg leave to offer a new differentia ſpecifica an deſcription of it.

FESTUCA paniculâ erectâ, ſpiculis ovatis quadrifloris, glumis acuminatis muticis, foliis ſetaceis glabris pungentibus.
POA paniculâ erectâ, ſpiculis trifloris glabris, corollis acuminatis, calyce duplo longioribus. *Ger. Gallo-prov.* 91, tab. 2, f. 1.
POA culmo recto, locuſtis trifloris glaberrimis, calycibus ariſtatis. *Hall. Hiſt.* V. 2, 223, No. 1463.
POA Gerardi. *Allion. Flor. Pedemont.* V. 2, 245, No. 2201.
ANTHOXANTHUM (paniculatum) floribus paniculatis. *Linn. Sp. Pl.* 40, *Am. Acad.* 1. 145.
GRAMEN ſparteum, paniculâ flaveſcente. *Rudb. Elyſ.* V. 1, 40, f. 14.

Habitat in pratis et paſcuis alpinis. 4

RADIX perennis, cæſpitoſa, fibroſa.
CULMI tripedales, erecti, ſtricti, teretes, ſtriati, glaberrimi: geniculo uno alterove purpureo.
FOLIA involuto-ſetacea, ſtricta, glaberrima, ſtriata, mucronato-pungentia, glauca; baſi dilatato-membranacea, vaginantia, albida. *Stipulæ* intrafoliaceæ, breviſſimæ, aut nullæ.
PANICULA erecta, ramoſa, multiflora, laxa, aureo-ſpadicea, ramis plerumque binis.
PEDUNCULI angulati, ſubflexuoſi, erecti.
SPICULÆ ovatæ, compreſſæ, plerumque quadrifloræ, glabræ.
CALYCIS valvulæ ſubæquales, carinatæ, acuminatæ, nec ariſtatæ, margine membranaceo-pellucidæ, baſi fuſcæ.

COROLLÆ bivalves, alterâ majori carinatâ alteram amplectens, calyce longiores, acuminatæ.

STAMINA. "*Filamenta* tria, breviſſima. *Antheræ* purpuraſcentes, incluſæ." Gerard.

PISTILLUM. *Styli* duo, breviſſimi. *Stigmata* plumoſa.

SEMEN unicum, oblongum, utrinque acutum, ſuperne ſulco longitudinali notatum, fuſcum.

OBS. Panicula variat magis vel minus ramoſa.

Linnæus ſeems to have referred this plant to the genus of Anthoxanthum, merely from the habit and colour of its flowers, in both which reſpects they have a great reſemblance to the A. odoratum. He probably could not diſſect the ſpecimen of Burſer, to inveſtigate its fructification: but Gerard as well as myſelf have examined the flowers living, and found them to be triandrous. Their beautiful gold or bronze-like colour is noticed by Gerard; which is a little extraordinary, as he rarely mentions colour in his deſcriptions.

I have lately learnt from Savoy that this graſs is likely to become of conſiderable uſe in agriculture, and that large quantities of it are now cultivating for that purpoſe. It has vegetated in Chelſea garden, under the care of Mr. Fairbairn, from ſeed I brought from Mount Cenis.

ADDI-

ADDITIONAL REMARKS.

Read October 5, 1790.

WHEN the preceding obſervations were laid before the Linnean Society, I named the graſs in queſtion Feſtuca anthoxantha, in alluſion, not only to its old generic name, but alſo to the yellow colour of its flowers.

At the ſame time I had a ſecret ſuſpicion of its being the Feſtuca ſpadicea of Gouan's Illuſtrationes Botanicæ, page 4, and Linnæus's Syſtema Naturæ, ed. 12, v. 2, p. 732. I was almoſt convinced that the deſcription found in the place laſt quoted had been made from the very ſpecimen above mentioned, now in the Linnean Herbarium. In order to ſettle this point, I ſent one of my own ſpecimens, without any remarks, to profeſſor Gouan, and have juſt received for anſwer that it is certainly his Feſtuca ſpadicea. To this name that of F. anthoxantha muſt therefore give way, as the Linnean name has the right of priority, and is indeed very apt.

Since my former paper was written, I have alſo collected ſome ſynonyms of the above graſs, from the Sherardian Herbarium, part of which I have looked over in company with profeſſor John Sibthorp. They are the following.

Gramen paniculatum, alpinum, radice craſſiſſimâ, foliis rigidis, ſtriatis, et aſperis, paniculâ fuſcâ non ariſtatâ. *Michelii Hort. Piſan.* 75.

G. montanum paniculâ ſpadiceâ craſſiore. *Tournef. Inſ.* 524.
Nardus ſpuria Narbonenſis. *C. Bauh. Pin.* 13.
Nardus Gangitis ſpuria Norbonæ. *Lob. Adverſar.* 43.

The laſt ſynonym is added on the authority of Micheli, as well as from the deſcription and incomplete figure of Lobel. Micheli alſo confirms the ſynonym of Tournefort.

Hence we learn, that Linnæus has totally miſapplied the above ſynonyms of Bauhin and Lobel, in quoting them as belonging to his Nardus Gangitis. That the latter is quite a different plant, appears from his own Herbarium; and Linnæus has committed a greater error in his quotation of Moriſon; for inſtead of ſection 8, t. 13, fig. ultima of that author, the figure he ſhould have quoted is the laſt but one, the *figura ultima* being quite a different plant from all the above: and yet I am afraid the differentia ſpecifica in Species Plantarum (ſpicâ recurvâ) was made from too great an attention to this miſquoted figure*. At any rate, that character is very bad, as being equally applicable to the common Nardus ſtricta. What is ſtill more unfortunate is, that the N. Gangitis is no Nardus at all, but appears to belong rather to Rottbollia, or at leaſt to the ſame genus with Rottbollia incurvata (Ægilops incurvata Linn.), as probably does the Nardus Thomæ likewiſe.

The foregoing obſervations exhibit a ſeries of errors and miſconceptions, which can ſcarcely be paralleled in the botanical hiſtory of any other plant, and thoſe the errors of the greateſt men; owing to which, the Anthoxanthum paniculatum and Nardus Gangitis have been enveloped in more obſcurity, and the labours of enqui-

* The figure of Moriſon is ſo confuſed, that this error could hardly be avoided. It is certain, however, that all his three ſpikes of flowers belong to the laſt figure.

ring botaniſts have been more frequently rendered abortive than in any ſimilar caſe, except thoſe, indeed, in which writers on the Materia Medica, with their ſovereign power of confounding, have interfered. Such miſtakes are not here pointed out with any invidious intention, but ſolely from a love of truth. Contemptible indeed are the critics who can triumph over the occaſional inequalities of an Homer; nor leſs contemptible and ungrateful are thoſe who, while they live but in the light they borrow from Linnæus, can exult over imperfections, which are avoided only by perſons who have never exerted themſelves in the ſervice of ſcience or mankind.

TAB. 10. is an exact copy of Rudbeck's figure above quoted, traced from his Campi Elyſii in the Sherardian Library.

XII. *On*

XII. *On the Migration of certain Birds, and on other Matters relating to the feathered Tribes. By William Markwick, Esq. Associate of the Linnean Society.*

Read February 3, 1789.

THE different accounts which have been published by various authors relating to the œconomy of birds, have always appeared to me exceedingly strange and unsatisfactory. I was willing to attribute these contrarieties to a variety of reasons. I thought perhaps that different causes operated upon these little animals, and led them to adopt different modes of living, suitable to the urgency of the occasions. But at length I became rather confirmed in the idea, that many authors wrote not from their own observation, but from guess, and the vague accounts which others had given before, who had still received them from others no better acquainted with the subject than themselves. This determined me to make accurate observations of what should really occur. I therefore offer the following remarks to the Linnean Society, as matters which are to be depended upon, and which I myself saw: and I the more readily enter upon this task, as I should apprehend if different observers stationed in different parts of the kingdom would take the trouble to notice the occurrences which happen, not only the catalogue of the British species would be most correctly ascertained, but their œconomy illustrated so effectually,

tually, that doubt and ignorance would no longer obſcure ſo curious a ſubject.

Catsfield, the place where theſe obſervations were made, is ſituated near Battle in Suſſex, about five miles from the ſea-ſide. The country round it is finely diverſified with hill and dale. Though there is no large river near it, yet there is much oozy ſpringy ground, and many woods, ſome of a tolerably large extent, in the neighbourhood.

I will firſt ſet forth in one ſynoptic table the ſeveral particulars which I have been led to notice, and then mention the reſult of my obſervations, by way of giving a general notion of the ſeveral incidents. After which I will add ſome few other illuſtrations, which could not eaſily be compriſed in theſe tables.

A TABLE,

[To front Page 121.

A TABLE of the Appearance and Diſappearance of the following BIRDS.

	1768	1769	1770	1771	1772	1773	1774	1775	1776	1777	1778	1779	1780	1781	1782	1783
Swallow—*Hirundo ruſtica.*																
Firſt ſeen	Ap. 14	Ap. 12	Ap. 18	Ap. 27	Ap. 12	Ap. 17	Ap. 13	Ap. 14	Ap. 16	Ap. 12	Apr. 7	Ap. 14	——	Apr. 8	Ap. 22	Ap. 13
Not ſeen after	Nov. 13	Oct. 25	Nov. 10	Oct. 28	Nov. 13	Oct. 18	Oct. 16	Oct. 24	Oct. 22	Oct. 27	Oct. 26	Oct. 29	Nov. 3	Oct. 15	Sep. 1	Nov. 6
Martin—*Hirundo urbica.*																
Firſt ſeen	——	Ap. 26	May 8	Ap. 17	Ap. 26	Ap. 24	May 1	Ap. 30	Ap. 19	Ap. 23	Ap. 26	Ap. 14	Ap. 29	May 12	Ap. 26	May 1
Not ſeen after	——	Oct. 4	Oct. 31	Oct. 28	Nov. 13	Nov. 1	Oct. 22	Oct. 14	Oct. 22	——	Oct. 26	Oct. 15	Nov. 3	Sep. 7	Nov. 2	Nov. 6
Swift—*Hirundo Apus.*																
Firſt ſeen	——	May 3	May 11	Ap. 29	May 2	May 13	May 16	Ap. 28	May 14	May 9	May 2	May 9	May 6	May 12	May 18	May 13
Not ſeen after	——	——	Oct. 1	Oct. 28	Au. 26	Oct. 10	Sep. 21	——	Au. 11	——	Sep. 2	——	Sep. 8	Sep. 1	Au. 28	Nov. 6
Sand Martin—*Hirundo riparia.*																
Firſt ſeen	——	——	May 16	——	——	Ap. 21	May 16	Sep. 25	——	July 3	Ap. 10	May 7	Apr. 8	Ap. 26	May 13	July 25
Not ſeen after	——	——	——	——	——	Oct. 10	Sep. 21	Sep. 25	——	Sep. 3	Sep. 2	——	Sep. 8	Sep. 1	Au. 28	Sep. 1
Wry Neck—*Jynx Torquilla.*																
Firſt ſeen	Apr. 3	Ap. 13	Ap. 15	Ap. 23	Ap. 13	Ap. 10	Mar. 31	Ap. 13	Ap. 18	Mar. 26	Ap. 21	Ap. 11	Ap. 10	Ap. 14	Ap. 25	Ap. 18
Not ſeen after	Sep. 25	——	Aug. 25	Oct. 6	Sep. 14	——	Sep. 2	——	Aug. 5	Sep. 6	Au. 26	——	Sep. 14	——	Au. 29	——
Cuckoo—*Cuculus canorus.*																
Firſt ſeen	May 1	Ap. 22	Ap. 27	May 1	——	May 5	Ap. 29	Ap. 29	Ap. 17	Ap. 30	Ap. 23	Ap. 25	Ap. 23	Ap. 19	Ap. 26	Ap. 28
Not ſeen after	Oct. 6	Sep. 22?	Aug. 25	——	Au. 26	Aug. 25	Sep. 2	Sep. 5	Oct. 11	——	——	Sep. 23	——	——	——	——
Goat Sucker—*Caprimulgus Europæus.*																
Seen	——	——	——	——	——	——	——	——	——	——	——	——	——	May 29	——	——
Turtle Dove—*Columba Turtur.*																
Seen	——	——	——	——	——	——	——	——	——	——	——	——	——	June 11	June 4	——
Woodcock—*Scolopax Ruſticola.*																
Firſt ſeen	——	Oct. 15?	Oct. 13	Oct. 24	Oct. 12	Oct. 22	Oct. 20	Oct. 21	Oct. 18	Oct. 20	Oct. 24	Oct. 12	Oct. 19	Oct. 30	Oct. 23	Oct. 14
Not ſeen after	Ap. 12	Apr. 7	Apr. 6	Ap. 18	Mar. 23	Mar. 19	Ap. 17	Ap. 13	Apr. 6	Mar. 17	Apr. 5	Mar. 21	Apr. 8	Mar. 21	Mar. 27	Apr. 6
Red Wing—*Turdus iliacus.*																
Firſt ſeen	Dec. 14	Dec. 18	——	Mar. 2	Nov. 2	——	Nov. 25	——	Mar. 22	Jan. 9	Oct. 17	——	——	Nov. 30	Dec. 21	——
Not ſeen after	Ap. 13	Apr. 7	Apr. 1	Ap. 18	Mar. 1	Apr. 2	Ap. 17	Ap. 13	Apr. 6	Mar. 17	Apr. 5	Mar. 15	Apr. 8	Ap. 14	Mar. 27	Apr. 6
Royſton Crow—*Corvus Cornix.*																
Firſt ſeen	Nov. 17	Nov. 7	——	Oct. 21	Oct. 18	——	Dec. 1	——	——	——	——	Oct. 30	——	Dec. 23	——	Jan. 15
Not ſeen after	Ap. 14	——	Ap. 14	Ap. 18	Feb. 21	Mar. 25	——	Ap. 13	Apr. 6	——	——	Apr. 1	——	Ap. 14	——	Apr. 3
Snipe—*Scolopax Gallinago.*																
Firſt ſeen	——	Nov. 11	Nov. 10	Nov. 8	Oct. 19	Oct. 23	Oct. 3	Oct. 16	Nov. 9	——	Jan. 29	Nov. 13	Nov. 11	Sep. 29	——	Dec. 8
Not ſeen after	——	——	Mar. 31	Ap. 18	Apr. 2	Apr. 7	Mar. 19	Ap. 14	Apr. 6	——	Apr. 5	Mar. 13	Apr. 8	Mar. 21	——	Apr. 6
Fieldfare—*Turdus pilaris.*																
Firſt ſeen	——	Nov. 18	——	Nov. 5	Nov. 15	Nov. 10	Nov. 10	Oct. 26	Nov. 6	Nov. 10	Oct. 27	——	——	Dec. 25	——	Dec. 29
Not ſeen after	——	——	Apr. 1	Ap. 18	Apr. 8	Ap. 10	Ap. 17	Ap. 13	Apr. 6	Mar. 14	Apr. 5	——	Apr. 8	Ap. 14	——	Apr. 6
Jack Snipe—*Scolopax Gallinula.*																
Firſt ſeen	——	——	Nov. 20	Dec. 28	Dec. 26	——	——	Dec. 19	——	——	Jan. 29	——	Dec. 28	——	Dec. 21	Dec. 29
Not ſeen after	——	——	——	Ap. 18	Mar. 16	Apr. 7	——	Ap. 13	Apr. 6	Feb. 8	Apr. 5	Mar. 13	Ap. 19	Ap. 14	——	Apr. 6
Siſkin, or Aberdavine—*Fringilla Spinus.*																
Firſt ſeen	Apr. 5	Ap. 20	——	——	——	——	Ap. 22	——	——	——	——	——	Ap. 10	Ap. 15	——	——
Not ſeen after	——	——	——	——	——	——	——	——	——	——	——	——	Ap. 30	——	——	——
Redſtart—*Motacilla Phœnicurus.*																
Firſt ſeen	Apr. 6	Ap. 15	Ap. 27	Ap. 17	Apr. 5	Ap. 14	Ap. 21	Ap. 22	Ap. 17	Ap. 23	Ap. 20	Ap. 30	Ap. 30	Ap. 17	Ap. 25	Ap. 27
Not ſeen after	Sep. 25	Sep. 22	Sep. 29	Sep. 30	Sep. 15	Sep. 18	Sep. 9	Sep. 20	Sep. 11	Sep. 18	Sep. 14	Sep. 23	——	Sep. 6	Sep. 20	Oct. 2
Willow Wren—*Motacilla Trochilus.*																
Firſt ſeen	Apr. 6	Ap. 29	May 16	Mar. 30	Ap. 18	Ap. 16	Ap. 20	Ap. 22	Apr. 3	Ap. 14	Apr. 7	Ap. 19	Ap. 16	Apr. 3	Ap. 18	Ap. 13
Not ſeen after	Oct. 18	Oct. 4	Oct. 23	Sep. 29	Sep. 16	Sep. 20	Sep. 21	Sep. 27	Sep. 11	Sep. 28	Sep. 30	Oct. 1	Sep. 13	Sep. 4	Sep. 20	Oct. 7
Nightingale—*Motacilla Luſcinia.*																
Firſt ſeen	Ap. 12	Ap. 16	May 8	Ap. 23	Ap. 18	Ap. 21	Ap. 20	Ap. 26	Ap. 20	Ap. 17	Apr. 8	Ap. 17	Apr. 5	Ap. 14	May 3	Ap. 28
Not ſeen after	——	——	——	——	Nov. 1	——	——	——	——	——	——	Sep. 23	Sep. 14	——	——	Oct. 2
White Throat—*Motacilla Sylvia.*																
Firſt ſeen	Ap. 23	Ap. 17	May 5	Ap. 26	Ap. 26	Ap. 20	May 3	Ap. 21	Ap. 19	Ap. 19	May 2	Ap. 21	Ap. 30	Ap. 14	Ap. 25	Ap. 26
Not ſeen after	Oct. 6	Sep. 21	Aug. 28	Oct. 6	Sep 16	Sep. 13	Sep. 9	Sep. 13	Sep. 5	Sep. 29	Sep. 20	Sep. 23	Sep. 20	Sep. 7	Sep. 20	Oct. 2
Wheat Ear—*Motacilla Oenanthe.*																
Firſt ſeen	May 5	Ap. 15	May 6	Ap. 5	May 23	Ap. 16	May 8	June 29	Ap. 21	——	May 18	Apr. 3	Ap. 22	Mar. 26	Mar. 13	Apr. 3
Not ſeen after	Oct. 6	——	Oct. 1	Oct. 26	Sep. 17	Sep. 20	Oct. 3	Oct. 14	Sep. 5	——	Sep. 13	Sep. 25	——	——	——	——
Fly Catcher—*Muſcicapa grijola.*																
Firſt ſeen	May 6	May 11	May 13	May 9	May 17	May 14	May 12	May 21	May 21	——	May 14	May 18	May 14	May 16	May 16	May 14
Not ſeen after	Oct. 6	——	Aug. 25	Oct. 6	Sep. 29	Sep. 19	Sep. 2	Sep. 13	——	Sep. 21	Sep. 13	Sep. 23	Sep. 14	Sep. 22	Au. 31	Oct. 2
Land Rail—*Rallus Crex.*																
Firſt ſeen	Sep. 1	Sep. 23	Aug. 27	——	Sep. 9	Sep. 1	Sep. 12	——	Sep. 2	Sep. 4	Sep. 14	Sep. 1	Au. 24	Sep. 29	Sep. 12	Sep. 2
Not ſeen after	Nov. 26	Nov. 3	Oct. 24	——	Nov. 7	Oct. 22	——	Oct. 14	Oct. 19	Oct. 27	——	Nov. 4	——	——	——	——
Whin Chat—*Motacilla rubetra.*																
Firſt ſeen	——	Ap. 30	May 10	Ap. 17	May 5	Ap. 20	——	Aug. 7	Au. 20	May 10	Aug. 4	——	——	Au. 20	Au. 28	Au. 26
Not ſeen after	——	Sep. 21	Sep. 21	Oct. 6	Sep. 5	Sep. 16	——	——	——	——	Sep. 17	Sep. 23	——	——	——	——
Black Cap—*Motacilla Atricapilla.*																
Firſt ſeen	——	Ap. 30	——	Ap. 22	——	Ap. 23	May 7	——	May 20	Ap. 23	May 29	——	Ap. 30	Ap. 14	Ap. 26	May 15
Not ſeen after	——	——	——	Oct. 6	——	——	——	——	——	Sep. 19	——	Sep. 23	Sep. 14	Sep. 4	——	Oct. 2
Redback'd Butcher Bird—*Lanius Collurio*																
Seen	——	——	——	——	——	——	——	——	——	May 12	May 9	July 10	May 11	May 9	——	June 7

N. B. When I ſay that I have not ſeen a bird after ſuch a date, I do not wiſh to be underſtood that I always ſaw it on that day. Generally ſpeaking, I had miſſed it ſome little time before, but entered my memorandum on the day which I have expreſſed.

EXPLANATORY REMARKS *on the foregoing* TABLE.

Hirundo ruſtica—*the Swallow.*

The Swallow's firſt appearance was generally about the 12th of April, never earlier than the 7th, or later than the 27th of that month; and I never ſaw it later in the year than the 16th of November, and then only a ſingle bird or two, the generality of them diſappearing long before that time.

Hirundo urbica—*the Martin.*

This bird is ſomewhat later in its appearance than the foregoing one, we having never ſeen it earlier than the 17th of April; but in general it does not appear till towards the latter end of that month, and frequently not till May, having one year not been ſeen till the 12th of May; and I never ſaw it later in the year than the 13th of November; but, like the former, the generality had diſappeared before.

Hirundo Apus—*the Swift.*

This bird is later in its appearance than either of the two former ones, being hardly ever ſeen before the beginning of May, twice only on the 28th and 29th of April during the whole ſixteen years; and its lateſt appearance was on the 18th of May; nor does it remain ſo late in the autumn as the former ones, the lateſt I have ever obſerved it being the 2d of September.

Hirundo riparia—*the Sand Martin.*

As this bird is not near ſo common in this country as the other ſpecies, my obſervations on its appearance muſt be uncertain, though I believe it generally makes its appearance very early, as I once ob-

EXPLANATORY REMARKS *on the foregoing* TABLE.

Hirundo ruſtica—*the Swallow.*

The Swallow's firſt appearance was generally about the 12th of April, never earlier than the 7th, or later than the 27th of that month; and I never ſaw it later in the year than the 16th of November, and then only a ſingle bird or two, the generality of them diſappearing long before that time.

Hirundo urbica—*the Martin.*

This bird is ſomewhat later in its appearance than the foregoing one, we having never ſeen it earlier than the 17th of April; but in general it does not appear till towards the latter end of that month, and frequently not till May, having one year not been ſeen till the 12th of May; and I never ſaw it later in the year than the 13th of November; but, like the former, the generality had diſappeared before.

Hirundo Apus—*the Swift.*

This bird is later in its appearance than either of the two former ones, being hardly ever ſeen before the beginning of May, twice only on the 28th and 29th of April during the whole ſixteen years; and its lateſt appearance was on the 18th of May; nor does it remain ſo late in the autumn as the former ones, the lateſt I have ever obſerved it being the 2d of September.

Hirundo riparia—*the Sand Martin.*

As this bird is not near ſo common in this country as the other ſpecies, my obſervations on its appearance muſt be uncertain, though I believe it generally makes its appearance very early, as I once ob-

ſerved it on the 8th, and another year on the 10th of April; but ſometimes, indeed, I did not ſee it till late in the year, owing, I ſuppoſe, to their being ſcarce. The lateſt I ever ſaw it in the autumn was the 25th of September.

Jynx Torquilla—*the Wry Neck.*

The firſt appearance of the Wry Neck for ſixteen years together was generally about the 13th of April, never earlier than the 26th of March, nor later than the 25th of April; and the lateſt of its continuing to appear was the 14th of September.

Cuculus canorus—*the Cuckoo.*

The firſt of the Cuckoo's being heard for ſixteen years together was generally about the latter end of April, never earlier than the 17th of that month, nor later than the 5th of May; and it continues to ſing till about the latter end of June, the 26th being the lateſt that I ever heard it. After that it is ſilent, though it continues to make its appearance till the beginning of September, the 14th of that month being the lateſt period of my ſeeing it. What Willoughby and others aſſert concerning this bird's breeding in the neſt of a ſmall bird, I know to be a fact, having myſelf taken a young Cuckoo out of the neſt of an Hedge-ſparrow, and kept it in a cage till the approach of winter, when it died.

Caprimulgus Europæus—*the Goat Sucker.*

I have only taken notice of ſeeing this bird in the year 1781, on the 29th of May.

Columba Turtur—*the Turtle.*

I have only taken notice of the appearance of this bird in two years, 1781 and 1782, which was on the 4th and 11th of June.

Scolopax

Scolopax Ruſticola—*the Woodcock.*

The firſt appearance of the Woodcock, according to my journal during ſixteen years, has been generally in October, never earlier than the 12th of that month; and as to its continuance with us, I never ſaw it later than the 10th of April. We have had two or three inſtances, in this neighbourhood, of young Woodcocks being ſhot in the ſummer-time; and I think I once ſaw an egg of this bird taken out of a neſt in the neighbourhood: but their breeding here is very uncommon, and owing, I ſuppoſe, to accident; the old ones perhaps having been wounded by ſportſmen in the winter, and ſo diſabled from taking a long journey in the ſpring.

Scolopax Gallinago—*the Snipe.*

This bird alſo generally makes its firſt appearance in October: I once ſaw it ſo early as the 29th of September, and the 14th of April was the laſt of my ſeeing it here.

Scolopax Gallinula—*the Jack Snipe.*

This bird is not ſo frequently met with as the foregoing, ſo that I cannot ſpeak with certainty as to its appearance; though I believe it is ſome time later than the common Snipe, the earlieſt of my ſeeing it being the 20th of November, generally not before December; though it ſeems to continue with us late, as I have ſeen it on the 19th of April.

Corvus Cornix—*the Royſton Crow.*

This bird, being ſeldom ſeen far from the ſea-coaſt, has not been very frequently obſerved by me. The earlieſt of its appearance, according to my journals, was the 17th of October; and I never ſaw it after the 14th of April, that being the lateſt of my obſerving it, according to my notes.

Turdus pilaris—*the Fieldfare.*

This bird is very uncertain in its appearance. Some years great flocks of them are early to be ſeen; other years very few, and thoſe not till late in the winter: which variation, as to the time of their appearing, is cauſed, as I ſuppoſe, by the different degrees of cold in the different winters. The earlieſt appearance of this bird that I have obſerved, was on the 26th of October, and the lateſt of my ſeeing it was the 8th of April.

Turdus iliacus—*the Red Wing.*

This bird is alſo very uncertain as to the time of its firſt appearance, but ſeems to be later in its viſit than the foregoing; for, according to my journal, the 14th of December is the earlieſt of its appearance, and in general I did not ſee it till January or February. In March and the beginning of April, when the weather is fine, the Red Wings aſſemble together on the tops of high trees, and ſing very melodiouſly; ſoon after which they leave us, the 13th of April being the lateſt of my ſeeing theſe birds.

Rallus Crex—*the Land Rail.*

The firſt appearance of this bird I cannot ſpeak to with any great certainty, having ſeldom met with it before the ſeaſon for ſhooting Partridges, September; though it has twice made its appearance in Auguſt, once on the 24th, and the other time on the 27th. And how long it continues with us is alſo uncertain; though I do not recollect ever to have ſeen it ſo late in the year as November. That it is a bird of paſſage, and that its ſtay with us is ſhort, is moſt probable; for it does not breed here, and certainly leaves us before the winter commences. From its generally flying very ſlow, and to all appearance weakly, one would ſuppoſe it ill adapted to long and quick flight: but that it can exert itſelf

on

on occaſion, I have been an eye witneſs; having ſeen it fly with amazing ſwiftneſs, equal to that of any Hawk: it alſo runs very faſt.

Fringilla Spinus—*the Siſkin, or Aberdavine.*

This little bird was obſerved only in the years 1768, 1769, 1774, 1780 and 1781. It is undoubtedly a bird of paſſage, ſpending a ſhort time with us early in the ſpring, probably in its paſſage from one country to another, as it neither breeds with us in ſummer, nor appears here in the winter. I never ſaw it before the 5th of April, nor after the 30th of the ſame month. I obſerve it feeds on the ſeeds which are in the cones of the fir.—With us it is called the Barley-bird, from its appearing about the time of ſowing barley, and continuing with us no longer than the barley-ſowing laſts.

Mr. Latham ſays it is not unfrequent in England in the winter. With us it is ſeldom ſeen at all. I never ſaw it in the winter. The longeſt ſtay I ever obſerved it to make, was from the 10th to the 30th of April in the year 1780.

Lanius Collurio—*the red-backed Butcher Bird.*

This bird breeds with us, and generally appears about the 9th or 10th of May; having never been ſeen by me earlier than the 9th of May, and one year I did not ſee it till the 7th of June.

Motacilla Phœnicurus—*the Redſtart.* Mot. Trochilus—*Willow Wren.* Mot. Sylvia—*White Throat.* Mot. Oenanthe—*Wheat Ear*, and Mot. Luſcinia—*Nightingale.*

Theſe ſmall birds generally appear pretty early in April, and continue to make their appearance till September, ſometimes rather later, as I have ſeen the Wheat Ear and Willow Wren in October. The ſame temperature of the air in the ſpring, which invites the flies

flies and other ſmall inſects to come forth, brings theſe birds to feed on them. But whether they come out from their hiding places, as the inſects do, or whether they come from far diſtant countries, is a queſtion not yet determined by naturaliſts. Probably the life of inſects is terminated with the ſummer, and the inſects of the following year are produced from eggs, which are hatched by the warmth of the ſpring: but no naturaliſt ever aſſerted that this was the caſe with birds. Their life is certainly prolonged from year to year; but how they diſpoſe of themſelves during the winter, is the queſtion. I never ſaw theſe birds in the winter, the earlieſt of my ſeeing any of them being on the 13th of March, when I ſaw the Wheat Ear.

Muſcicapa Griſola—*the Fly Catcher.* Mot. Atricapilla—*Black Cap.* and Mot. Rubetra—*Whin Chat.*

Theſe birds appear ſomewhat later than the foregoing, but I never ſaw any of them in the winter.

I will here beg leave to mention a few particulars reſpecting other birds which have engaged my notice: the white Water-wagtail, the grey Water-wagtail, and the yellow Water-wagtail.

How the Water-wagtails diſpoſe of themſelves in the winter, is the moſt difficult to account for of any birds I know; for though the generality of them diſappear in the autumn, yet they are often ſeen in the middle of winter. If there happens to be a fine day, and the ſun ſhines bright, theſe birds are ſure to make their appearance, chirping briſkly, and ſeemingly delighted with the fine weather: whereas, perhaps, they had not been ſeen for three weeks or a month before. In ſhort they are never ſeen in winter but on a fine day. Where do they come from? Certainly not from a far diſtant country; there not being time for a very long journey in the

ſpace

ſpace of a ſingle day; and beſides, they never ſeem to be tired or lifeleſs, but are very briſk and lively.

Sterna Hirundo & Sterna minuta—*Sea Swallows.*

Theſe birds are, as I ſuppoſe, ſummer birds of paſſage; appearing on our ſea-coaſts about April or May, and continuing with us till the autumn. The earlieſt that I have obſerved the great Sea Swallow, Sterna Hirundo, was the 15th of April; the leſſer, or Sterna minuta, the 24th of April; and the black Sea Swallow, Sterna fiſſipes? is ſo rare, that in ſixteen years I obſerved it but once, and that was on the 28th of April.

As to the time of their leaving us, I cannot ſpeak with any certainty. I once ſaw the leſſer Sea Swallow ſo late as the 15th of October.

Motacilla Atricapilla—*the Black Cap,*

Sings very prettily, and has a note ſomewhat like the Nightingale; for when I firſt heard it, I took it for that bird, till I had ſeen it.

Charadrius Oedicnemus—*the Stone Curlew,*

Whiſtles in the evening. I heard this bird June 17th, 1770, amongſt the corn on the downs not far from Eaſtbourn, where I ſuppoſe it breeds.

Corvus Corax—*the Raven.*

There ſeems a wonderful antipathy between this bird and the Corvus frugilegus, or Rook. In the year 1778, as ſoon as a Raven had built her neſt in a tree adjoining to a very numerous rookery, all the Rooks immediately forſook the ſpot, and have not returned to build there ſince.

At the Biſhop of Chicheſter's rookery at Broomham near Haſtings in Suſſex, upon a Raven's building her neſt in one of the

trees, all the Rooks forſook the ſpot; but they returned to their haunt in the autumn following, and built neſts there the ſucceeding year. When this circumſtance took place, the good Biſhop was very ill. The flight of the Rooks (for at firſt the cauſe of it was not known) was conſidered by the country people as ominouſly portending the death of the poſſeſſor. However, his Lordſhip happily recovered; and, in the mean time, the flight of theſe poor prophets was better accounted for.

Motacilla Regulus—*the golden-crowned Wren.*

This bird, though the ſmalleſt of any except the humming-bird, and to appearance the moſt delicate, is yet hardy enough to endure the cold of our ſevereſt winters; for it is now (January 26th, 1776) the ſevereſt weather I ever remember, and yet it is chirping before me.

Before I conclude this article, I will beg leave to mention a few birds, found in my neighbourhood, which are rarely met with. And I do this the more readily, as I am deſirous of affording evidence of the ſouthern ſituations in which they have been taken. They are the Scolopax lapponica, *the ſmall Curlew*, or *red-breaſted Godwit*; the Tringa Glareola, or *brown-ſpotted Sandpiper*; the Ampelis garrulus, or *Chatterer*; and the Fringilla Montifringilla, or *Brambling*.

The Tringa Glareola has never been figured by any author. I made a drawing of it from a freſh ſpecimen, with the following deſcription.

Tringa Glareola—*the Brown-ſpotted Sandpiper.*

The Wood Sandpiper. *Latham's Synopſis*, vol. iii. p. 172, ſp. 13.

Tringa (Glareola) roſtro lævi, pedibus virеſcentibus, corpore fuſco albo punctato, pectore albido. *Linn. Syſt. Nat.* vol. i. p. 250.

Tringa

Tringa nigra albo punctata, pectore maculato, abdomine ſubalbido, pedibus vireſcentibus. *Fn. Suec.* 152.

Tringa. *Briſſon's Ornithologia*, vol. ii. p. 259.

This bird was ſhot by the ſide of a little freſh-water rivulet in the pariſh of Battle, and ſent me by a friend. I do not find it mentioned by any author except Linnæus; who, in his Syſtema Naturæ, ſeems to think it only a variety of the Tringa Ochropus, or Green Sandpiper: but, in his Fauna Suecica, he takes notice of it as a diſtinct ſpecies, calls it Tringa Glareola, and deſcribes it as follows, which agrees with the bird that was ſent to me: "Magnitudo Sturni, dorſum fuſcum albo punctatum, uropigium album, remiges fuſcæ, prima rachi nivea; ſecundariæ apicis margine albæ, rectrices faſciis albis fuſciſq; laterales magis albæ, minuſq; faſciatæ, abdomen albidum." He alſo ſays, "Habitat in ſylvis uliginoſis."

This bird is rather more than nine inches in length from the tip of the bill to the end of the tail, and near a foot and a half from tip to tip of the wings when extended. Its bill is ſmooth, black, an inch and a half long. The noſtrils are long, and placed near the head, and each mandible has a furrow running along it, more than half way from the head. From the bill to each eye there goes a blackiſh line, and over each eye is a white ſpace, and it is whitiſh under the chin. The top of the head, neck, and breaſt, are of a browniſh aſh-colour ſtreaked, eſpecially on the breaſt and cheeks, with a darker browniſh aſh-colour. The back is of a duſky brown, tinged a little with olive-colour, and marked pretty thick with ſmall whitiſh ſpots. The rump and covert feathers of the tail are white. The tail conſiſts of twelve feathers, marked with dark-coloured or blackiſh and white bars, but the two outermoſt are almoſt entirely white; and the nearer they are to the outſide, the more white they have. The quill feathers of the wings are all over of a dark duſky brown colour, and the

covert feathers of a duſky brown tinged with olive-colour, thoſe next the back being marked with ſmall whitiſh ſpots. The legs and feet are of a greeniſh colour, and naked above the knees. The toes are long, the outermoſt joined to the middle one by a membrane as far as the firſt joint. The claws are black.

TAB. XI. repreſents the Tringa Glareola ſomewhat leſs than the life.

XIII. *The*

Tringa Glareola.

XIII. *The Hiſtory and Deſcription of a new Species of Fucus. By Thomas Woodward, Eſq. Fellow of the Linnean Society.*

Read April 7, 1789.

A PLANT belonging to the order of Algæ of the Cryptogamia claſs of Linnæus, and ſuppoſed to be a non-deſcript Fucus, has been long found in great quantities on the beach at Yarmouth, amongſt other rejectamenta of the ſea. A ſpecimen of this was ſent ſome years ago by Mr. Pitchford to the late ingenious Mr. Lightfoot, whoſe knowledge of this claſs of plants was undoubtedly great, and whoſe judgment deſervedly held in the higheſt eſteem. In anſwer to Mr. Pitchford's enquiries, Mr. Lightfoot declared that the plant was new to him, and was not, as he believed, deſcribed in Mr. Hudſon's Flora Anglica, or by any author with which he was acquainted; but, till it could be found in fructification, nothing could be poſitively aſcertained concerning it. On the arrival of the Linnean Herbarium in England, I carried a ſpecimen to London, and compared it, along with my worthy and learned friend, in whoſe poſſeſſion the Herbarium now is, with the ſpecimens of Fuci there preſerved; but we found none that at all correſponded with it. In this ſtate it reſted, it not being ever known from whence the plant, though ſo frequent on the Yarmouth beach, was waſhed; when in the month of October, 1787, I viſited Cromer, on the north-eaſt coaſt of Norfolk, with a view of examining what ſea-plants grew on the rocks there, as they are called by the

inhabitants. Theſe rocks are formed of ſea-pebbles and other large ſtones, which are thrown up by the waves on that expoſed ſhore in immenſe quantities, and are agglutinated by the ſea-ſlime into maſſes of various ſizes; theſe are left dry by the receſs of the tide to a conſiderable diſtance. The ſurface is very unequal, and conſequently numerous ponds of ſalt water, various in ſize and depth, are ſeen amongſt them; and as theſe in a calm day are perfectly clear and pellucid, the ſea-plants growing on the ſtones are there exhibited in great beauty. Amongſt others I obſerved great plenty of the above-mentioned plant; ſo much, that I had reaſon to conclude, that the principal part of what was found on the beach at Yarmouth, and elſewhere to the ſouthward, was waſhed from this part of the coaſt. I ſearched for its fructification, but in vain; and therefore contented myſelf with obſerving its mode of growth, without thinking of making any particular deſcription of the plant. In the following winter I received ſome ſpecimens of marine plants, freſh from the ſea, from Mr. Wigg, ſchool-maſter, at Yarmouth; to whom we are obliged for the diſcovery of many rare and ſome new ſpecies of Algæ, and who deſerves the warmeſt applauſe for his induſtry in collecting, and ſagacity in aſcertaining numerous plants, almoſt unaſſiſted by books. Amongſt theſe I was equally ſurpriſed and pleaſed to find this plant in a ſtate of fructification, and ſtill more to obſerve, on examination, that the fructification was particularly curious, and unlike that of any ſpecies of Fucus hitherto deſcribed. It being now clearly aſcertained that this is a non-deſcript Fucus, it may be diſtinguiſhed by the name of

FUCUS ſubfuſcus.

Fronde filiformi, ramoſiſſima, ramis ramuliſque ſparſis, foliis ſubulatis ſubalternis, fructificationibus paniculatis, capſulis ſuboctoſpermis.

Place in the genus, next to Fucus ſiliquoſus.

Hab. Cromer on the coaſt of Norfolk. Duration ⊙?

DESCRIP-

DESCRIPTION.

THE plant adheres to the ſtones under the ſurface of the water, without any viſible root, immediately branching into numerous ſtems. Individual frons about ſix inches high, the ſize of ſmall twine, round, and rough towards the baſe with the remains of broken branches; the lower part of the principal branches having the ſame appearance. Branches numerous, growing without order; towards the ſummit much crowded; nearly the ſize of the ſtem: theſe again branched in a ſimilar manner; the laſt clothed with ſhort ſubulate leaves, growing in a ſubalternate order, but not regularly.

The fructification is ſituate in the boſom of the leaves and of the ſmaller branches, on ſhort fruit-ſtalks, each of which appears to the naked eye to bear one or more capſules, about the ſize of the ſmalleſt pin's head. Theſe capſules, viewed with a good common eye-glaſs, have the appearance of flowers, conſiſting of ſeveral fleſhy petals, much reſembling the germina of the Sedums; but when moiſtened with water and put under the microſcope, it appears that they are compoſed of ſeveral lanceolate capſules, on ſhort fruit-ſtalks forming a panicle, or ſometimes a ſimple umbel; each individual having the appearance of a ſiliqua, and containing ſix or eight round ſomewhat compreſſed ſeeds, diſpoſed in two parallel lines. Theſe ſeed-veſſels appear to have neither valves nor diſſepiment, nor are the ſeeds attached to any ligament; therefore it is truly a capſule of one cell, and not either ſilique or legume.

The colour of the plant is reddiſh brown, or ſubfuſcous, when freſh; when dry it is nearly black; but if moiſtened, or held before a ſtrong light, the real colour may be obſerved. The capſules are pale and ſemi-tranſparent, the ſeeds the colour of the plant.

When

When dry it ſhrinks from the ſize of ſmall packthread to that of coarſe thread, and the branches in proportion.

By its being ſo conſtantly found on the beach in winter, I ſhould ſuppoſe its duration annual, and its time of flowering the autumn, being in ſeed in winter.

REFERENCE TO THE FIGURE. TAB. 12.

Fig. 1. A ſingle ſtem complete. This is the repreſentation of a dried ſpecimen, of a young and perfectly vigorous plant, but not in a ſtate of fructification. When older, many of the ſmaller branches and leaves are broken off, giving the plant a more naked appearance—natural ſize.

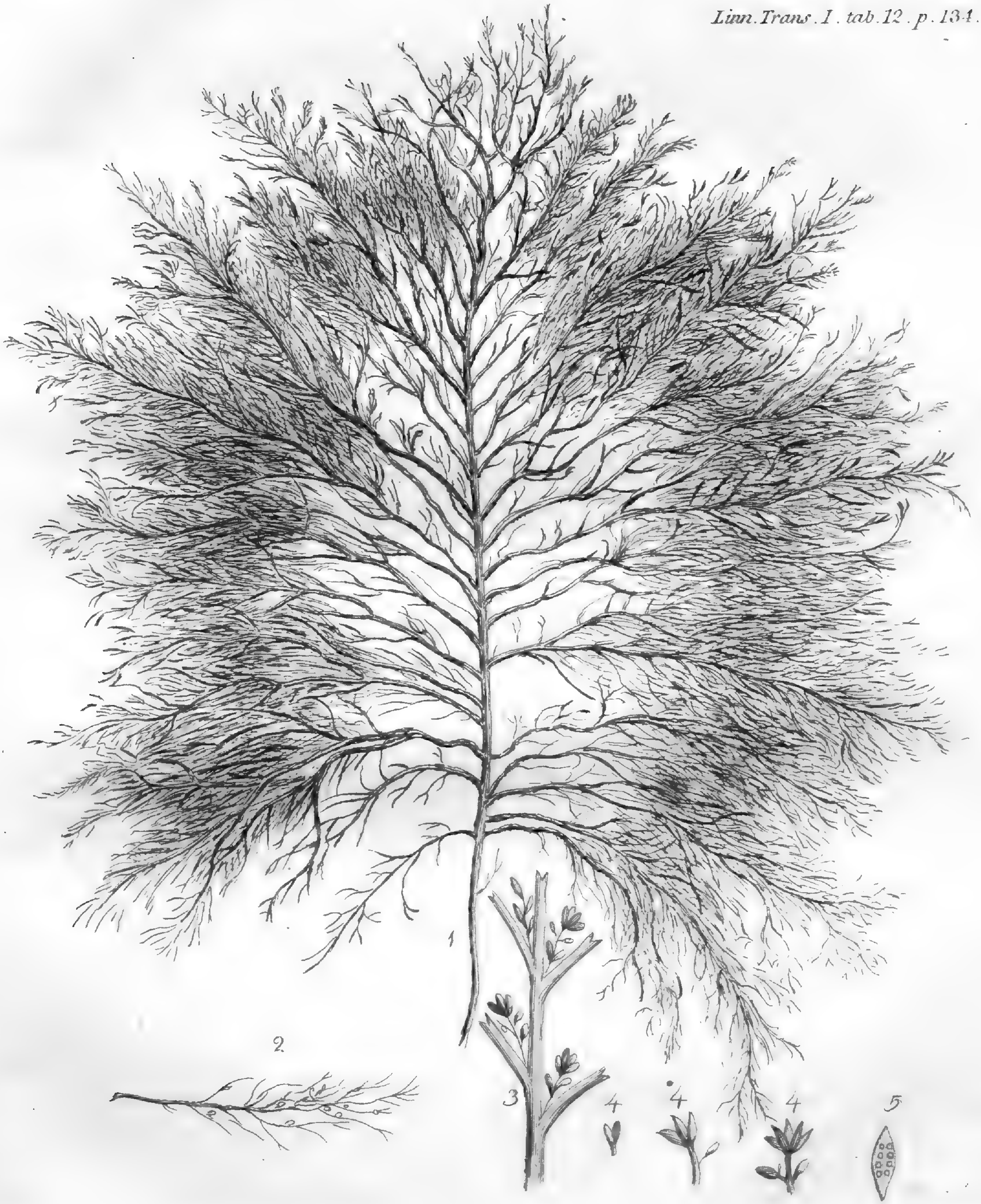
2. A ſmall branch of another dried ſpecimen, with the fructification—natural ſize.

3. A part of ditto, magnified. The leaves and ends of the branches, when highly magnified, appear ſlightly bifid, but not ſo exactly or regularly as the figure repreſents. Whether this be the real growth, or only owing to accidental breaking by the waves, I could not aſcertain; but it was the ſame in all the branches which I examined, and is therefore probably natural.

4. Different appearances of the fructification.

5. A ſingle capſule very highly magnified, and ſhewing the ſeeds as naturally diſpoſed. This is repreſented in the figure rather too broad, and too acutely pointed.

XIV. *Account*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XIV. *Account of a ſingular Conformation in the Wings of ſome Species of Moths. By Mr. Eſprit Giorna, of Turin, Foreign Member of the Linnean Society.*

Read June 2, 1789.

Veniet tempus quo iſta, quæ nunc latent, in lucem dies extrahat.
LINN. *in Introitu ad Syſt. Nat.*

MEPRISÉE dans les tems anciens, l'Entomologie doit, on peut dire, ſa naiſſance dans le ſiecle paſſé aux ſoins des Aldrovands, des Mouffets, des Rays, &c. et ſon accroiſſement dans celui-ci aux expériences et aux erreurs de Goedart. Cet obſervateur patient, en parcourant la vaſte forêt de la nature preſque ſans expérience, et ſans guide *, s'eſt ſouvent égaré; il a pris des effets pour des cauſes, et a donné comme caractères des marques, qui n'étaient qu'accidentelles. Mais ſes erreurs piquèrent la curioſité des ſavans; on voulut s'aſſurer de ce qu'il avait avancé, on obſerva, on fit des expériences, et chacun s'eſt empreſſé à publier ſes obſervations, et ſes découvertes.

Cette ſcience cependant était encore dans ſon enfance il n'y a que quinze ans: *In incunabilis adhuc tenera jacet*, diſait Fabricius en 1775 †: mais le penchant de l'eſprit humain pour la nouveauté, le champ

* Les auteurs qui l'ont précédé ont travaillé beaucoup; mais leurs ouvrages, preſque ſans ordre, et ſans ſyſteme, encore ne pouvaient ſervir de guide ſûr aux obſervations de Goedart.

† In Prolegomenis ad Syſtema Entomologiæ. Flenſburgi, 1775.

vaſte que cette matière offre pour les découvertes, ſon aménité, et l'utilité qu'elle laiſſe entrevoir par ſon étroite liaiſon avec la Phyſique, la Chymie, et l'Agriculture, ont engagé beaucoup de perſonnes à en entreprendre l'étude, et lui ont mérité l'attention des plus ſavans perſonnages de l'Europe; de ſorte qu'aujourdhui elle grandit à vue d'œil par les travaux innombrables de ſes amateurs, comme il a été forcé douze ans après de l'avouer le même Fabricius, *Entomologia ingenio, ſtudioque multorum nutrita, nunc in vegetiorem ætatem læta feſtinat* *.

Il eſt donc de l'intérêt commun de la ſociété littéraire; il eſt du devoir même de chaque individu qui s'applique à quelque branche de la phyſique, de faire part aux autres de ſes travaux, et de leurs réſultats; et c'eſt pour remplir autant qu'il eſt en moi ce devoir, que je viens vous offrir, Meſſieurs, ce que l'étude de la nature m'a fait découvrir de nouveau à l'égard des inſectes.

En m'occupant depuis quelques années, par goût et par amuſement, à l'hiſtoire naturelle, j'ai pu obſerver qu'il y a beaucoup d'eſpèces inconnues encore dans les inſectes, et que d'un autre côté les auteurs ſe ſont plus à les multiplier en donnant pour différences d'eſpèces, celles qui n'étaient que de ſexe, ou des ſimples variétés. Si les circonſtances répondent à mes deſirs, j'aurai l'honneur de vous communiquer, Meſſieurs, mes remarques ſur ce ſujet; je ne vous entretiendrai dans ce moment que de la découverte d'un caractère qui m'a frappé dans la plupart des Sphynx et des Phalenes.

Si c'en eſt une, je ne puis mieux l'adreſſer qu'à la ſociété qui ne s'eſt propoſée pour but, que de découvrir et d'étaler aux yeux du public les tréſors de la nature, et de rendre immortels les écrits et le nom du père, et reſtaurateur de l'hiſtoire naturelle, le grand Linné.

Il eſt étonnant, que parmi tant d'obſervateurs attentifs et clair-

* In Præfat. ad Mantiſſam Inſectorum. Hafniæ, 1787.

voyans

voyans, qui nous ont détaillé juſqu'au moindre des inteſtins d'un inſecte; il eſt étonnant, dis-je, que leur ſoit échappée dans les Sphynx et dans les Phalenes une partie extérieure ſi viſible, et ſi frappante telle que celle que j'entreprends de vous décrire.

Un caractère ineffaçable de la bonté et de la ſageſſe du Créateur eſt empreint dans toute la nature: le moindre inſecte partage ſes ſoins et mérite ſa prévoyance. Les Papillons deſtinés à voltiger doucement de fleur en fleur pendant le jour dans la campagne ouverte, et fournis d'ailes très-larges à leur baſe, ſurtout les inférieures, n'ont à craindre aucun déplacement de celles-ci dans leurs courſes, et ſont ſuffiſamment garantis de tout accident fâcheux de ce côté-là: mais les Sphynx, et nombre de Phalenes, dont les ailes ſont très-étroites à leur baſe, qui volent la nuit avec beaucoup de rapidité, et preſque toujours dans des brouſſailles, il était très-facile, qu'en heurtant contre quelque obſtacle leurs ailes ſe dérangeaſſent en paſſant les inférieures par deſſus les ſupérieures; et l'animal embarraſſé par cet accident pourrait tomber, et ſe perdre dans l'herbe, dans des branches, ou dans l'eau, ou devenir la proie de ſes ennemis. L'Auteur de la nature a pourvu à cet inconvénient; il a muni les ailes de l'animal d'une bride qui les retient à leur place ſans les gêner dans le vol.

De la baſe de l'aile de deſſous ſort une pointe vers ſa partie antérieure, plus ou moins longue ſelon la groſſeur de l'inſecte, de nature cruſtacée, dure, élaſtique et réſiſtante, deſtinée à ſoutenir l'aile ſupérieure à ſa place, que j'appellerai pour cela *Reſſort* ou *Appui (Fulcrum)*. Cette pointe fait un angle avec le bord de l'aile inférieure à peu près de 15 juſqu'à 30 degrés *, comme vous pouvez le voir par la figure

* Cet angle eſt celui que j'ai obſervé dans les inſectes deſſéchés avec les ailes étendues, dont les bords extérieurs de celles de deſſus ſont à peu près en ligne droite, de ſorte que cet angle eſt à mon avis le même que doit faire cette pointe avec l'aile inférieure, lorſque l'animal vole. Du reſte je conçois que ce Reſſort doit tenir à un muſcle, qui le régle à volonté, ou ſelon le beſoin de l'inſecte; et que lorſqu'il eſt tranquille, cette pointe ſe trouve couchée le long du bord de l'aile, et l'angle pour lors devient nul.

1re (TAB. 13.) ci-jointe*: mais ce n'eſt pas tout, Meſſieurs; l'intelligence de vues du Créateur ſe manifeſte encore davantage par un anneau attaché à la nervure principale de l'aile ſupérieure. Cet anneau (fig. 2.) deſtiné à recevoir ce reſſort, le laiſſant gliſſer avec facilité, le tient dans ſon aſſiette ſans lui ôter la liberté des mouvemens.

Ce ſecond caractère ne ſe voit que dans les mâles; et il eſt facile, ſelon mon idée, d'en deviner la raiſon: *Creatoris ſapientiſſimi omniſcientia nil fruſtra creavit, ſed omnia artificioſiſſime inſtruxit* †. Les mâles volent beaucoup, et avec une très-grande viteſſe; il faut qu'ils parcourent de longues eſpaces pour chercher les femelles, et remplir le grand but de la nature, et ſont par conſéquent très-expoſés aux dangers que nous venons de dire: les femelles au contraire, faites pour attendre les viſites des mâles, volent fort peu, et lentement; ce grand ſoin de la nature leur ſerait donc inutile, auſſi quelques-unes n'en ont point, et celles qui en ſont pourvues ne l'ont ni ſi long, ni ſi ſolide que les mâles; et il n'eſt compoſé dans la plus grande partie que d'un paquet de pluſieurs filets minces réunis enſemble.

Voilà un ſyſtême: direz-vous, Meſſieurs, qu'il eſt facile d'en batir! C'eſt une maladie univerſelle que la vanité produit, que l'amour propre fomente, et qui repand plus de brouillards que de clarté ſur les connaiſſances humaines. Les ſyſtêmes dans les ſciences ſont comme les feux follets qui égarent et deroutent ſouvent les voyageurs. L'homme commence ordinairement par rêver; ſon amour propre lui inſinue peu à peu qu'il a deviné le ſecret de la nature; il s'en flatte, il ſe le perſuade enſuite, il fonde des expériences ſur ſon

* La fig. 1re (TAB. 13.) repréſente une des ailes inférieures du Sphynx *Convolvuli* mâle, avec le Reſſort *a*, *b*, qui ſort de la baſe de cette aile. La fig. 2de fait voir le même Sphynx par deſſous, avec les ailes étendues, où l'on voit l'anneau *d*, qui reçoit le Reſſort *b*, *c*, comme il eſt naturellement dans l'animal.

† Linn. Amœn. Academ. vol. iii. p. 253.

ſyſtême,

ſyſtême, au lieu de fonder ſon ſyſtême ſur des expériences; il le débite enfin, et ce n'eſt ſouvent qu'un rêve.

Votre remarque eſt très-ſenſée, Meſſieurs; mais ce n'eſt point un ſyſtême que je vous offre; ce n'eſt qu'une idée, une ſimple conjecture. Rien dans le monde n'eſt fait à l'haſard; *ſed in finem certum atque determinatum, certamque ob cauſam, quæ vel propagationi animalis inſervit, vel conſervationi**. Or il m'a paru de l'entrevoir ce but de la ſageſſe de Dieu dans le caractère que je viens de vous découvrir de ces inſectes. Je vous expoſe ce que j'en penſe, et c'eſt à votre jugement que je ſoumets mes réflexions.

Voici les Sphynx et Phalenes que j'ai examinés à cet égard; je vous les préſente ſelon l'ordre de Linné; je marque dans quelques-uns le longueur de ce Reſſort en lignes priſes ſur le pied de Londres. Je ne donne que le nom ſimple de ceux que j'ai trouvé manquer de ce caractère.

S P H Y N X.

1. ocellata. { Mâle. Je n'en ai pas. / Femelle. Reſſort très-court ſans anneau.
2. Tiliæ. { M. Reſſort avec anneau. / F. Je n'en ai point.
3. Populi.
4. Nerii. { M. Reſſort avec anneau. / F. Je ne lui en ai point vu.
5. Convolvuli. { M. Reſſort long. li. 4 avec / F. Reſſort l. $2\frac{1}{2}$ ſans } anneau.
6. Atropos. { M. Reſſort l. $3\frac{1}{2}$ avec anneau. / F. Reſſort en paquet de 20 filets.
7. Elpenor. { M. Reſſort avec anneau. / F. Reſſort plus court ſans anneau.
8. Porcellus. { M. Reſſort avec anneau. / F. Je ne lui en ai point apperçu.

* Linn. Amœn. Academ. vol. iii. pag. 252.

9. ſtellatarum. { M. Reſſort avec anneau. F. Reſſort en paquet de 4 filets.

10. Euphorbiæ. { M. Reſſort avec anneau. F. Je ne lui en ai point vu.

11. fuciformis. { M. Reſſort avec anneau. F. Reſſort en paquet de pluſieurs filets ſans anneau.

12. Filipendulæ. { M. Reſſort avec anneau. F. Reſſort en paquet de 10 filets ſans anneau.

13. Phegea. { M. Reſſort ſeul ſans anneau. F. Reſſort en paquet de pluſieurs filets très-minces.

14. caffra. { M. Reſſort avec anneau. F. Paquet de 5 filets ſans anneau.

15. Statices. { M. Reſſort avec anneau. F. Paquet de 4 filets ſans anneau.

16. pigmée de la collect. d'Ernſt. { M. Reſſort avec anneau. F. Je ne lui en ai point obſervé.

PHALÆNA.

Attaci.

17. Pavonia major.
18. Pavonia minor.
19. Tau.

Bombyces elingues, alis reverſis.

20. quercifolia.
21. ilicifolia.
22. Rubi.
23. Quercus.
24. laneſtris.
25. Vinula. { M. Reſſort avec anneau. F. Paquet de pluſieurs filets.
26. verſicolora.
27. Mori.
28. Populi.

28. Populi.
28*. Neuſtria.

Bombyces elingues, alis depreſſis, dorſo lævi.

29. Caja. { M. Reſſort de l. 1 ¼ avec anneau. F. Reſſort ſans anneau.

30. villica. { M. Reſſort de l. 1 ½ avec anneau. F. Petit paquet preſque imperceptible.

31. diſpar. { M. Reſſort avec anneau. F. Paquet de 15 filets ſans anneau.

32. Chryſorrhæa. { M. Reſſort avec anneau. F. Paquet ſans anneau.

33. Salicis. { M. Reſſort avec anneau. F. Je n'ai pas examiné la femelle.

Bombyces elingues, alis depreſſis, dorſo criſtato.

34. pudibunda. { M. Je n'en ai point. F. Paquet de 4 filets ſans anneau.

35. gonoſtigma. { M. Reſſort avec anneau. F.

36. cæruleocephala. { M. Reſſort avec anneau. F. Paquet de 3 filets ſans anneau.

37. Coſſus.
38. palpina.

Bombyces ſpirilingues, dorſo lævi, alis deflexis.

39. Aulica. { M. Reſſort avec anneau. F. Paquet de 5 filets ſans anneau.

40. Ruſſula. J'en ai examiné 6, que j'ai, et je les ai toutes trouvées avec le reſſort et l'anneau: ſeront-ce tous mâles? Il y a une autre Phalene qui a les ailes un peu plus étroites de couleur fauve foncée; les taches ſont préciſement les mêmes que dans la précédente; j'en ai obſervé deux, que j'ai; je ne leur ai point trouvé de reſſort: ne ſerait-ce pas peut-être la femelle de celle-là?

41. grammica.

41. grammica. { M. Reſſort avec anneau. F. Paquet en filets ſans anneau.

Bombyces ſpirilingues, dorſo criſtato, alis deflexis.

42. Libatrix. { M. Reſſort avec anneau. F. Paquet ſans anneau.

43. Æſculi. { M. Reſſort de l. 2¼ ſans anneau. F. Paquet très-court de pluſieurs filets.

Noctuæ ſpirilingues, dorſo læves, abſque criſta.

44. Dominula. { M. Reſſort avec anneau. F. Paquet de pluſieurs filets.

45. Hera. { M. Reſſort avec anneau. F. Paquet de 3 filets.

46. Batis. Paquet en filets. Je n'en ai qu'une ſeule, et probablement c'eſt la femelle.

47. glyphica. { M. Reſſort avec anneau. F. Paquet de 3 filets.

48. Jacobeæ. { M. Reſſort avec anneau rouge très-élégant. F. Paquet de pluſieurs filets.

49. Sponſa. { M. Reſſort de l. 2¼ avec anneau. F. Je ne l'ai pas examinée.

50. Nupta. { M. Reſſort avec anneau. F. Paquet de 3 filets.

51. Pronuba. { M. Reſſort très-gros à proportion avec anneau. F. Paquet de 3 filets.

52. Fraxini. { M. Reſſort avec anneau. F. Je ne l'ai pas.

53. Chryſitis. { M. Je n'en ai point. F. Paquet de pluſieurs filets.

54. meticuloſa. { M. Reſſort avec anneau. F. Paquet de filets.

55. gothica. Reſſort avec anneau. Je n'en ai vu qu'une ſeule; il y a apparence que c'eſt le mâle.

Geometræ

Geometræ pectinatæ, alis poſticis ſubangulosis.

56. lactearia.
57. vernaria.
58. Thymiaria.

Geometræ pectinicornes, alis rotundatis.

59. purpuraria. { M. Reſſort avec anneau. F. Paquet de 20 filets.
60. puſaria.
61. papilionaria.

Geometræ ſeticornes, alis rotundatis.

62. clathrata.
63. bilineata.
64. Cratægata. { M. Reſſort avec anneau. F. Paquet de filets.

Tineæ.

65. puſiella. Reſſort avec anneau. Je n'en ai qu'une.
66. Evonymella. { M. Reſſort avec anneau. F. Paquet ſans anneau.

On voit par cette liſte que, parmi les Sphynx que j'ai obſervés, il n'y a que celui du peuplier, qui ſoit depourvu de ce Reſſort. Cela me confirme toujours plus dans mon opinion. Le Sphynx du peuplier eſt des plus tranquilles que je connaiſſe ; il vole rarement; et c'eſt celui qui a les ailes à proportion les plus larges : d'ailleurs le port ſeul de ſes ailes marque l'inutilité d'un tel moyen pour les retenir à leur place: les ailes de deſſous, lorſqu'il eſt en repos, depaſſent toujours celles de deſſus. La même réflexion a lieu pour toutes les Phalenes que vous trouverez qui manquent de ce Reſſort, telles que la Pavonia major, minor, Tau, Quercifolia, &c.

Ce caractère ne pourrait-il pas faciliter la claſſification d'ailleurs ſi embrouillée encore dans les Lépidopteres, et ſurtout dans les Phalenes? Les halteres ne ſont-ils pas une claſſe dans les inſectes à deux

ailes ſelon Scopoli*? Cette partie du moins eſt bien plus ſenſible que celles de la bouche, ſur leſquelles eſt fondé le ſyſtême de Fabricius.

Mais ſi cette partie ne ſuffit pas pour établir une claſſe, elle pourra du moins nous ſervir pour diſtinguer le ſexe, qui eſt encore douteux dans pluſieurs de ces inſectes; auſſi m'a-t-elle déjà éclairé ſur le doute dans lequel nous laiſſent les auteurs, et nommément la Collection des Papillons d'Europe par Ernſt à l'égard du Sphynx à ailes tranſparentes (fuciformis). Il y en a de deux ſortes; un a le bord des ailes couleur de marron ainſi qu'une bande à travers le ventre; l'autre a cette bande noire avec le bord des ailes verdâtre-obſcur; ils ſont parfaitement ſemblables dans le reſte. La plûpart des auteurs ont pris cette différence comme la diſtinction de ſexe; d'autres ont douté ſi c'en était une d'eſpèce: cette derniere opinion eſt la vraie; j'en ai trouvé de toutes les deux ſortes avec le reſſort et anneau, et avec le reſſort ſans anneau; donc il y a mâle et femelle dans toutes les deux, et ſont par conſéquent deux eſpèces différentes. Ce ſera une ſimple variété, vous me direz, Meſſieurs; mais cela ne peut être; car vous m'enſeignerez que les variétés ſe rencontrent rarement, or ces deux Sphynx ſont auſſi fréquens les uns que les autres.

Le reſſort des femelles eſt compoſé dans la plûpart d'un paquet de filets, comme je vous l'ai fait obſerver ci-deſſus: ce paquet eſt retenu dans les Phalenes par une touffe de poils, qui partent de la ſeconde nervure de l'aile ſupérieure, et ſont recourbés vers le bord extérieur †; mais le nombre de ces filets n'eſt pas le même dans toutes les eſ-

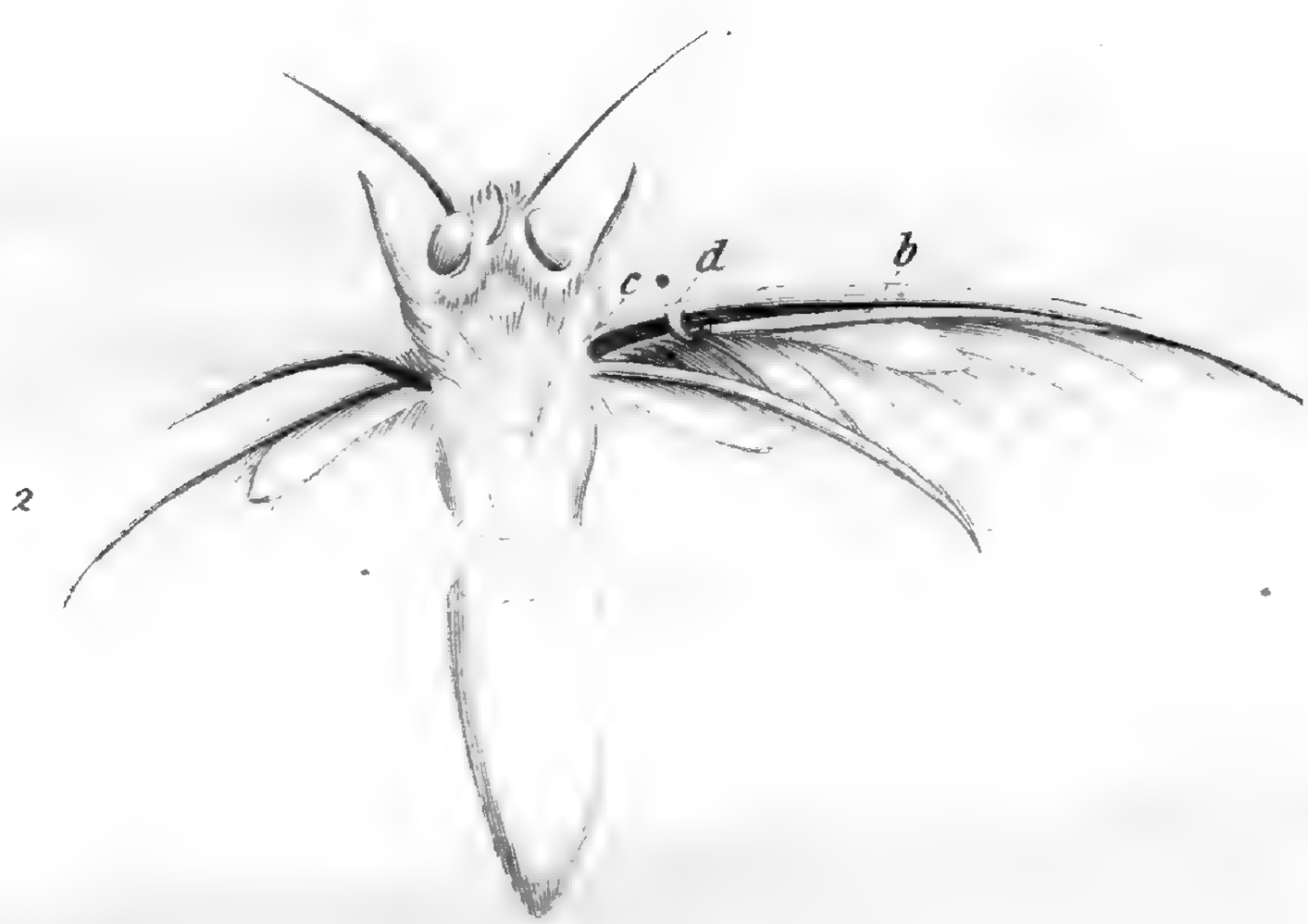
* Entomolog. Carniol. Ord. vi. Halterata, clavula ſub ſingulis alis.

† Voyez la fig. 3. (TAB. 13.) Elle repréſente la ſemelle de la Phalene *Pronuba* vue en deſſous. D'un côté elle manque de l'aile ſupérieure pour laiſſer voir le paquet *a* compoſé de 3 filets bien diſtincts et un peu groſſis au microſcope; et de l'autre côté on voit ce paquet *b*, *c*, qui repoſe ſur la touffe de poils *d*. L'aile detachée *z*, fait voir que ce paquet ſort de la baſe de l'aile.

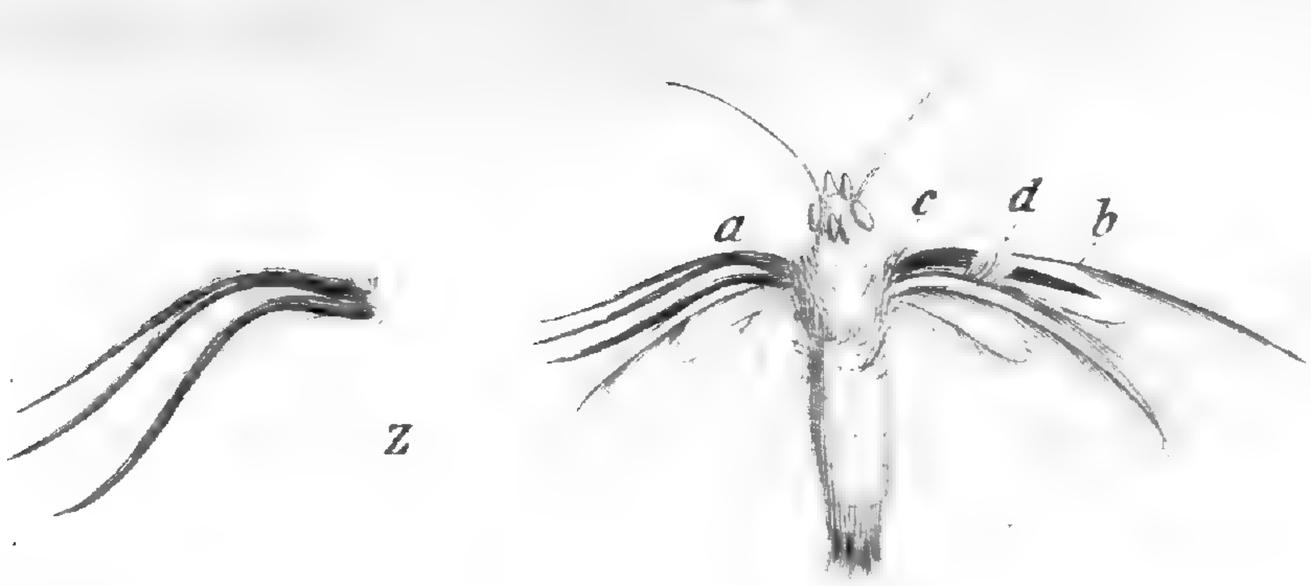
pèces

Linn.Trans.I. tab.13 .p.144.

1



2



Z

3

Mackenzie in

pèces (autre remarque à faire). Dans les inſectes que j'ai obſervés avec le microſcope, je l'ai trouvé de 3 filets dans les uns, de 4 dans d'autres, de 5, de 10, de 15, &c. juſqu'à 20, comme vous l'aurez obſervé par ma liſte. Ce nombre cependant en eſt conſtamment le même dans tous les individus de la même eſpèce. Cette différence, ce me ſemble, pourrait encore nous ſervir de guide pour nous tirer des labyrinthes de l'entomologie.

La collection des papillons d'Europe d'Ernſt nous donne une quantité d'eſpèces de Sphynx à ailes tranſparentes (Linn. *Legitimæ alis integris ano barbato*), comme auſſi de Sphynx beliers (Linn. *Adſcitæ habitu et larva diverſæ*). Sont-elles véritablement toutes des eſpèces, ou ne ſont-elles que des ſimples variétés? Le nombre des filets qui forment le Reſſort des femelles déterminé et toujours conſtant à chaque eſpèce, ne ſervirait-il pas à nous débrouiller ce cahos? C'eſt à vous, Meſſieurs, à en juger.

Vous qui poſſédez des collections complettes, vous pouvez vérifier mes obſervations, porter votre examen ſur les Sphynx et Phalenes qui manquent dans ma liſte, et en tirer peut-être des notions plus heureuſes que je ne ſaurai le faire.

NOTE.

THIS curious apparatus affixed to the wings of Moths, which Mr. Giorna conſiders as a new diſcovery, has been long known to many of the Engliſh collectors of Butterflies and Moths: it is claimed (and a good account given of it with accurate figures) by Mr. Moſes Harris, in a work of his, entitled, *An Eſſay preceding a Supplement to the Aurelian, wherein are conſidered the Tendons and Membranes*

of the wings of Butterflies, &c. In this work the uſe and actions of theſe ſprings appear to be well defined and explained; and Mr. Harris obſerves that it pertains only to the males, the females having, inſtead of the ſprings, four ſmall hairs or briſtles: it was thought, however, proper to publiſh this account, as Mr. Giorna has carried the matter further than Mr. Harris, and it is hoped will excite others to purſue the ſubject.

XV. *Obſer-*

XV. *Obſervations on the Language of Botany. By the Rev. Thomas Martyn, B. D. F. R. S. Profeſſor of Botany in the Univerſity of Cambridge, and Fellow of the Linnean Society. In a Letter addreſſed to the Preſident.*

Read October 6, 1789.

SIR,

I HAVE little doubt of your agreeing with me in opinion, that nothing has contributed more to the rapid progreſs which the ſcience of Botany has made within the laſt thirty or forty years, than the excellent language which Linnæus invented, and which has been by common conſent adopted, not only by thoſe who follow the ſyſtematic arrangement of the illuſtrious Swede, but by all who ſtudy Botany as a ſcience. Without pretending to any peculiar foreſight, we may venture to affirm, that the Linnean language will continue to be in uſe, even though his ſyſtem ſhould in after ages be neglected; and that it will be received into every country where the ſcience of Botany is ſtudied, with certain modifications adapting it reſpectively to each vernacular tongue.

So long as Botany was confined to the learned few, there was no difficulty in uſing the terms of the Linnean language, exactly as the author had delivered it: but now that it is become a general purſuit, not only of the ſcholar, but of ſuch as have not had what is called a learned education; and ſince the fair ſex have

adopted it as a favourite amuſement; it is become neceſſary to have a language that ſhall be ſuitable to every rank and condition, a language that may be incorporated into the general fund, and carry with it the proper marks of the mother tongue into which it is to be received.

In order to attain this deſirable end, I beg leave, Sir, to ſubmit to your conſideration, and to that of the ſociety over which you preſide, theſe two fundamental principles: Firſt, that we ſhould adhere as cloſely as poſſible to the Linnean language itſelf: and ſecondly, that we ſhould adapt the terminations, plurals, compounds and derivatives, to the ſtructure and genius of our ſterling Engliſh.

That we ought to adopt the Linnean terms themſelves, is ſufficiently apparent from the great advantage reſulting from the uſe of one univerſal language. If we change or tranſlate theſe terms, we loſe all this advantage, and become unintelligible to botaniſts of every other nation, without any benefit gained on the other hand: for theſe new terms will be equally difficult even to the Engliſh ſtudent; and will require as much explanation as the Latin or Greek, many of which have preſcription and poſſeſſion to plead in their defence. To load the ſcience and our Engliſh tongue with a uſeleſs addition of new words, is certainly an evil to be avoided.

Thus, for inſtance, in the parts of fructification, if we adopt the terms *empalement*, *bloſſom*, *chive*, *thread*, *tip*, *pointal*, *ſeed-bud*, *ſhaft*, *ſummit*, they require explanation, in their appropriate ſenſe, as much as *calyx*, *corolla*, *ſtamen*, *filament*, *anthera*, *piſtillum* or *piſtil*, *germen* or *germ*, *ſtyle* and *ſtigma*, which are already familiar to the ears of all who have ſtudied the ſcience of Botany, even though they have little or no acquaintance with the learned languages. For the ſame reaſons *legume* is to be preferred to *ſhell* or *cod*, *ſiliqua* or *ſilique* to *pod*, *ſilicle* to *pouch*, *glume* to *huſk* or *chaff*, *culm* to *ſtraw*, *digitate* to *fingered*, *ovate* to *egged*, *pinnatifid* to *feather-cleft*.

Some

Some few Engliſh terms, it muſt be owned, were uſed by the learned Grew; ſuch as *empalement*, *chive*, *ſemet* for *anther*, *pointell*, *ovary* for *germ*, and *knob* or *button* for *ſtigma:* but theſe never made their way into the world, or became of general uſe. It is not neceſſary therefore to diſcuſs the comparative merits of theſe terms with the Linnean; ſince, after all, we muſt ſubmit to the ſupreme law in theſe matters, general conſent *: and when a Greek or Latin term has been once ſanctioned by uſe, there can be no doubt but that it ought to be preferred even to a term originally Engliſh, which is either little known, or is applied to another ſignification.

It ſeems therefore upon the whole to be a deſirable object, that all who talk or write of Botany in Engliſh, ſhould keep as cloſe as poſſible to the Linnean language: nor does it ſeem liable to any material objection, if we proceed with diſcretion and propriety, without violating the rules of common ſenſe or of grammar.

For inſtance, when there is a ſignificant Engliſh term, which has been in long and general uſe, it ought to be preferred. Thus it would be abſurd to put *ſemen* for *ſeed*, or *folium* for *leaf*: *cell* is preferable to *loculament*, *partition* to *diſſepiment*, and perhaps *ſeed-veſſel* to *pericarp*. Opinions will differ upon the extent to which this exception to the general principle ſhould be carried: but the original terms of the ſcience in our language are ſo few, that it may very well be confined within a ſmall compaſs.

There are however caſes, in which it ſeems adviſable rather to invent a new Engliſh term, than to adopt the Linnean. Thus in the caſe of very long words, ſuch as *campaniform*, *infundibuliform*, *hypocrateriform*, and other ſeſquipedalian terms, which give too great an air of pedantry to the language, it will perhaps be thought better by

* ——————" Si volet uſus,
" Quem penes arbitrium eſt, et jus, et norma loquendi."

moſt perſons to uſe *bell-ſhaped*, *funnel-ſhaped*, and *ſalver-ſhaped*; or *bell-form*, *funnel-form*, and *ſalver-form*; our Engliſh tongue admitting compounds with great ſucceſs and facility: eſpecially ſince theſe terms convey immediately to the Engliſh botaniſt a familiar idea of the ſeveral forms of the corolla, which they are intended to expreſs.

When words alſo have already an appropriate ſenſe in Engliſh, it ſeems better to tranſlate them than to uſe the originals themſelves. Thus, although in Latin we ſay *caulis ſtrictus* or *exaſperatus*, and *folium exaſperatum*; yet it has an abſurd ſound in Engliſh to talk of a *ſtrict* or *exaſperated* ſtalk, and of leaves being *exaſperated*. On the contrary, it is ſtill worſe, although it has not ſo ridiculous a ſound, to drop the original Latin term, in order to adopt an Engliſh one before appropriated to another ſenſe, and therefore only tending to create confuſion. What I mean may be exemplified in the terms *lanceolate* and *ſerrate*, applied to leaves: theſe are become ſufficiently familiar by uſe; but if not, the explanation muſt be referred to: whereas, if we uſe the words *lanced* and *ſawed*, a novice might eaſily be miſled; for having been accuſtomed to the ideas of a *lanced gum* and *ſawed wood*, he will not readily apply the former to the ſhape of a lance's head; or the latter to the ſharp notching round the edge of a leaf, reſembling the teeth of a ſaw.

There are likewiſe ſome Latin words which do not perfectly aſſimilate to our language, and therefore are better tranſlated. Such are *teres* and *amplexicaulis*. Now we cannot well ſay in Engliſh *tere* or *amplexicaul*; but the firſt may frequently be tranſlated *round*: this however will ſometimes create a confuſion, and *columnar* gives the idea of *teres* moſt preciſely; for when applied to a ſtem, or any of its ſubdiviſions, it ſignifies, not a cylindric, but a tapering form, like the ſhaft of a column. The ſecond of theſe terms may be rendered, ſignificantly enough, *embracing* or *ſtem-claſping*.

Theſe

Theſe and other exceptions, which will readily preſent themſelves to any one who conſiders the ſubject, being admitted; the advantage of the ſcience will be moſt effectually conſulted by retaining the Linnean terms, whenever there is no cogent reaſon to the contrary. It is frequently even dangerous to ſubſtitute equivalent terms; or at leaſt it requires the utmoſt caution, if we would avoid confuſion. Thus, if we tranſlate the two Linnean terms *deciduus* and *caducus* by the ſame Engliſh word *falling*, two diſtinct ideas are confounded*: would it not therefore be better to uſe the two Latin terms, with an Engliſh termination, deciduous and caducous? *Plumoſus* is rendered *feathery*; and *pinnatus*, *feathered:* but is not this confounding ideas totally diſtinct? and are not therefore the terms *plumous* or rather *plumoſe*, and *pinnated* or rather *pinnate*, to be preferred? *Dichotomus* may be tranſlated *forked:* but this Engliſh term implying no more than one diviſion into two parts, does by no means fully expreſs the idea of a ſtem continually and regularly dividing in pairs from the bottom to the top. Surely then *dichotomous* † is preferable to *forked.*

But where ſhall we find Engliſh words to expreſs all the variations of pubeſcence, which Linnæus has diſcriminated with ſo much nicety‡? Some of them indeed may very well admit of tranſ-

* *Caducus* ſignifies a more quick or ſudden falling off than *deciduus*. The calyx of the Poppy dropping before the corolla is unfolded, is ſaid to be *caducus*. In *Berberis*, and many plants of the claſs *Tetradynamia*, it falls off; but not till after the corolla is expanded: the calyx in this caſe is ſaid to be *deciduus*.

† If the *jus et norma loquendi* would permit, I ſhould be for rendering all Latin adjectives ending in *us*, by the Engliſh termination *ous;* and all ſuch as end in *oſus*, by the termination *oſe*.

‡ As *ſcabrities*, *lana*, *lanugo*, *villus*, *tomentum*, *pili*, *ſetæ*, *ſtrigæ*, *hami*, *ſtimuli*, *aculei*, *furcæ*, *ſpinæ*, &c. and the adjectives derived from theſe and others; as *lanatus*, *lanuginoſus*, *villoſus*, *tomentoſus*, *piloſus*, *ſetaceus*, *ſtrigoſus*, *hamatus*, *aculeatus*, *furcatus*, *ſpinoſus*, *ſcaber*, *hirtus*, *hirſutus*, *hiſpidus*, *exaſperatus*, &c.

lation;

lation*; but many will not. For inſtance, if we render *ſcaber* by the Engliſh word *rough*, how ſhall we diſtinguiſh it from *aſper*, which has the ſame ſignification? We are therefore reduced to the neceſſity of rendering *aſper*, rough†; and of retaining moſt of the other Latin terms with Engliſh terminations, as *ſcabrous*, *hirſute*, *hiſpid*, &c. unleſs we would wantonly load the ſcience of Botany, and our Engliſh tongue, with terms newly invented or applied, which are not either more ſignificant, or more eaſy to be underſtood, than thoſe which we are already in poſſeſſion of.

As to the ſecond general principle, namely, that the terminations and plurals of our words, together with their compounds and derivatives, ſhould be adapted to the ſtructure and genius of the Engliſh language; it will not perhaps by many be thought of equal importance with the firſt. There is perhaps no language that is more irregular than ours, or that admits of more licenſe in many reſpects.

This however is no reaſon why, in the formation of new terms, we ſhould not follow ſuch fundamental rules as we have, avoid irregularities as much as poſſible, and add no freſh barbariſms to thoſe which already diſgrace us. The well known Horatian rule ‡ muſt be our conſtant guide in the formation of our terminations and plurals; and analogy muſt be attended to in the ſtructure of our compounds and derivatives. Thus *nectary* may be uſed for *nectarium*, *piſtil* for *piſtillum*, *ſtyle* for *ſtylus*, *pericarp* for *pericarpium*, *receptacle* for *receptaculum*, *capſule* for *capſula*, *glume* for *gluma*, *culm*

* As *lana* wool, *pili* hairs, *ſetæ* briſtles, *hami* hooks, *ſtimuli* ſtings, *aculei* prickles, *ſpinæ* thorns: *lanatus* may be rendered woolly, *piloſus* hairy, *ſetaceus* briſtly, *hamatus* hooked, *aculeatus* prickly, *ſpinoſus* thorny.

† If ſo, in order to preſerve the analogy, *exaſperatus* may be tranſlated *roughened*.

‡ "Et nova factaque nuper habebunt verba fidem, ſi
"Græco fonte cadant, parcè detorta.——

for

for *culmus*, &c. Some of theſe words, as *nectarium* and *pericarpium*, are become ſo familiar to learned botaniſts, that they will perhaps hardly be perſuaded to give up the Latin termination. The final in *a* may be admitted more readily; and *corolla* having uſe on its ſide, will doubtleſs be preferred by many to *corol*, which has not ſo melodious a ſound. Naturaliſts talk familiarly of a butterfly's *antenna*; and *cupola*, which in the laſt century was conſidered as a ſtranger, is in this admitted to be a denizen. I muſt obſerve, however, that by changing the final *a* into *e*, ſome confuſion will be avoided, which ariſes from not diſtinguiſhing the Latin feminine ſingular from the neuter plural; and by uſing *ſtipule* for *ſtipula*, we ſhall no longer hear of a leaf-ſtalk or petiole having two *ſtipula*.

But whatever allowance may be made in ſingular terminations, the plurals muſt certainly follow the analogy of the Engliſh tongue; and if we tolerate *corolla* and *anthera*, *nectarium* and *pericarpium*, we cannot poſſibly allow of *corollæ* and *antheræ*, *nectaria* and *pericarpia*; but we muſt uſe either *corollas* or *corols*, *antheras* or *anthers*, *nectariums* or *nectaries*, *pericarpiums* or *pericarps*, according as we preſerve the original term entire, or anglicize it.

All derivatives and compounds ought to follow the analogy of the original words from which they are derived, or of which they are compounded. Thus from *corol* we regularly form *corollet*, as from *crown*, *coronet*: if we adopt the terms *prickle* and *thorn*, we muſt uſe the adjectives *prickly* and *thorny*, not *aculeate* and *ſpinoſe*: from *glume* we form *glumoſe*; from *ament*, *amentaceous*; from *awn*, *awned* and *awnleſs*; from *axil* or *axilla*, *axillary*; from *pinna*, *pinnate*, *bipinnate*, &c. from *calyx* are formed *calycle*, *calycled*, *calycine*; from *petal*, *anther*, *berry*, we make the compounds *five-petalled*, *anther-bearing*, *berry-bearing*, not *bacciferous*; from *cell*, *two-celled*; from *leaf*, *two-leaved*; from *ſeed*, *two-ſeeded*.

Without, however, entering too much into the minuteneſſes of

this subject, suffice it to remark, that when we admit terms of art or science to participate in the rights of citizens, they should put on our garb, and adopt our manners. If this rule had always been observed, our language would not have been deformed with innumerable barbarisms, which learned and unlearned ignorance have joined to introduce among us; and which nothing but the constant habit of speaking or hearing them, can ever reconcile to our ears*.

It would be easy to add many more observations, but it is not my design to exhaust the subject. I have addressed these cursory remarks to you, Sir, as being at the head of a society, one of whose principal views is to promote English Botany; in hopes that some member of the society, who has more leisure than myself, may turn his thoughts to the subject, and handle it so fully, that all of us who are engaged in the same pursuit, may speak the same language.

I am,

Park Prospect, Westminster,
October 5, 1789.

SIR, &c.

THO. MARTYN.

* Such are *per-cent*, *per-annum*, *per-pound*, and *per-post*; *ipso facto*, *minutiæ*, *data*, *errata*, *in vacuo*, *vice versa*, *plus et minus*, *vis inertiæ*, *in equilibrio*, *jet-d'eau*, *aqua fortis*, *aqua vitæ*, *ignis fatuus*, *cæteris paribus*; *equivoque*, *critique*, *je-ne-sçai-quoi*, *sçavoir-vivre*, *outré*, *et cetera*, *et cetera*, *et cetera*.—It should seem that the mercantile world, the learned world, and the fashionable world, had formed a conspiracy to debase our sterling English by ill-made terms, affectedly introduced without the least necessity.

XVI. *Observations on the Genus of Begonia.* By *Jonas Dryander*, M. A. *Libr. R. S. and Member of the Royal Academy of Sciences of Stockholm, Fellow of the Linnean Society.*

Read November 3, 1789.

THE Genus of Begonia was firſt eſtabliſhed by Plumier, and publiſhed in 1700 by Tournefort, in the Appendix to his Inſtitutiones Rei Herbariæ, three years before the Nova Plantarum Americanarum Genera of Plumier appeared. From Tournefort, Linnæus introduced it in the firſt edition of his Genera Plantarum, among the Fragmenta, or ſuch genera as were not ſufficiently deſcribed to be referred to their proper claſſes; and in the ſecond edition it ſtill remains in the Appendix: but in the fifth and ſixth editions he refers it to Polygamia Monœcia, though without any alteration in the deſcription of the genus from that in the firſt edition. In the thirteenth edition of the Syſtema Vegetabilium this genus firſt found its proper place in the Linnean Syſtem, which is, Monœcia Polyandria.

Ludwig, in the firſt edition of his Definitiones Plantarum (1737), introduces it very improperly in his fifth claſs, Plantæ flore perfecto ſimplici regulari pentapetalo. But in the ſecond edition (1747) he gives it in the Appendix, among Fragmenta varia; and Boehmer alſo in the third edition (1760) refers it to Plantæ dubiæ.

Linnæus, in his Ordines Naturales, has ranged the Begonia in the fifth diviſion of the twelfth order, Holoraceæ, with Polygonum, Rumex, and others. Erxleben, in his Anfangsgründe der Naturgeſchichte, has claſſed it with nearly the ſame plants in his forty-ſecond order, called Vaginales; and Rüling, in his Ordines Naturales, has it in his thirty-third order, Polygona, which differs from Erxleben's Vaginales only in ſome of the genera referred to it.

Adanſon, in his Familles des Plantes, has joined it with a very different ſet of plants, in his thirty-ſecond family, which he calls Portulacæ. But Juſſieu, in his Genera Plantarum ſecundum Ordines naturales diſpoſita, juſt publiſhed, has given it among Plantæ incertæ ſedis; and juſtly ſays, "Genus nulli verè affine."

When Plumier firſt determined the genus, he referred to it ſix ſpecies; but the few words by which he diſtinguiſhed them, were not ſufficient, in the preſent ſtate of Botany, to diſcriminate ſpecies. Whence Linnæus, in his firſt edition of Species Plantarum, having then probably never ſeen a Begonia, joined all the ſpecies of Plumier, and one of Sloane, under the name of Begonia obliqua; and in the ſecond edition he added two more ſynonyms, one from Rumphius, and one from Browne: ſo that in fact Begonia obliqua contained, under one trivial name, all the ſpecies at that time known; and it is no wonder that this vague name has been applied by different botaniſts to almoſt any ſpecies of Begonia which occurred to them. Chevalier Lamarck in the Dictionnaire Encyclopédique, and M. Jacquin in the firſt volume of his Collectanea, were the firſt who attempted to bring this confuſed genus into ſome order; but neither of them had ſeen more than one ſpecies, and were obliged to make out the reſt merely from books.

A ſpecies of Begonia, which flowered in October laſt year (1788) in Mr. Lee's garden at Hammerſmith, made it neceſſary for me to ſtudy the genus of Begonia, for the purpoſe of determining that plant:

plant: and having an opportunity of comparing dried ſpecimens of ſeveral ſpecies, and the aſſiſtance of deſcriptions of ſome of them made on the ſpot by the late Doctors Solander and Kœnig, beſides the knowledge to be got from printed books, I was tempted to lay before the Society the reſult of my reſearches. Though I have ſeen ſpecimens of fifteen out of the twenty-one ſpecies I have determined, ſtill many of them were not ſo perfect in all their parts, as to enable me to give a ſatisfactory account of them; and the impoſſibility of determining with certainty ſuch fleſhy plants from dry ſpecimens, makes it ſtill more neceſſary to offer this only as a ſketch of the imperfect knowledge we have of this genus, in hopes of inciting ſuch botaniſts, as may hereafter have an opportunity of examining the living plants, to fill up the chaſms which ſtill remain. It muſt alſo be left to a future conſideration, when the different ſpecies ſhall be better known, if it would not be more convenient to divide this natural genus into ſeveral artificial ones; as it is almoſt impoſſible to give a general deſcription of the genus, there being ſo great a variation in the parts of fructification.

Conſcious of the impoſſibility of making good figures from imperfect dried ſpecimens of ſucculent plants, but ſtill wiſhing to give ſome aſſiſtance to thoſe who have no opportunity of ſeeing the ſpecimens I have uſed, I have given the outline of a leaf of moſt of the ſpecies, which were not figured before; and alſo a figure of the fruit, when I had a perfect one.

There ſtill remain ſeveral Begonias of which I have ſome knowledge, but not ſufficient to introduce them in this arrangement of the genus: thoſe will be found in an appendix at the end, under the title of Species obſcuræ.

It will be neceſſary to explain ſome terms made uſe of in my ſpecific differences:

Folium *inæqualiter cordatum*, cujus alter lobus major. (Malè *obliquum* dictum, cum terminus hic directionem folii, non figuram, reſpiciat.)

Folium *ſemicordatum*, cujus alter lobus obliteratus.

Capſulæ *alæ parallelæ*, dum alæ margo exterior lateri capſulæ parallelus eſt.

Rotundatæ, cum medio latiores.

Obtuſangulæ, ſupernè latiores, angulo rotundato.

Acutangulæ, ſupernè latiores, angulo acuto.

BEGONIA. *Tourn. Inſt.* 660. tab. 442. *Lin. Gen. Pl.* ed. i. n. 901. ed. vi. n. 1156. *Ludw. Def. Gen.* 1737. p. 49. 1747. n. 1044. 1760. n. 1266. *Adanſ. Fam.* p. 244. *Lam. Encycl.* i. p. 393. *Gærtn. Sem.* p. 156, tab. 31. *Juſſ. Gen.* p. 436.

(Dixit Plumier in memoriam D. Begon, Regi Galliæ ab intimis conſiliis et rei nauticæ præfecti in ora Santonum, cujus merita in rem herbariam me quidem latent.)

* *Maſculi Flores.*

CAL. nullus.

COR. *Petala* quatuor (in *octopetala* 6—9): quorum duo oppoſita majora, plerumque ſubrotunda (in *ferruginea* omnia ſubæqualia oblonga).

STAM. *Filamenta* numeroſa (15—100), receptaculo inſerta, breviſſima, interdum baſi coalita. *Antheræ* oblongæ, erectæ.

* *Feminei Flores*, plerumque in eodem cum maſculis pedunculo communi.

CAL. nullus.

COR. *Petala* plurimis quinque, aliis (4, 7, 18, 19, 21) ſex, aliis (8, 16) fortè quatuor, plerumque inæqualia.

PIST.

PIST. *Germen* inferum, triquetrum, in plurimis alatum. *Styli* plerisque tres, bifidi. *Stigmata* sex.

PER. *Capsula* plerisque triquetra, alata, trilocularis, basi secus alas dehiscens; aliis (5, 6) bilocularis; aliis (4, 18) fortè unilocularis.

Character Essentialis.

MASC. *Calyx* nullus. *Corolla* polypetala. *Stamina* numerosa.

FEM. *Calyx* nullus. *Corolla* polypetala, supera. *Capsula* alata, polysperma.

Habitus Generis.

Tota planta carnosa.

Caulis plerisque herbaceus, sed species quædam acaules.

Folia petiolata, in caulescentibus alterna.

Stipulæ ad basin petiolorum binæ.

Pedunculi plerisque dichotomi, in caulescentibus axillares.

Locus Natalis.

Inter tropicos, in Asia et America. In Africæ continente nulla species hucusque inventa, sed in insulis adjacentibus tres.

Species.

1. BEGONIA *nitida*, fruticosa erecta, foliis glaberrimis inæqualiter cordatis obsoletè dentatis, capsulæ ala maxima subrotunda.

Begonia nitida. *Hort. Kew.* iii. p. 352.

Begonia obliqua. *L'Herit. Stirp. Nov.* i. p. 95. tab. 46. (exclusis synonymis plurimis).

Begonia minor. *Jacqu. Collect.* i. p. 128. n. 3. descr. in p. 126*.

Begonia purpurea. *Swartz Prodr.* 86.

Habitat in Jamaica. *Gul. Wright.* ♄

This elegant shrub, which is now a common ornament to our hot-houses, was introduced here in the year 1777.

* *Icon.* vol. ii.

Dr.

Dr. Swartz informed me, by letter, that his B. purpurea is the common garden Begonia; but the ſynonym of Browne, which he quotes, cannot well belong to theſe ſpecies, as Browne's plant is ſcandent. I do not know if Begonia roſeo flore, folio aurito, minor et glabra, of Plumier (Begonia obliqua *β. Linn. Sp. Pl.*), which Jacquin and Swartz refer to this ſpecies, belongs to it; as it is impoſſible from theſe few words to know what plant he meant, in a genus, where the ſpecies are very difficult to diſtinguiſh from one another. Among a great many collections of plants from different Weſt India iſlands, which I have ſeen, I have never found B. nitida from any other iſland than Jamaica; and as Plumier had, as far as I know, not been in that iſland, I think it rather probable that he did not mean this ſpecies: beſides, the epithet of Minor is ill applicable to ſo tall a ſhrub, and which has as large leaves as any in the genus, except macrophylla and grandis.

However unwilling to change names, I could not adopt any of the trivial names given to this plant: *obliqua* is too vague, as Linnæus under the name of Begonia obliqua includes a great number of ſpecies, and it is even uncertain whether this be one of them; *minor*, as I have already remarked, applies ill to it; and *purpurea* ſtill leſs, as no part of it is of a purple colour.

2. BEGONIA *iſoptera*, cauleſcens, foliis glabris ſemicordatis obſoletè dentatis, capſulæ alis ſubæqualibus parallelis *.

Habitat in Java.

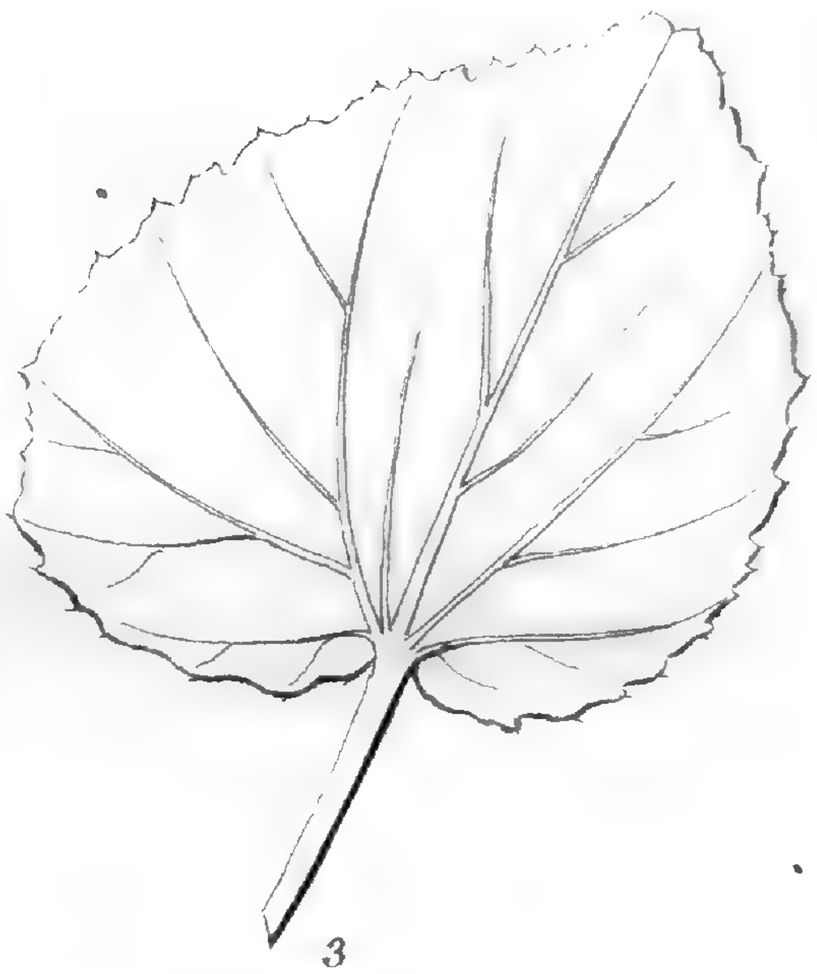
Of this we may ſoon expect a figure and deſcription in Dr. Smith's Icones Plantarum, from a ſpecimen in the younger Linnæus's Herbarium.

* *Smith Ic.* 43.

3. BE-

1

2



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3. BEGONIA *reniformis*, caulescens, foliis reniformibus angulatis dentatis, capsulæ ala maxima acutangula; reliquis parallelis minimis. TAB. 14. Fig. 1, 2.

Habitat in Brasilia, prope Rio de Janeiro, in rupium fissuris umbrosis. *Jos. Banks.*

Descriptio D. Doct. Solander.

" *Caules* carnosi, breves, crassitie digiti.

" *Folia* alterna, petiolata, latiora quam longiora, subreniformia, crenato-dentata, angulata: angulis 8—12, acutis, inæqualibus; basi cordata, altero latere minore.

" *Petioli* longitudine diametri longitudinalis foliorum.

" *Pedunculus* communis, spithamæus, terminatus *Cyma* bis dichotoma, dein tetrachotoma. *Pedicelli* dein umbellati.

" Floris masculi *Petala* quatuor, cruciata, patentia, alba: duo opposita majora, ovata, obtusa, integerrima, in medio extus convexa; reliqua dimidio minora, oblongo-lanceolata, acuta, parum carinata.

" *Filamenta* circiter triginta, filiformia, brevia, subæqualia, lutea. *Antheræ* lineari-oblongæ, filamentis longiores, longitudine petalorum minorum, erectæ, luteæ.

" *Pistillum* omnino nullum.

" Floris feminei *Petala* quinque, oblonga, subæqualia, patentia, parum concava, acutiuscula, alba.

" *Germen* inferum, ovatum, triangulare: angulis membranaceis: membrana anguli exterioris majore. *Styli* tres, bipartiti, villosiuscuIi. *Stigmata* simplicia.

" *Capsula* ovata, trigona, angulis membranaceis duobus interioribus æqualibus, minoribus; membrana anguli exterioris maxima, supernè in angulum acutum extensa; trilocularis: *loculis* cylindricis, basi dehiscentibus.

" *Semina* numerosissima, ovata, parva, receptaculo columnari crasso affixa."

4. BEGONIA *erminea*, cauleſcens, foliis cordatis acuminatis ſerratis, capſulæ ala maxima falcata; reliquis obliteratis.

Begonia erminea. *L'Herit. Stirp. Nov.* i. p. 97. tab. 47.

Habitat in Madagaſcar: in inſula Maroſſe intra ſinum Antongil, ſupra lapides ſecus rivulos. *Jo. Gul. Bruguiere.*

I know this ſpecies only from Mr. L'Heritier's deſcription and figure.

5. BEGONIA *crenata*, cauleſcens, foliis inæqualiter cordatis ſubrotundis obtuſis crenato-dentatis, capſulis bilocularibus. TAB. 14. Fig. 3.

Habitat in Indiæ Orientalis inſula Salſette, et prope Fort Victoria, in muris et rupibus. *Ant. Pantaleon Hove.*

"*Flores* pallidè rubri." *Hove.*

Floris *maſculi* petala quatuor, quorum duo oppoſita anguſtiora, vix breviora. Floris *feminei* petala quinque, quorum tria anguſtiora. *Stylus* unicus. *Fructus* hujus et ſequentis ſpeciei immaturos tantum vidi, eoſque malè ſiccatos, ut de figura alarum incertus ſim.

In Sir Joſeph Banks's Herbarium, are ſpecimens collected by Mr. Hove in the above-mentioned places.

6. BEGONIA *tenuifolia*, cauleſcens, foliis inæqualiter cordatis ovatis acutis angulatis obſoletè dentatis, capſulis bilocularibus. TAB. 14. Fig. 4.

Habitat in Pulo Pontangh, ſ. Prince's Iſland, prope Javam. *Joſ. Banks.*

Deſcriptio D. Doct. Solander.

"Floris maſculi *Corolla* tetrapetala, compreſſa, ex albido-incarnata, ſtriis rubris ornata. *Petala* per paria oppoſita: duo exteriora ovato-ſubrotunda, obtuſa, baſi parum cordata, diametro tri- vel

quadrilineari; duo interiora dimidio minora, ovato-oblonga, obtusiuſcula.

" *Filamenta* numeroſiſſima (100), receptaculo in conulum elevato inſerta, brevia. *Antheræ* ovatæ, erectæ, luteæ.

" *Piſtillum* nullum.

" Floris feminei *Petala* quinque, colore ut in mare, figura exteriorum maris: intimum reliquis minus.

" *Stamina* nulla.

" *Germen* incarnatum. *Styli* tres, glabri."

7. Begonia *ferruginea*, cauleſcens, foliis inæqualiter cordatis dentatis, floris maſculi petalis oblongis ſubæqualibus *.

Begonia ferruginea. *Linn. Suppl.* 419 (deſcr. Mutis). *Lamarck Encycl.* i. p. 395. n. 9. *Jacqu. Collect.* i. p. 128. n. i.

Habitat in Nova Grenada. *Joſ. Celeſt. Mutis.*

In the Linnean Herbarium is a leaf and ſome male flowers of this ſpecies; from which, together with the drawing of it by Dr. Mutis, Dr. Smith will give a figure in his next Faſciculus.

It is eaſily diſtinguiſhed from all other ſpecies which I know, by the long and narrow petals of the male flowers, all of the ſame breadth, and very little differing in length.

8. Begonia *grandis*, cauleſcens, foliis inæqualiter cordatis angulatis ſerratis, capſulæ alis parum inæqualibus.

Begonia obliqua. *Thunb. Japon.* 231. deſcr. *Ic. Kæmpfer.* tab. 20.

Sjukaido. *Kæmpf. Amœn.* 888.

Habitat in Japonia. *Engelb. Kæmpfer, Car. Petr. Thunberg.*

The male flowers alone are deſcribed by Dr. Thunberg, in his Flora Japonica; and by Kæmpfer, in his manuſcripts preſerved in

* *Smith Ic.* 44.

the Britiſh Muſeum (Sloan. MSS. 2915, p. 202); and the ſpecimen in the Linnean Herbarium has only male flowers: ſo that the only knowledge I have of the female flowers is from Kæmpfer's figure, in which the wings of the germen in ſeveral inſtances have an acute angle, but in others are rounded; for which reaſon I have avoided mentioning the ſhape of the wings, in the differentia ſpecifica.

Dr. Thunberg ſuppoſes this plant to be dioicous, but the figure of Kæmpfer has male and female flowers in the ſame panicle. This ſeeming contradiction may be reconciled by an obſervation I lately made. I wanted to examine the female flowers of Begonia nitida, and looked for them on plants in full flower, both at Kew and in the Marchioneſs of Rockingham's garden at Hillingdon; but could find nothing but male flowers, though it is very well known that the B. nitida is monoicous. This circumſtance is not peculiar to Begonias, as I have ſeen a large cedar-tree for ſeveral years full of male catkins, without a ſingle female one. Mr. L'Heritier alſo informed me that the female flowers are very rarely to be met with in Ailanthus glandulosa; and I have not yet been able to find any one in a large tree at Kew, which flowers very freely.

This ſpecies, and the following, macrophylla, have by far the largeſt leaves of any in the genus; but this has twice as large flowers as macrophylla.

9. BEGONIA *macrophylla*, cauleſcens, foliis inæqualiter cordatis crenato-dentatis: inferioribus angulatis, capſulæ alis obtuſangulis: una maxima.

Begonia macrophylla. *Lamarck Encycl.* i. p. 394, n. 6. deſcr. ex manuſcr. Plum.

Begonia grandifolia. *Jacqu. Collect.* i. p. 128, n. 2 (excluſo ſynonymo Brownei).

Begonia

Begonia purpurea et nivea maxima, folio aurito. *Plum. Ic.* 34, tab. 45, fig. 1.

Habitat in insulis Indiæ Occidentalis. *Car. Plumier, Joh. Ryan, Henr. de Ponthieu, Alex. Anderson.*

This species is both in Sir Joseph Banks's and the younger Linnæus's Herbarium. A specimen in the former Herbarium has, in the axilla of the lower leaf, a panicula consisting entirely of female flowers; and, from the axilla of the leaf above, a panicula of male flowers.

10. Begonia *acutifolia*, caulescens, foliis semicordatis angulatis dentatis, capsulæ ala maxima obtusangula; reliquis acutangulis.

Begonia acutifolia. *Jacqu. Collect.* i. p. 128, n. 4 (excluso synonymo Plumieri).

Aceris fructu herba anomala, flore tetrapetalo albo. *Sloan. Jam.* tab. 127, fig. 1, 2.

Habitat in Jamaica. *Hans Sloane, Franc. Masson.*

Sir Hans Sloane's description, in his History, vol. i. p. 199, agrees so ill with his figure and his specimens in the British Museum (Hortus Siccus, vol. iii. fol. 121), which I have compared with the specimens in Sir Joseph Banks's Herbarium, that I am rather inclined to believe, that he, confounding several species, has described one and figured another. The leaves are longer and narrower than he describes them, and not at all rough; having so very few hairs, that they might be called smooth. The specimens I have seen have no appearance of being from a creeping plant; they are all in fruit, and have no flowers.

This species comes very near to the following, but differs in the smoothness already mentioned, and in having longer footstalks, the length of one third or one fourth of the leaf; which, on the contrary, are so short in B. acuminata, as not to equal the angle of the leaf, which extends beyond the insertion of the footstalk.

11. Be-

11. BEGONIA *acuminata*, cauleſcens, foliis hiſpidis ſemicordatis acuminatis inæqualiter dentatis, capſulæ ala maxima obtuſangula; reliquis acutangulis. TAB. 14. Fig. 5, 6.

Habitat in Jamaicæ montibus cæruleis. *Jul. von Rohr, Gul. Wright.*

Floris *maſculi* Petala quatuor, quorum duo oppoſita minora. Floris *feminei* Petala quinque, quorum duo minora. Ad baſin germinis *bracteæ* duæ, argutè ferratæ, germine dimidio breviores.

Specimens are in the Herbarium of Sir Joſeph Banks *.

12. BEGONIA *humilis*, cauleſcens erecta, foliis hiſpidis ſemicordatis duplicato-ſerratis, capſulæ alis rotundatis parum inæqualibus. *Hort. Kew.* iii. p. 353. TAB. 15.

Habitat in Indiæ Occidentalis inſula Trinidad. *Alex. Anderſon.*

Deſcriptio.

Tota planta carnoſa, pellucida. Caulis, petioli et pedunculi pallidè rubentes. *Caulis* teres, geniculis tumidis, primo anno ſpithamæus, altero anno bipedalis. *Folia* ſemicordata, acuminata, duplicato-ſerrata: ſerraturis ciliatis; ſupra ſaturatè viridia, hiſpida e ſtrigis mollibus, erectis, baſi tuberculatis; ſubtus pallidè viridia, glaberrima præter ſtrigas rariores in venis, quales etiam in petiolis. *Stipulæ* ſemiovatæ, concavæ, ciliatæ, hyalinæ. *Pedunculi* axillares, ſæpius dichotomi. *Bractea* ad baſin pedicellorum ovata, ciliata, minuta. *Floris maſculi Petala alba:* duo cordato-orbiculata, magna; duo minima, quæ in quibuſdam floribus omnino deſunt. *Filamenta* circiter 15, breviſſima. *Antheræ* oblongæ, luteæ. *Floris feminei Petala* quinque, alba, perſiſtentia, obovato-oblonga: duo paulò anguſtiora. *Germen* trigonum, angulis acutis, alis rotundatis parum inæqualibus, pallidè carneis. *Styli* tres, breviſſimi. *Stigmata* bipartita: laciniæ divaricatæ, dein convergentes, et iterum divergentes, luteæ, tectæ glandulis minimis. *Capſula* figura germinis.

* This ſpecies has been introduced into the Royal Garden at Kew ſince the reading of this Paper.

When

Begonia humilis.

When this plant firſt flowered in Mr. Lee's garden at Hammerſmith, in October laſt year (1788), it was ſuppoſed to be annual, having produced flowers and fruits in a few months from its being ſown. It was then very low, as appears from the annexed figure, repreſenting a whole plant; and, ſuppoſing it to be then at its full height, I gave it the trivial name of *humilis*, in the Hortus Kewenſis. But it has ſince ſtood over the winter, and grown much taller.

13. Begonia *hirſuta*, cauleſcens, foliis hiſpidis ſemicordatis duplicato-ſerratis, capſulæ ala maxima obtuſangula; reliquis parallelis minimis.

Begonia hirſuta. *Aubl. Guian.* 913, tab. 348. *Lamarck Encycl.* i. p. 393, n. 3. *Jacqu. Collect.* i. p. 129, n. 8 (excluſo ſynonymo Plumieri).

Habitat in Guianæ rupibus. *Fuſée Aublet.*

The ſpecimen in Sir Joſeph Banks's Herbarium from Aublet is without fructification, ſo that my knowledge of the fruit is only from Aublet's figure. But it muſt be obſerved that the figures in his work are made at Paris from dry ſpecimens, as appears from the original drawings in Sir Joſeph Banks's library. In comparing them with the ſpecimens in his own Herbarium, now in the poſſeſſion of Sir Joſeph Banks, I have ſeveral times had occaſion to obſerve that they are not very faithful; and, in the inſtance of the two ſpecies of this genus figured there, the outline of the leaves is quite wrong: whence my ſpecific differences, made from the ſpecimens, will not be found to agree with his figures.

14. Begonia *Urticæ*, cauleſcens radicans, foliis utrinque hiſpidis inæqualiter ovatis duplicato-ſerratis, capſulis baſi tricornibus.

Begonia

Begonia Urticæ. *Linn. Suppl.* 420. deſcr. *Lamarck Encycl.* i. p. 394, n. 8. *Jacqu. Collect.* i. p. 129, n. 7*.
Habitat in America. *Joſ. Celeſt. Mutis.*

Dr. Smith will give a figure of this from a complete ſpecimen in the Linnean Herbarium.

15. BEGONIA *ſcandens*, ſcandens radicans, foliis ovato-ſubrotundis obſoletè dentatis, capſulæ ala maxima obtuſangula; reliquis parallelis minimis.

Begonia ſcandens. *Swartz. Prodr.* 86 (excluſo ſynonymo Plumieri).
Begonia glabra. *Aubl. Guian.* 916, tab. 349. *Lamarck Encycl.* i. p. 394, n. 4. *Jacqu. Collect.* i. p. 129, n. 5.
Habitat in Guiana, *Fuſée Aublet:* in Jamaica, *Gul. Wright, Rog. Shakeſpear, Ol. Swartz.*

I have adopted Dr. Swartz's trivial name in preference to Aublet's, becauſe the leaves are not quite without hairs.

In Sir Joſeph Banks's Herbarium are ſpecimens both from Guiana and Jamaica.

16. BEGONIA *tuberoſa*, repens, foliis inæqualiter cordatis angulatis dentatis, capſulæ alis parallelis.

Begonia tuberoſa. *Lamarck Encycl.* i. p. 393, n. 1.
Empetrum acetoſum. *Rumph. Amb.* v. p. 457, tab. 169, fig. 2.
Habitat in ſaxoſis inſularum Amboinæ, Moluccæ, et Celebes. *Ge. Ever. Rumphius.*

I know this plant only from Rumphius's figure and deſcription. Chevalier Lamarck has joined it with the Begonia capenſis of Linnæus's Supplement; but the capſules of that ſpecies have only two winged corners, one wing being very large: and there is every rea-

* Begonia urticæfolia. *Smith Ic.* 45.

ſon

Begonia tenera.

Mackenzie fec.t

ſon to ſuppoſe, from the figure and deſcription of Rumphius, that B. tuberoſa has all the wings of the ſame ſize, like the B. iſoptera.

17. BEGONIA *rotundifolia*, repens, foliis reniformi-ſubrotundis crenatis.

Begonia rotundifolia. *Lamarck Encycl.* i. p. 394, n. 7.
Begonia obliqua δ. *Sp. Pl.* 1498.
Begonia roſeo flore, folio orbiculari. *Tourn. Inſt.* p. 660. *Plum. Cat. Pl. Amer.* p. 20, *ic.* 33, tab. 45.
Habitat in India occidentali. *Car. Plumier.*

I have not ſeen any ſpecimen of this.

18. BEGONIA *nana*, acaulis, foliis lanceolatis, ſcapo ſubbifloro.

Begonia nana. *L'Herit. Stirp. Nov.* i. p. 99, tab. 48.
Habitat in Madagaſcar: in inſula Maroſſe intra ſinum Antongil, in lapidibus et truncis arborum. *Jo. Gul. Bruguiere.*

I have taken up this ſpecies only from Mr. L'Heritier's deſcription and figure.

19. BEGONIA *tenera*, acaulis, foliis inæqualiter cordatis, floribus umbellatis. TAB. 16.

Falkea tenera. *Kœn. Manuſcr. (in Bibl. Banks.)* vol. xvii. pag. 227.
Habitat in Zeylona. *Joh. Gerh. Kœnig.*

Deſcriptio D. D. Kœnig.

" *Folia* omnia radicalia, orbiculato-cordata, acuta, inæqualiter dentata, membranacea, tenera, ſupra fibrillis baſi glanduloſis, albis, pellucidis conſperſa; ſubtus fibrillis rarioribus præſertim ad venas adſperſa. *Petioli* teretes, erectiuſculi, glabri, adſperſi fibrillis rarioribus, rubri, foliis longiores, ſæpe pedales, craſſitie penna anſerina anguſtiores. *Scapi* erecti, teretes, læves, fibrillis adſperſi, car-

noſi, petiolis tenuiores et breviores. *Stipulæ* radicales, ovatæ, acuminatæ, concavæ, dorſo carinatæ, carnoſæ, albicantes, marceſcentes, ſemunciales. *Flores* umbellati, maſculis numeroſis, femineis paucis. *Umbellæ* interdum compoſitæ. *Bracteæ* ad baſin pedicellorum lanceolatæ, parvæ, caducæ. *Pedicelli* teretes, læves, fibrillis adſperſi, parum colorati, flore longiores. *Floris maſculi Petala* quatuor, nivea: *duo exteriora* cordato-orbiculata, extus fibrillis conſperſa, intus glabra, nervis obſoletis notata, ante floreſcentiam invicem adpreſſa, plana, ſub antheſi patentia; Petala *duo interiora*, cum exterioribus alternantia, ovata, acuta, utrinque glabra, exterioribus duas tertias minora. *Filamenta* baſi connata, numeroſa (50), capillacea, glabra, albicanti-viridia. *Antheræ* erectæ, clavatæ, filamentis longiores, petalis interioribus breviores, luteæ. *Floris feminei Petala* ſex, quorum tria exteriora, tria interiora, a maſculis non niſi numero diverſa. *Germen* clavatum, triquetrum, ad angulos alatum, fibrillis adſperſum. *Styli* tres, erectiuſculi, clavati, glabri, luteſcentes, petalis minoribus parum breviores. *Stigmata* reniformiter curvata, apicibus craſſioribus, pilis aureo-luteis tenuiſſimis præſertim ad apices obducta. *Capſula* turbinata, triquetra, alata, trilocularis. *Receptaculum* ſeminum membranaceo-trialatum. *Semina* utrinque ad alas adnata, numeroſa, globoſa, minima."

Dr. Kœnig quotes as ſynonym Soneri-ila *Rheed. Mal.* ix. p. 127, tab. 65; but the plant there figured has tripetalous hermaphrodite flowers, with three ſtamens and one ſtyle.

The annexed figure is from a dry ſpecimen in Sir Joſeph Banks's Herbarium.

20. BEGONIA *diptera*, acaulis, foliis inæqualiter cordatis, pedunculis dichotomis, capſulæ ala una maxima; altera anguſta; tertia obſoleta.

Begonia capenſis. *Linn. Suppl.* 420. *Jacqu. Collect.* i. p. 130, n. 9.
Begoniæ ſpecies capenſis. *Linn. Mant.* 502. deſcr. Kœnig.
Habitat in inſulæ Joannæ umbroſis, ad latera montium. *Joh. Gerh. Kœnig.*

The account of the capſules given in the above differentia ſpecifica, is taken from the manuſcript deſcription ſent by Dr. Kœnig to Linnæus, now in the poſſeſſion of Dr. Smith.

21. Begonia *octopetala*, acaulis, foliis cordatis quinquelobis, pedunculis dichotomis.

Begonia octopetala. *L'Herit. Stirp. Nov.* i. p. 101.
Habitat in montibus Limæ. *Joſ. Dombey.*

Of this I have neither ſeen ſpecimen nor figure.

Species Obscuræ.

1. Begonia *malabarica*, caulibus herbaceis, pedunculis axillaribus brevibus ſubtrifloris, fructibus baccatis. *Lamarck Encycl.* i. p. 393, n. 2.

Begonia *malabarica*, caule erecto, foliis obſoletè dentatis ſubtus hirſutis, pedunculis ſubtrifloris. *Jacqu. Collect.* i. p. 129, n. 6.
Tsjeria-narinampuli. *Rheed. Mal.* ix. p. 167, tab. 86.

No other ſpecies of Begonia being hitherto known, whoſe female flowers have only three petals, it requires the confirmation of modern botaniſts before one can truſt to the authority of the Hortus Malabaricus for ſo ſingular a circumſtance. I have ſeen ſeveral male flowers of Begonia humilis with only two petals, and why may not a ſimilar monſtroſity happen in female flowers?

2. Acetoſa Nigritarum ſeu Indorum Lingat. *Kamel Stirp. Luzon.* (*in Raii Hiſt.* vol. iii.) p. 14, n. 24. Icon in *Muſ. Britann. Manuſc. Sloan.* 4080, fig. 109.

This comes very near to the B. malabarica, ſo far as one can judge from the rude figure of Father Kamel *.

3. In a volume of drawings in Sir Joſeph Banks's library, made at Canton by a Chineſe, who had been inſtructed by the late Mr. Blake in the art of making botanical drawings, is a figure of a Begonia, under the name of *Tſou Hoy Tong*, which is related to grandis, but differs in the leaves not being angulated, and the margin being equally ſerrated. As only male flowers are repreſented in the drawing, it is impoſſible to determine it †.

4. Begonia *repens*, caulibus repentibus ad nodos radicoſis, foliis uniauritis, pedunculis axillaribus longis multifloris. *Lamarck Encycl.* i. p. 394, n. 5.

Begonia obliqua γ. *Sp. Pl.* 1498.

Begonia roſeo flore, folio aurito minor et hirſuta. *Tourn. Inſt.* 660. *Plum. Cat. Pl. Amer.* 20, *ic.* 34, tab. 45, fig. 2.

Chevalier Lamarck deſcribes this with white flowers, which, according to Plumier's name, ſhould be pink. He adds as a variety B. roſeo flore, folio aurito minor et glabra; and adds, ic. 45, f. 3: but that figure belongs to B. roſeo flore, foliis acutioribus, auritis et latè crenatis.

5. Begonia roſeo flore, folio aurito minor et glabra. *Tourn. Inſt.* 660. *Plum. Cat. Pl. Amer.* 20.

Begonia obliqua β. *Sp. Pl.* 1498 (excluſo ſynonymo iconum Plumieri).

I have before ſpoken of the uncertainty of this ſpecies, referred to B. nitida by Jacquin and Swartz.

* In this manner he ſigns his name to his letters to Petiver, preſerved in the Britiſh Muſeum, Sloan. MSS. 4081. The plant named from him ought therefore to be called *Kamelia* inſtead of *Camellia*.

† Tſieou-hai-tang. *Mem. ſur les Chinois par les Miſſionnaires de Pé-Kin*, iii. p. 443. Autumnal Hai-tang. *Groſier Deſcr. of China*, i. p. 503.

6. Be-

6. Begonia roſeo flore, foliis acutioribus, auritis et latè crenatis. *Tourn. Inſt.* 660. *Plum. Cat. Pl. Amer.* 20, *ic.* 34, tab. 45, fig. 3. Begonia obliqua ε. *Sp. Pl.* 1498.

7. Rumex ſylveſtris ſcandens, foliis cordato-angulatis ab altera parte majoribus. *Browne Jam.* 203.

8. Totoncaxoxo coyollin. *Hern. Mexic.* 195.

9. Begonia obliqua. *Gærtn. Sem.* p. 156, tab. 31.

XVII. *On*

XVII. *On the Genus of Symplocos, comprehending Hopea, Alſtonia, and Ciponima. By Mr. Charles Louis L'Heritier, of the Academy of Sciences at Paris, Foreign Member of the Linnean Society.*

Read January 5, 1790.

QUATUOR illa genera in unum complecti ſub nomine Symplocos planum mihi eſt. Utinam de claſſe necnon de ſpeciebus non minus certe pronuntiare poſſim!

Characteres tam eſſentialem quam naturalem primum exponam.

SYMPLOCOS.

Character eſſentialis.

CALYX ſuperus, quinquepartitus. Petala 5—10, baſi coalita.

Ordines plures filamentorum corollæ adnati. Germen inferum.

Drupa nuce tri-quinqueloculari.

Character naturalis.

CAL. Perianthium ſuperum, campanulatum, quinquepartitum: laciniis ſubrotundo-ovatis, concavis, villoſis, perſiſtentibus.

COR. quaſi monopetala, campanulata, calyce longior, receptaculo inſerta: petalis ſ. laciniis 5—10, ovatis, integerrimis, reflexis, baſi in tubum longitudine calycis coalitis, ſimul deciduis.

STAM.

STAM. filamenta numerosa, submonadelpha, s. basi inæqualiter connexa, linearia, plana, erecta, tubo corollæ adnexa vixque breviora, in plures ordines imbricata; exterioribus sensim longioribus latioribusque. Antheræ subrotundæ, biloculares, erectæ.

PIST. Germen inferum, turbinatum, apice subemersum. Stylus filiformis, longitudine staminum. Stigma capitatum, subquinquelobum.

PER. Drupa oblonga, oleæformis, unilocularis, calyce coronata.

SEM. Nux ejusdem formæ, striata, tri-quinqueloculari: nucleis teretibus, oblongis.

Car. Linnæus nomine primus Hopeam et Symplocon inter Polyadelphas, Aubletius Ciponimam et Linnæus secundus Alstoniam in Polyandria, collocavere. E characteribus genuinis supra deductis patet has omnes ad Monadelphiam et in unum genus revocandas esse. Symplocos, utpote antiquius, erit nomen genericum. Locum ordinis vindicat Symplocos hinc inter Gordoniam et Camelliam quibus germen est superum, inde inter Gustaviam et Carolineam quæ gaudent germine infero.

Species.

MARTINICENSIS. S. pedunculis subracemosis, foliis glaberrimis crenulatis.

S. martinicensis. *Linn. Sp. Pl.* 747. *Jacq. Am.* 166, t. 175, f. 68.

Habitat in Antillis. ♄

CIPONIMA. S. pedunculis multifloris, foliis integris subtus villosis.

Ciponima guyanensis. *Aubl. Guyan.* 567, tab. 226.

Habitat in Guiana. *Aublet. Patris.* ♄

Turiones admodum villosi. Folia subtus plus minusve villosa, sæpissimè integra, rarò laxissimè denticulata. Nuces quinqueloculares.

ARECHEA.

ARECHEA. S. pedunculis ſubquinqueflоris, foliis ſerratis nudiuſculis.
Arechea *vulgo*.
Habitat in ſylvis Peruæ. *Dombey*. ♄
S. Arechea intermedia eſt S. martinicenſis et Ciponimæ. Tres fortè ſunt varietates ejuſdem plantæ. Attendant Autoptæ.

TINCTORIA. S. floribus confertis ſeſſilibus, foliis glaucinis.
Hopea tinctoria. *Linn. Mant.* 105.
Arbor lauri folio, floribus in foliorum alis. *Cateſb. Car.* i. 54.
Habitat in Carolinâ. *Fraſer*. ♄

ALSTONIA. S. floribus ſubdecapetalis ſeſſilibus ſubternis.
Alſtonia theæformis. *Linn. Suppl.* 264.
Habitat in Americâ meridionali. *Mutis*. ♄

Dr. Olaus Swartz Symplocon octopetalam * nuper in Jamaicâ legebat, ſed deſcriptio inventori relinquenda eſt.

Calyx Alſtoniæ imbricatus refert bracteas Symplocos, quas pro calyce exteriori habere licet. Corollam monopetalam in Alſtoniâ dicebat Linnæus ſecundus, quia revera talis apparet in Symploco. Limbus octo-decem partitus in Alſtoniâ. Symplocos Swartzii eſt quoque octopetala. Filamenta Alſtoniæ tubo inſerta, imbricata, exteriora longiora, graphice repreſentant ſtamina Symplocos in plures ordines imbricatos, quorum interni breviores, diſpoſita. Germen ſuperum in Alſtoniâ addit Linnæus ſecundus, quia fructu ignoto tale diceres germen in Symploco, et tale habuere Jacquinus et Linnæus primus. De poſitione germinis in Ciponimâ Aubletius nihil habet.

* Nuperrime hanc evulgavit Swartz in ſuo Prodromo Plantarum Indiæ Occidentalis. Reponenda itaque inter congeneres pro ſextâ Symplocos ſpecie:
OCTOPETALA, S. floribus octopetalis. *Swartz. Prodr.* 109.
Habitat in Jamaicâ. *Swartz*. ♄

XVIII. *On the Genus of Calligonum, comprehending Pterococcus and Pallasia. By Mr. Charles Louis L'Heritier, of the Academy of Sciences of Paris, Foreign Member of the Linnean Society.*

Read January 5, 1790.

TOURNEFORTIUS peregrinator orientalis celeberrimus arbuſculam Polygono et Atraphaxi proximam detexerat in Armeniâ, cujus deſcriptionem et iconem in ſuo Itinere Orientali evulgavit ſub nomine *Polygonoides Orientale Ephedræ facie. Tourn. It.* ii. 356.

Linnæus ex eadem Polygonoide a Gronovio acceptâ genus Calligoni ſtabilivit.

Hiſce temporibus alteram ejuſdem generis ſpeciem in deſertis Mari Caſpio vicinis legit celeb. Pallas; ſed nec Polygonoidi Tournefortii nec Calligono Linnæi attendens, pro novo genere novam hanc Calligoni ſpeciem propoſuit in tomo ſecundo Itineris, ubi deſcriptionem et iconem videre licet ſub nomine *Pterococci aphylli* (pag. 738, t. v.). Mox ipſe Pallaſius huic errori alterum errorem in tomo tertio Itineris (pag. 536.) ſubjecit, ubi aſſerit ſuum Pterococcum eſſe Polygonoidem Tournefortii.

Car. Linné nomine ſecundus iterum plantam Pallaſii quaſi novum genus conſecrare tentavit, Pallaſio inventori coætaneo præclare merito de re botanicâ dicavit, nuncupavitque *Pallaſiam caſpicam* in ſuo Plantarum Supplemento. Ivit itaque inter botanicos et hortu-

lanos, Calligono fere ignoto, fama Pallaſiæ. Liceat tandem Calligonum contumelioſæ oblivioni eximere.

Calligonum in herbario Linnæano deſideratur; ſed Polygonoides quam vidi in herbario Tournefortiano, etſi Pallaſiæ herbâ et flore ſimillima, fructu admodum diſcrepat.

Tandem fatendum eſt nonnullos irrepſiſſe errores in icone Tournefortianâ, multa quoque deſiderari in charactere generico Linnæano. Exempli gratiâ, Tournefortius depingit ſtylum unicum dum 3 vel 4; ſtamina pauca dum circiter quindecim. Denique ex eadem icone crederes calycem et corollam ſimul exſtare, facile deceptus diſco viridi foliolorum calycinorum ita miſere expreſſo ut quaſi perianthium exhibeatur in Tournefortio, dum corolla nulla. Linnæus ſtigmata duo abſque ſtylo Calligono aſſignat, dum ſtyli tres vel ſæpius quatuor et totidem ſtigmata; numerum ſtaminum non prefixit; nec fructum graphice deſcribit.

Pauca quoque emendanda ſunt in optimâ Pallaſii deſcriptione. In Pterococco *folia omnino nulla* dicit Pallaſius, ſed revera adſunt in turionibus plantæ nunc in meo horto floriferæ et fructiferæ. Tournefortius, qui in Polygonoide depingit folia, forte tamen habuerat * pro naſcentibus ramulis proliferis, articulatiſque mox evaſuris; dum iſta folia ſunt caduca.

Nunc noſtris et anteceſſorum obſervatis fretus, Calligonum elucidare et firmare jam aggredior.

* D'où naiſſent au lieu de feuilles des brins cylindriques, epais de demie-ligne, verd de mer, longs d'un pouce ou 15 lignes, compoſés de pluſieurs pieces articulées bout à bout, ſi ſemblables aux feuilles de l'Ephedra qu'il n'eſt pas poſſible de les diſtinguer ſans voir les fleurs. *Tourn. Voyag.* ii. 356.

CAL-

CALLIGONUM.

Character eſſentialis.

CAL. quinquepartitus. COR. nulla. Filamenta circiter 16, baſi ſubcoalita. Germen ſuperum, tetraëdrum. Styli 4. Nux cruſtâ polypterâ S. polychætâ, unilocularis.

Character naturalis.

CAL. Perianthium monophyllum, baſi turbinatum, limbo quinquepartitum: laciniis ſubæqualibus, ſubrotundis, patentibus, demum obſolete reflexis, perſiſtentibus, duabus exterioribus paulo minoribus.

COR. nulla (niſi calycem dicas).

STAM. Filamenta circiter 16, divergentia, capillaria, inferne ſubincraſſata pubeſcentia, baſique leviter coalitâ germen nectarii inſtar ambientia, marceſcentia. Antheræ ſubrotundæ, biloculares, peltatæ.

PIST. Germen ſuperum, ovatum, tetraëdrum, acuminatum. Styli tres vel ſæpius 4, filiformes, patentes, baſi ſubcoaliti ſeu deſinentes in acumen germinis, filamentis vix breviores. Stigmata tot quot ſtyli, capitata.

PER. nullum (niſi cruſta nucis).

SEM. Nux corticata: cortice exſucco inſeparabili; oblonga, tetraëdra, tetraptera, unilocularis, evalvis: alis nunc membranaceis longitudinaliter bipartitis dentatis criſpis, nunc ſetoſis; ſetis ramoſis rigidis mollibus: nucleo ejuſdem formæ.

Species.

POLYGONOIDES. C. fructibus cancellatis, ſetis ramoſis rigidis.

C. polygonoides. *Linn. Spec.* 748.

Polygonoides orientale Ephedræ facie. *Tourn. Cor.* 47, *It.* ii. *p.* 356, *t.* 356.

Habitat in Armeniâ. *Tournefort.* ♄

COMOSUM. C. fructibus cancellatis, ſetis ramoſis mollibus.
Habitat in Ægypto, *Lippi*: Barbariâ, *Louiche Desfontaines.* ♄

Varietas forte præcedentis. Plantæ in omnibus ſimillimæ, ſed in plantâ Lippianâ fructus comoſior ſetis mollioribus, dum ſetæ diſtinctiſſimæ rigidiores in plantâ Tournefortianâ cujus unicum vidi fructum.

PALLASIA. * C. fructibus alatis, alis membranaceis criſpis dentatis.
Pterococcus aphyllus. *Pall. It.* ii. 738, *t.* 5. et iii. *p.* 356.
Pallaſia caſpica. *Linn. Suppl.* 252.
Habitat in Moſcoviâ ad Caſpium mare. *Pallas.* ♄

Frutex ſemiorgyalis, ramoſus, diffuſus, totus floridus, ſat ſpecioſus.

Rami alterni, teretes, reclinati, flexuoſi, articulati, ſubnodoſi, aphylli.

Turiones ad ſingula genicula numeroſiſſimi 6—10, confertiſſimi, faſciculati, juncei, nunc ſimplices nunc ramoſi, quorum pauci firmantur in ramos plures pereunt, ſubulati, articulati, læte virides ſ. fere glauci.

Folia alterna, ſeſſilia, ſolitaria ad ſingulas articulationes turionum, teretia, ſubulata, carnoſa, turionibus conformia, ſemiuncialia.

Stipula ſ. vagina membranacea, obſolete trifida, marcida, articulum ambiens, ut in Polygonis.

Flores laterales axillareſve, ſæpius terni ad ſingulum articulum, pedunculati, albi diſco laciniarum calycinarum vireſcente, fragrantes.

De cæteris conſulatur Pallaſii Iter, tom. ii. p. 738.

Herba admodum ſimillima in his tribus Calligonis, flores quoque conformes. Differentiæ ſpecificæ e ſolo fructu hucuſque eruendæ ſunt.

* Novum Pallaſiæ genus inter ſyngeneſiſtas vide apud *L'Her. Stirp.* ii. 39. t. 19. et *Ait Kew.* 3. p. 498.

XIX. *Obſervations on Polypodium Oreopteris, accompanied with a Specimen from Scotland. By Mr. J. Dickſon, Fellow of the Linnean Society.*

Read January 5, 1790.

THIS plant has been miſtaken by all our Engliſh botaniſts. By ſome it has been confounded with P. Thelypteris, by others with P. Filix mas; but it is very diſtinct from both. Doody, Dillenius, Ray, Hudſon, Lightfoot, Bolton, &c. have all fallen into the ſame error. For a full account of this plant I beg leave to refer to Vogler, who has written an entire diſſertation upon it, and calls it P. montanum. Wildenow gives it the ſame name. Ehrhart in his Plant. Crypt. Decas 3, No. 22, has publiſhed it by that of P. Oreopteris, which we prefer; as the name of P. montanum has been given to another ſpecies by Allioni. My opinion reſpecting this fern is ſupported by that of Sir Joſeph Banks and Mr. Dryander, as well as of Dr. Smith and Mr. Jacquin; and, as the diſſertation above alluded to may not be in every body's hands, I ſhall mention ſome of the moſt remarkable particulars in which this plant differs from P. Thelypteris.

1ſt. P. Thelypt. has a ſmall creeping root, of which ſee a good figure in Schmeidel's Icones Plant. t. xi. P. Oreopteris has a large ſcaly root, wrapped and tied together with ſmall ſtrong fibres which cannot be ſeparated without difficulty.

2d. When

2d. When P. Thelyp. grows old, the under ſide of the leaf is totally covered with the confluent fructifications, and the edges of the pinnulæ are reflexed or contracted. In P. Oreopt. the fructifications are always on the margins, both in a young and old ſtate, and never run into one another; the lobes oval and plain.

3d. The ſize of this plant is four times as large as that of P. Thelypteris, and the latter always grows in boggy places; whereas P. Oreopt. grows in dry woods, moors, and on hills, very rarely near water.

Linnæus, in Flo. Suec. ſays of P. Thelypt. *punctа minutiſſima diſperſa.*

I know of no figure of P. Oreopteris. Mr. Bolton has given a ſmall fig. t. 22, f. 2, which may be it; but as he has joined it with P. Thelypt. it is not worth notice*.

I have found it both in England and Scotland, moſt plentifully in the latter.

How Mr. Lightfoot could miſtake this fern, I cannot underſtand.

* Since the above was written, Mr. Bolton has, in a letter to Mr. Dickſon, acknowledged his P. Thelypteris to be the P. Oreopteris. His Acroſtichum Thelypteris (Fil. Brit. t. 43.) is the true Polypodium Thelypteris of Linnæus.

XX. *Account*

XX. *Account of a ſpinning Limax, or Slug. By Mr. Thomas Hoy, of Gordon Caſtle, Aſſociate of the Linnean Society.*

Read February 2, 1790.

IT is well known that ſeveral inſects, ſuch as Spiders and the Caterpillars of many ſpecies of Moths, can convey themſelves ſafely through the air, without wings, by means of ſilk lines or threads ſpun out of their own body: but it has not been obſerved (as far as I know) that any ſpecies, arranged under Linnæus's claſs of Vermes, is poſſeſſed of a ſimilar power of ſelf-conveyance. An inſtance occurred to me, about a year ago, which leaves me no room to doubt but that ſome of them can convey themſelves, at leaſt *downwards* from a conſiderable height, in that manner. In going through a plantation of Scotch firs, I obſerved ſomething hanging from a branch of one of them, at a little diſtance. As it ſeemed to be larger than any Caterpillar of the tribes *Geometræ* or *Tortrices*, that I was acquainted with, it attracted my particular notice. When I approached it, I found it to be a *Snail*, or rather *Slug* * ; and, at firſt, ſuppoſed that it had been ſhaken from the tree by wind, after having been entangled in a Spider's web, or among the ſilk lines of ſome Caterpillar. Upon obſerving it, however, more attentively, it was hanging by one line only, which was attached to its tail. This

* Limax.

line or thread, at the diſtance of one inch and a half from the animal, appeared to be as fine as thoſe ſpun by the *Aranea diadema*, but nearer to its body it was thicker; and, at its junction to the tail, was broad and flat, exactly correſponding to the tail itſelf. The Slug was four feet below the branch from which it was ſuſpended, and at the diſtance of four feet and a half from the ground; to which it was approaching gradually at the rate of an inch in about three minutes, ſlower conſiderably than its ordinary motion, either upon the ground, or even in aſcending the trunk of a tree; not ſo ſlow, however, as one would expect, if it is conſidered that a Slug is not furniſhed, like the inſects above mentioned, with a particular reſervoir of glutinous liquid, from which the ſilk lines are ſpontaneouſly and almoſt inſtantaneouſly emitted; but that the line, by which it deſcends, is drawn from that ſlimy, glutinous exudation gradually ſecreted from its pores, and covering its whole body. It ſeemed to require a great degree of exertion in the animal to produce a continued ſupply of this liquid, and to make it flow towards its tail. For this end it alternately puſhed out its head, and drew it back again below its ſhield; turned it as far as poſſible, firſt to one ſide and then to the other, as if thereby to preſs its ſides, and ſo to promote the ſecretion. This motion of the head in a horizontal direction to one ſide, made its whole body turn round; whereby the line by which it hung was neceſſarily twiſted, and from being flat became round. Beſides, it might perhaps tend to draw off the glutinous matter, and thus lengthen the line; which could ſcarcely be effected merely by the weight of the Slug, although that was pretty conſiderable, being between ſixteen and ſeventeen grains.

This Slug ſeemed to be of a ſpecies between the *Limax agreſtis* and *flavus*. Linn. Its ſpecific character might be,

LIMAX *(ſilans) cinereus margine flavo.*

Perhaps

Perhaps the ſhade of the fir-trees, and the wet foggy weather when I obſerved it, may have rendered the *Limax flavus* of a paler colour; therefore I cannot pretend abſolutely to introduce this, as a new ſpecies, to the acquaintance of the Linnean Society. But if the foregoing account exhibits a new inſtinct, or ſomething that has not been heretofore obſerved in the animal œconomy, it may perhaps not be below the notice of a Society inſtituted for promoting the knowledge of natural hiſtory.

ADDITIONAL NOTE,

By Dr. Shaw.

IT is conſiderably more than ten years ſince I had an opportunity of obſerving the phænomenon ſo accurately deſcribed by Mr. Hoy. Having never either before or ſince obſerved a ſimilar appearance, I was inclined to conſider it as a circumſtance merely accidental; but as it is thus confirmed by Mr. Hoy, there ſeems no reaſon to doubt that the animals of the genus Limax have a power of occaſionally managing their glutinous excretion in ſuch a manner as to ſerve the purpoſe of a thread in a direct deſcent.

The copy of my own Memorandum on this ſubject is as follows:

September 27, 1776.

" Sitting in an arbour about eight feet high, I was amuſed with a very uncommon ſpectacle, which I at firſt took for a Caterpillar

hanging by its thread, and reaching to within a foot of the ground, and therefore I did not much regard it; till on a nearer view I perceived it, to my great ſurpriſe, to be a ſmall Slug, about three quarters of an inch in length. It hung by the extremity of its tail, and gradually deſcended till it almoſt touched the ground, when I ſhook it off with my finger. The thread ſeemed to iſſue from the body of the animal; yet I never obſerved a ſecond or a former inſtance of any kind of Snail having the faculty of forming a thread."

February 6, 1791. GEORGE SHAW.

XXI. *De-*

XXI. *Deſcriptions of three new Animals found in the Pacific Ocean. By Mr. Archibald Menzies, Fellow of the Linnean Society.*

Read April 6, 1790.

1. ECHENEIS lineata. Tab. 17, Fig. 1.

E. CAUDA cuneata, ſtriis capitis decem, lineis albis utrinque duobus longitudinalibus.

Habitat in Oceano Pacifico, inter Tropicos, teſtudini adhærens.

The body of this fiſh is about five inches long; ſubulate, ſmooth, and of a dark brown colour; dotted all over with minute darker ſpots, and ornamented with two whitiſh longitudinal lines on each ſide, which begin at the eyes and end in the tail.

The under mandible is a little longer than the upper, and both are furniſhed with minute teeth. The clypeus on the top of the head has but ten tranſverſe ſtreaks, which is the chief diſtinction of this ſpecies.

B 10, P 18, D 33, V 5, A 33, C 14.

2. FASCIOLA clavata. Tab. 17, Fig. 2.

F. corpore teretiuſculo annulato rugoſo albido poſtice gibboſo.

Habitat in Oceano Pacifico, ſæpiùs in ventriculo Scombri Pelamidis.

This little animal is about two inches long, having a ſoft cylindrical body annulated with fine wrinkles; and towards the extremity it becomes ſpherically-gibboſe, ending in the anal aperture, and ſtrongly marked with tranſverſe *rugæ*. About two thirds of its length from this extremity, the ventral aperture protrudes; from which to the mouth it becomes very ſlender, and on the under ſide ſomewhat depreſſed.

In moving, it faſtens itſelf alternately by the ventral aperture and its mouth, raiſing its ſlender neck between them into an arched form like a leech, and in this manner drags its body along with a ſlow motion.

It is of a whitiſh colour, ſomewhat pellucid, diſcharging at its mouth a black-coloured fluid, which can eaſily be perceived through its body. I have often found it in the maws of the boneto, between the Tropics, in the Pacific Ocean.

3. HIRUDO branchiata.

H. depreſſa attenuata albida, ſetis lateralibus ramoſis utrinque 7, interaneis fuſcis bifidis perlucentibus.

Habitat in Oceano Pacifico, teſtudini adhærens.

The body, when moving, is about an inch long, of a whitiſh pellucid colour, ſoft, depreſſed, annulated with fine rugæ, and towards the head attenuated, having a row of ſoft pellucid branchy briſtles on each ſide, oppoſite to one another, making in all ſeven pair. The head is ſmall and truncated; but the other extremity is larger, round, and dilated. The entrails appear through the body, bifid, and of a dark brown colour.

This ſpecies was found in great abundance adhering to a turtle, in the Pacific Ocean, between the Tropics.

XXII. *Re-*

XXII. *Remarks on the Genus Veronica. By James Edward Smith, M. D. F. R. S. Preſident of the Linnean Society.*

Read May 4, 1790.

THE genus of Veronica is one of the moſt familiar to European botaniſts. Its generic character is among the cleareſt and moſt deciſive, and its ſpecies in general as well aſcertained as thoſe of moſt large genera. Nevertheleſs ſome of them are ſtill obſcure; and as this obſcurity has in many inſtances originated with the great Linnæus himſelf, the removal of it is only to be expected from the inveſtigation of his Herbarium and original manuſcripts.

The various remarks which I have made on this genus ſhall be the ſubject of the following Paper. Not that they are all that remain to be made, but they are all about which I am certain. As far as they go they will ſerve to correct long-eſtabliſhed errors, and will therefore be not quite unworthy notice; though they may hereafter be much increaſed, and perhaps corrected, by the enquiries of myſelf or others.

Dies diem docet.

I take the ſpecies on which I have any thing to remark in the order in which they ſtand in the fourteenth edition of Syſtema Vegetabilium.

3. V. *ſpuria* is Veronica ſpicata anguſtifolia. *C. B. Pin.* 246, as appears from the Sherardian Herbarium at Oxford.

10. V. *officinalis* β is moſt certainly a diſtinct ſpecies from the common α. It is plentiful on the Alps of Switzerland and France; and I have frequently compared it, in its native ſoil, with the common V. offic. growing in the ſame place.

I prefer the name of V. Allionii, which has been given it by Villars, to that of V. pyrenaica, by which Allioni has diſtinguiſhed it, as it is by no means peculiar to the Pyrenean Mountains. Its ſpecific character is as follows:

V. *Allionii*, ſpicis lateralibus pedunculatis, foliis oppoſitis ſubrotundis nitidis rigidis, caule glabro reptante.

Synonyms.

V. Allionii. *Villars, Plantes de Dauphiné*, v. ii. p. 8.
V. pyrenaica. *All. Flo. Ped.* 265, t. 46, f. 3.
V. No. 2. *Gerard. Flo. Gall. Prov.* 322.

Deſcription.

Root perennial, creeping.
Stem round, ſmooth, procumbent, creeping very far.
Leaves roundiſh, or obovate, firm, rigid, totally different in ſubſtance from thoſe of V. officinalis, ſmooth, ſhining, crenate, paler on the under ſide.
Spikes oval, denſe, on long footſtalks.
Flowers very numerous, violet-coloured, of a different figure from thoſe of V. officinalis.

Villars mentions a variety with hairy leaves and ſtem, which I have never ſeen.

12. V. *kamtſchatica*, Linn. Supp. 83, appears to me a variety of V. aphylla, only differing in the greater ſize of all its parts. The circumſtance

circumſtance of the hairs being articulated like a conferva, is common to both plants, as well as the ſerrated leaves. We may rejoice to get rid of ſo uncouth a trivial name as *kamtſchatica*; and indeed all trivial names taken from the countries of plants, are now generally laid aſide by the more accurate and ſcientific botaniſts.

15. V. *alpina* is now certainly known to grow in Britain, having been found in the Highlands of Scotland by Mr. Dickſon in 1786, and not before in this iſland; what has been taken for it being either a large variety of V. ſerpyllifolia, or V. fruticuloſa.

28. V. *multifida.* The ſynonym of Buxbaum applied by Linnæus to this plant, belongs in fact to V. orientalis, Hort. Kew.* The real V. multifida is only known by an original ſpecimen in the Linnean Herbarium from Siberia, by which it appears to be totally diſtinct from V. auſtriaca (with which moſt people confound it) and all the varieties of that plant. Its leaves are multipartite, their laciniæ pinnatifid, with the lobes decurrent.

Calyx quinquefid, perfectly ſmooth.

It appears not to turn black or brown in drying, as V. auſtriaca does.

The ſynonyms of Jacq. Flo. Auſtr. t. 329, quoted by Murray, ought of courſe to be excluded.

30. V. *latifolia.* To this ſpecies is now by common conſent referred the V. pſeudo-chamædrys of Jacquin, which indeed ſcarcely can be deemed even a variety. V. Teucrium and V. piloſa of Linnæus ſeem alſo to belong to the ſame ſpecies; but, as I

* V. heterophylla. *Saliſb. Ic.* tab. 4.

have no original ſpecimens of theſe two plants, I cannot determine the matter with abſolute certainty. The long deſcription of V. piloſa, Sp. Pl. 1664, is by Linnæus eraſed from his own copy, which looks as if he had not been quite clear in his ideas on the ſubject.

32. V. *agreſtis*, and

33. V. *arvenſis*, are both always found with white flowers in the environs of Rome.

37. V. *romana* ought certainly to be excluded. All its ſynonyms, in the firſt edition of Species Plantarum, belong to V. acinifolia; and the ſpecimen in the Linnean Herbarium, from which the ſpecific difference (as well as the deſcription, *Mant.* 317) was made, is moſt certainly nothing elſe than V. peregrina.
V. romana, *Allion. Flo. Ped.* No. 289, t. 85, f. 2, *Villars Dauph.* v. ii. p. 19, ſeems alſo to me to be a variety of V. acinifolia.

38. V. *acinifolia*. The figure of Vaillant is excellent.

39. V. *peregrina*. Its ſpecific character ought to be thus amended:
V. floribus ſolitariis ſeſſilibus, foliis oblongis obtuſiuſculis dentatis integriſque, caule erecto.

Fig. 407 of Flo. Dan. ſeems to be intended for this plant, but it is one of the moſt wretched that can be conceived; the leaves are there repreſented as ovate and acute. Moriſon's figure, § iii. t. 24, f. 19, expreſſes tolerably well the upper part of the plant with entire leaves.

This ſpecies is a native of Sweden and Denmark. I have alſo a wild ſpecimen gathered by Commerſon at Buenos Ayres.

The

The lower leaves are almoſt always obtuſely dentated; the upper ones among the flowers as conſtantly entire.

V. *biloba*, Mant. 2. 172, is accidentally omitted by Murray. It is the V. orientalis, Ocymi folio, flore minimo, of Tournefort's Corolla and Herbarium.

The ſpecific character and deſcription in Linnæus's Mantiſſa are very faulty; and the ſynonyms of Columna (*Ecphr.* t. 290) and C. Bauhin (*Pin.* 249) have no kind of affinity to the Linnean plant.

The following deſcription was made from the Tournefortian Herbarium, when I named the plant V. rubiacea; but as V. biloba is a good name already printed, it ought not to be changed.

V. floribus ſolitariis, foliis cordato-lanceolatis dentatis, calycinis æqualibus ovatis acuminatis trinerviis.

V. *biloba* Linn. excluſis ſyn. Bauh. & Columnæ.

V. arvenſis annua, Chamædryos folio. *Buxb. C.* 1, p. 24, t. 36.

Root fibrous, annual.

Stem three or four inches high, erect, branched, downy.

Leaves on ſhort footſtalks, cordato-lanceolate, acute, ſerrated, ſcarcely hairy.

Flowers ſolitary, on footſtalks, about the top of the ſtem and branches, alternate.

Bracteæ lanceolate, acute, entire, ſlightly ciliated, a little longer than the footſtalks of the flowers.

Calyx of the fruit much enlarged, of four leaves, ciliated, equal, ovate, acute, each marked with three nerves, and not unlike the leaves of ſome ſpecies of Rubia or Galium: they much exceed the corolla and capſule in length.

Corolla ſmall, white.

Capſule obcordate, downy.

Tournefort gathered this plant in the corn-fields of Cappadocia. It may be inſerted into the Syſtema Veg. next to V. acinifolia.

I ſhall conclude this paper with the two following ſpecies of Veronica, deſcribed at the ſame time from Tournefort's Herbarium.

V. *gentianoides* *, corymbo terminali hirſuto, foliis radicalibus lanceolatis acutis ſubcrenatis nudis.

V. orientalis erecta Gentianellæ foliis. *Tourn. Corol. et Herb.*

V. erecta Blattariæ facie. *Buxb. C.* 1, p. 23, t. 35.

Gathered by Tournefort in Cappadocia, by Buxbaum in Armenia: Dr. J. Sibthorp alſo found it in his tour to the eaſt.

This ſpecies ought to ſtand next V. bellidioides, to which it is next akin, though perfectly diſtinct.

Root perennial.

The *radical leaves* are oppoſite, lanceolate, acute, irregularly crenate, marked with three nerves, perfectly ſmooth, pale and ſomewhat cartilaginous in the margin, and very much reſemble thoſe of Gentiana acaulis. Thoſe on the ſtem are ſtrikingly different, obtuſe and hairy.

Stem aſcending, ſmooth below, hairy in the upper part.

Corymbus ſomewhat ſpiked, conſiſting of many flowers.

Footſtalks hairy.

Calyx hairy, quadrifid, equal.

Corolla large, beautiful, of a deep blue.

Antheræ heart-ſhaped, large.

* V. gentianoides. *Vahl Symb. Bot. p.* 1.

The

The figure of Buxbaum erroneouſly repreſents the plant altogether ſmooth, and the floral leaves acute.

V. *filiformis*, floribus ſolitariis, foliis cordatis crenatis pedunculo brevioribus, calycinis lanceolatis.

V. orientalis, foliis hederæ terreſtris, magno flore. *Tourn. Cor. et Herb. Buxb. C.* 1, p. 25, t. 40, f. 1.

Gathered by Tournefort in the eaſt. Buxbaum ſays it grows about hedges in Bithynia. It ſhould be placed next to V. hederifolia.

Root appears to be annual.

Stems filiform, procumbent.

Leaves alternate, on ſhort footſtalks, ſubrotundo-cordate, crenate, (not lobed or cut) notches about three on each ſide, clothed with a few ſcattered articulated hairs, as in V. hederifolia.

Flowers ſolitary, axillary, large.

Footſtalks filiform, downy, three times longer than the leaves.

Leaves of the *Calyx* equal, lanceolate, ſlightly downy.

Corolla twice as long as the calyx, ſpreading, blue.

Capſule obcordate, reticulated.

This plant is very like V. hederifolia in many reſpects, but is ſufficiently diſtinguiſhed from that ſpecies by its leaves being crenate and not five-lobed, the ſegments of its calyx lanceolate, not ovate, and by the very long filiform footſtalks of its flowers.

XXIII. *Descriptions of two new Species of Phalæna. By Mr. Louis Bosc, of Paris, Foreign Member of the Linnean Society.*

Read October 5, 1790.

1. PYRALIS tuberculana.

P. ALIS anticis grisеis fusco punctatis margine crassiori antice tritubercula to.

H. *Parisiis.* Larva in Hedysaro Onobrichide et Coronillâ coronatâ.

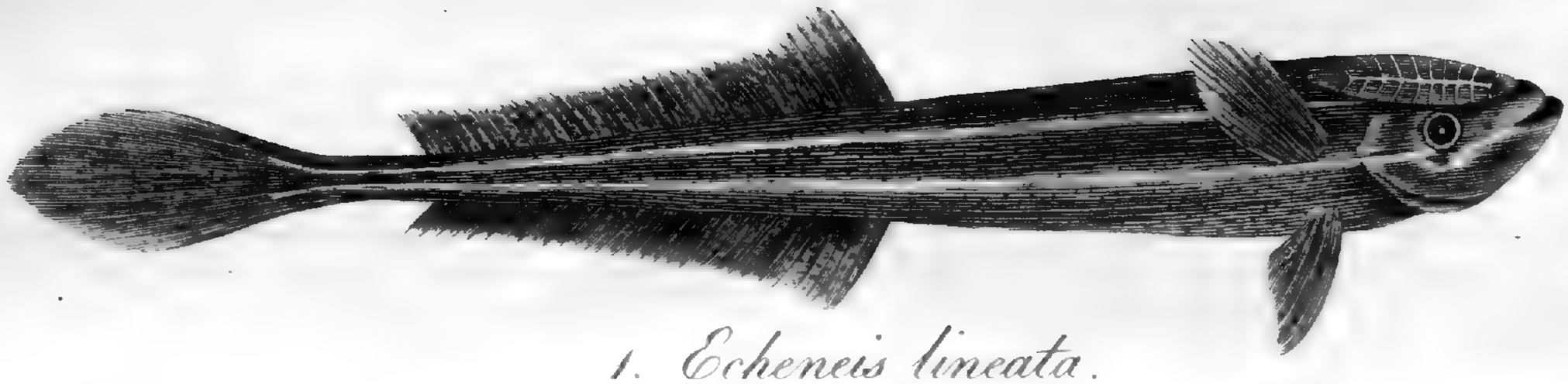
Larva fusco viridis. *Folliculum* sportæforme, e parenchymâ plantarum fabricatum et cauli affixum. *Pupa* Junio occurrit, et *Imago* Aprili sequentis anni.

Caput ex albo argenteum; *Palpi* compressi, fusci, albo punctati; *Antennæ* fuscæ basi subtus argenteæ et auriculatæ; *Oculi* nigri. *Thorax* argenteo-grisеoque varius, antice cristatus; *Crista* argentea, fusco-bifasciata; fascia anteriori minori. *Alæ* deflexæ; *Superiores* supra albæ, fusco grisеoque punctatæ et maculatæ; *Tubercula* tria seriem formantia margine antice crassiori, omnia æqualia non scabra, dimidio alba et fusca. *Alæ* inferiores pallide fuscæ, puncto centrali nigro. *Pedes* fusci, albo annulati.

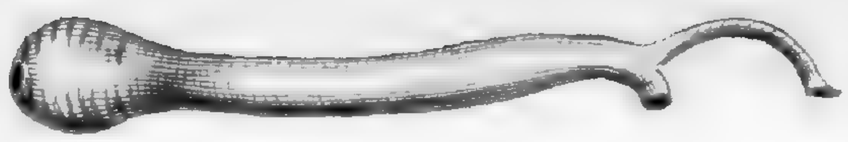
Tab. 17. Fig. 4. Pyralis tuberculana.

5. Folliculus pupam continens.

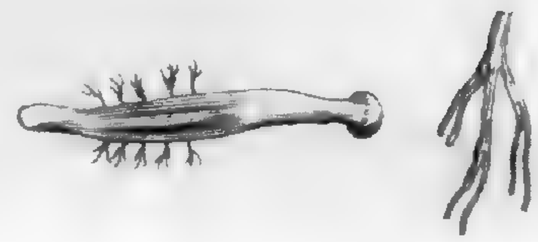
2. TI-



1. *Echeneis lineata.*



2. *Fasciola clavata.*



3. *Hirudo branchiata.*

4

5

Phalæna Pyralis Tuberculana.

6

7

Phalæna Tinea Sparrmannella.

2. TINEA Sparrmannella.

T. Alis violaceo-nitentibus maculis numeroſis aureis, majori ad marginem tenuiorem.

H. *Pariſiis.* Capitur æſtate in paludibus.

Caput nigrum, hirſutiſſimum; *Antennæ* fuſcæ, filiformes. *Alæ anticæ* violaceo-nitentes aureo-maculatæ. Maculæ numeroſæ, angulatæ vel irregulares, ſupra diſcum adſperſæ, tamen ad faſcias formandas tendentes; duodecim circiter ad marginem craſſiorem, et una major in medio ad tenuiorem. Subtus, ſicut *alæ poſticæ*, auratoviolaceæ. *Pedes* fuſco argentei.

Locus in Syſtemate poſt Tineam Mouffetellam.

In memoriam peregrinatoris celeberrimi Andreæ Sparrmann, Suecici, in botanicis et zoologicis verſatiſſimi.

Inſectum pro mole inter ſplendidiſſima.

Tab. 17. Fig. 6. Inſ. magnit. nat.

7. Id. auctum.

XXIV. *The Botanical Hiſtory of the Genus Dillenia, with an Addition of ſeveral nondeſcript Species. By Charles Peter Thunberg, Knight of the Order of Waſa, Profeſſor of Botany and Medicine in the Univerſity of Upſal, Foreign Member of the Linnean Society.*

Read December 7, 1790.

INTER arbores illas Indicas, quarum figuras et deſcriptiones nobiſcum communicarunt illuſtriſſ. Rheede in Horto Malabarico et Rumphius in Herbario Amboinenſi, DILLENIÆ Genus certe adeo ſpecioſum ſeſe offert, ut ulterius et accuratius noſtrum examen merito mereri videatur. Hujus ſpeciem non niſi unicam, à Rheede ab *Ouds Hoorn* commemoratam, illuſtris à Linné in Syſtemate ſuo ſexuali collocavit, ac minus juſte huc retulit *Songium* Rumphii, qui quidem, uti etiam ejus *Sangius* valde diſſimiles et diſtinctæ ſunt, atque ſic etiam tres diverſas conſtituunt ſpecies. Poſtea, ſub meis in inſula Ceilona excurſionibus botanicis, tres alias et quidem valde ab invicem diſtinctas ſpecies indagare mihi contigit, ſic ut ſex ſint, quæ ſub Dilleniæ pulcherrimo genere, jam militent ſpecies. Has omnes, breviter deſcriptas, novaſque depictas, non indignas fore credidi, quæ inſerantur Actis Societatis, quæ non modo pro incremento Hiſtoriæ Naturalis, et imprimis Botanices, ſed etiam pro ulteriori ejus reformatione ſedulo vigilare ſibi propoſuit.

Character generis, in Generibus Plantarum Linnæi allatus, vituperandus omnino non eſt, licet ill. botanicus ipſe ipſam non vidiſſet

Dillenia integra.

plantam vivam vel ſiccatam, ſed ex deſcriptione et figura Rheediana illam deſcripſiſſet, et licet, quoad reliquas ſpecies, parum emendandus erit.

CAL. *Perianthium* pentaphyllum: *foliola* obovata, obtuſa, concava, coriacea, intus glabra, extus villoſa, perſiſtentia.

COROLLA pentapetala, decidua. *Petala* obovata, inferne attenuato-anguſtata, obtuſiſſima, tenuiſſime ſubcrenata, concaviuſcula, calyce longiora.

STAM. *Filamenta* ſubnulla, ſed

Antheræ numeroſiſſimæ, germinis baſi inſertæ, lineares, aurantiacæ, linea nigra exaratæ, calyce breviores.

Pollen flavum.

PIST. *Germen* ſuperum, ovatum.

Styli plures, erecti, ſimplices, antheris longiores.

Stigmata ſimplicia.

Fructum maturum videre non licuit.

Species.

1. D. *integra*: (TAB. 18.) foliis obovatis obtuſis ſubintegris, pedunculis unifloris.

Creſcit in inſula *Ceilona*, Indiæ Orientalis.

Ceilonenſibus: Gudapara et Runumidale.

Arbor ramis alternis, rugoſis, fuſcis, glabris.

Folia alterna, petiolata, obovata, obtuſa, a medio ad apicem ſerrulata ſerraturis obſoletis vixque manifeſtis, utrinque glabra, coriacea, ſupra viridia, ſubtus pallidiora, nervoſa nervis alternis parallelis ſurſum curvis, utrinque inter nervos tenuiſſime reticulata, patentia, ſubſpithamæa, palmam lata.

Petioli ſemiteretes, canaliculati, villoſi, pollicares.

Flores

Flores in ultimis ramulis terminales, ſubſolitarii, pedunculati.

Uſus: Decocto foliorum utuntur Ceilonenſes ad ulcera depuranda.

2. D. *ſpecioſa*: foliis oblongis, rotundato-acutis denticulatis, pedunculis unifloris.

Creſcit, ut aſſeverat Rheede, in *Malabaria*; in *Java* ipſe inveni creſcentem.

Dillenia Indica, Linn. Syſt. Veget. xiv. p. 507, Spec. Plant. p. 754, excluſo ſynonymo Rumphii.

Syalita Malabaris, Rheede Hort. Malabar. tom. iii. p. 39, tab. 38, 39.

Arbor excelſa ramis craſſis, rugoſis, cinereis, glabris.

Folia alterna, petiolata, oblongo-rotundata, obtuſa cum acumine, undato-denticulata, parallelo-nervoſa nervis ſuboppoſitis, ſupra glabra, ſubtus obſcura, fuſceſcentia, ſubpedalia, palmam lata.

Petiolus craſſus, brevis, vix pollicaris.

Flores terminales in ramulis, ſolitarii, pedunculati.

3. D. *elliptica*: foliis elliptico-ovatis acutis ſerratis, pedunculis unifloris.

Creſcit, ex auctoritate Rumphii, in *Amboina*, *Celebe*, *Macaſſaria*.

Songium Rumph. Herbar. Amboin. tom. ii. p. 140, tab. 45.

Folia alterna, petiolata, elliptica, acuminata, argute ſerrata, nervoſa: nervis oppoſitis, parallelis.

Flores terminales, ſolitarii, pedunculati.

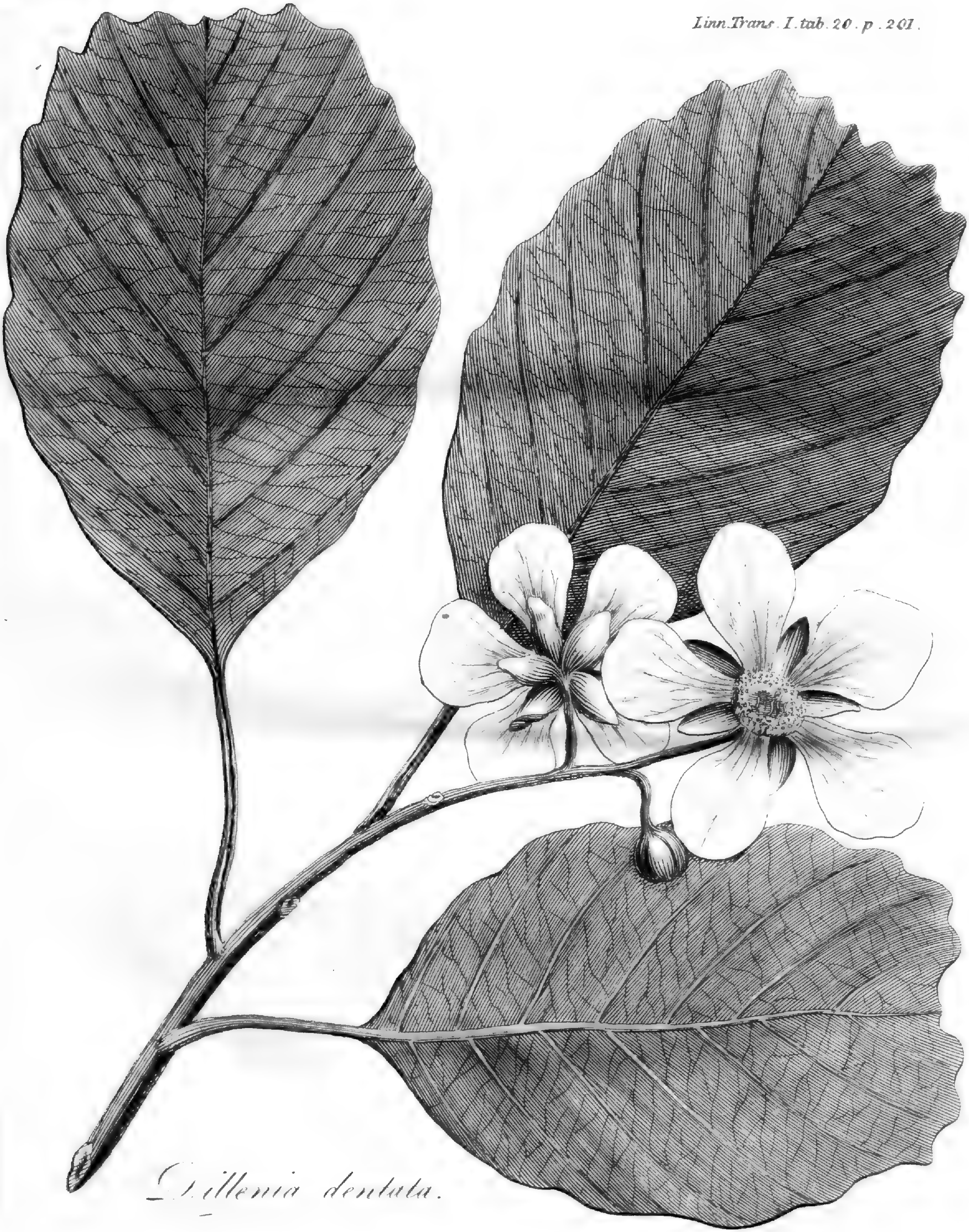
4. D. *retuſa*: (TAB. 19.) foliis obovatis truncatis ſerratis, pedunculis unifloris.

Creſcit in Ceilonæ ſylvis.

Arbor ramis alternis, rugoſis, fuſcis, glabris.

Folia alterna, approximata, petiolata, obovata; inferne attenuata, integra;

Dillenia retusa.



Dillenia dentata.

integra; ſupernè remotè ſerrata ſerraturis obſoletis; apice truncata, ſubretuſa; coriacea, utrinque glabra, nervoſa: nervis parallelis, alternis, ſurſum curvatis; inter nervos tenuiſſimè reticulata, patentia, palmam ferè lata, et duplo longiora.

Petioli ſemiteretes, canaliculati, baſi hirſuti, vix pollicares.

Flos terminalis, ſolitarius, pedunculatus.

5. D. *ſerrata*: foliis elliptico-ovatis acutis ſerratis, pedunculis trifloris.

Creſcit, ſecundum Rumphium, in *Celebe*, *Macaſſaria*, *Java*.

Sangius, Rumph. Herbar. Amboin. tom. ii. p. 142, tab. 46.

Folia alterna, petiolata, elliptica, acuta, argutè ſerrata, nervoſa: nervis ſuboppoſitis et alternis, parallelis.

Flores in pedunculis lateralibus terni, pedicellati.

6. D. *dentata* (Tab. 20): foliis ovatis retuſis dentatis, pedunculis trifloris.

Creſcit in *Ceilona*.

Ceilonenſibus: Diapara.

Arbor ramis alternis, rugoſis, cinereis, glabris.

Folia alterna, petiolata, ovata, obtuſiſſima ſeu emarginato-retuſa, infernè integra, ſupernè et apice dentata, coriacea, nervoſa: nervis ſuboppoſitis, parallelis, ſurſum directis, utrinque glabra, ſupra viridia, ſubtus obſcuriora, palmaria.

Petioli angulati, glabri, folio paulo breviores.

Flores in ramis terminales, racemoſi, ſubterni.

Pedicelli alternі, glabri, ſemipollicares.

XXV. *The Botanical History of Trifolium alpestre, medium, and pratense.*

By Adam Afzelius, M. A. Demonstrator of Botany in the University of Upsal, Foreign Member of the Linnean Society.

Read November 2, 1790.

WITH a view of publishing a new edition of the *Flora Suecica* of the late illustrious Linnæus, I have long been occupied in procuring information concerning the Swedish Plants. Having spent ten years in this pursuit, I flattered myself with the idea of knowing all those described by him, a few only excepted, which I could not perfectly make out. But on my arrival in this country I found myself in an error; having met with many of the most common plants in Sweden, which in England bear quite different names. This discovery opened to me a new field of study and labour. It was necessary to examine whether the English or Swedish botanists understood by the true names the plants described by Linnæus. It would indeed be an inexcusable fault in the Swedish ones, if they, who had constant access to, and were tutored by, their master himself, should nevertheless be always in the wrong in such cases; accordingly we find the foreign natural historians now and then likewise mistaken.

This is the less surprising, as, in the first place, Linnæus has often misquoted synonymous names from the ancient authors; and, in the second place, when he has not given the description of the plants,

plants, his characteriſtics alone, being ſhort and conciſe, will not always ſuffice to diſtinguiſh his plant from all others. This difficulty is great where there is no recourſe to the ſpecimen itſelf which he deſigned by ſuch a name. A plant might be found in this country, for inſtance, which Linnæus never knew; which nevertheleſs might agree perfectly with the characteriſtics of one in his ſyſtem, though it differed very eſſentially from it in many other reſpects: this might give riſe to miſtakes; as has frequently been the caſe.

If Linnæus has been the involuntary cauſe of ſuch confuſion, he has, however, a claim to our indulgence; for, independent of his want of leiſure for minutely inveſtigating every appellation given each plant by various botaniſts, he could not, in claſſifying nature, derive any aſſiſtance from preceding authors, as theſe in general furniſhed him but with a vague and confuſed ſound of terms, owing to their own ignorance and careleſſneſs, whereby they have ſtrangely miſtaken and confounded many very different plants. This has particularly been the misfortune of that inaccurate compiler Caſpar Bauhin, and in a great meaſure alſo of Haller; ſo that, in conſulting the former eſpecially, one is always uncertain what he means. Another conſideration is, that Linnæus at that time had no figures to refer to, except thoſe of old authors, which at times are only cuts in wood, and for the moſt part ſo badly executed, that it is a hard matter, and ſometimes even impoſſible, to pronounce which plant they are preciſely meant to repreſent; eſpecially when the queſtion is of two ſpecies nearly related.

But, be this as it may, I find that the wrong quotations of Linnæus have often led other authors into error; owing apparently to their having paid more attention to his citations than to his very characteriſtic deſcriptions of plants, which however are the chief things to be conſidered; and, if maturely weighed, ſufficient to pre-

vent many miſtakes. I ſhall do myſelf the pleaſure of communicating ſucceſſively my obſervations relative to caſes of this nature; but at preſent ſhall confine myſelf to three ſpecies of Trefoil, which, common as they are, particularly two of them, ſtill want a good deal of illuſtration. Theſe plants have, even till this very time, not only been confounded among themſelves, but alſo with many others. And though we are now furniſhed with good figures of each, ſtill the true limits between them are not yet drawn; nor have theſe ſpecies as yet been ſo minutely and accurately examined, as for the always invariable and diſtinguiſhing characteriſtics of each to have been pointed out.

In order to form an adequate idea of theſe Trefoils, and to know their hiſtory from the beginning to the preſent time, I have examined all authors quoted by Linnæus, Reichard, Murray, and the Engliſh botaniſts, with many others that I have been favoured with an opportunity of ſeeing in the large and choice library of Sir Joſeph Banks; without which aſſiſtance, and the examination of the Linnean Herbarium, my enquiries would have been confined and imperfect. In the courſe of my inveſtigations I have diſcovered, that many of the authors cited treat of plants quite different from thoſe for which they have been quoted; and that others ſpeak in ſuch a manner, that it is impoſſible to judge to what particular ſpecies their inaccurate figures, confuſed deſcriptions, and vague characteriſtics, if at times even all three are to be found together, are the moſt applicable. With regard to thoſe authors who have either been miſtaken themſelves in their quotations, or been miſquoted by others, I have, to the beſt of my judgment, endeavoured to put them in their proper places: and, as to the others, I could do no more than make my obſervations, and give my opinion, where particular hints or circumſtances have not enabled me to diſcover what they

they meant. Upon the whole, indeed, theſe authors are of a local uſe only, in pointing out to their own countrymen the places where their native plants are to be found.

In the firſt place, therefore, I beg leave to give a brief hiſtory of each of theſe three Trefoils, and ſhew with which each of them has been, and ſtill is, confounded, together with my reaſons for what alterations I may have made. In the ſecond place, I ſhall quote the genuine ſynonyms of authors, whom I am by ſufficient reaſons convinced to have treated of theſe plants. And, thirdly, I ſhall add an adequate deſcription of each, with particular characteriſtics ſufficient at all times to diſtinguiſh them from each other, and from the ſpecies neareſt related to them. To begin then with

TRIFOLIUM ALPESTRE.

Cluſius is, to my knowledge, the firſt who mentions this Trifolium, in his Hiſtory of the Hungarian and Auſtrian Plants. He has left us no figure; but his deſcription, brief and imperfect as it is, ſtill ſuffices to convince us that he meant the real one. He ſays that, both in ſhape and ſize, it much reſembles the preceding, which is either Tr. *pannonicum* or Tr. *montanum*; but that its leaves are ſomewhat more narrow; its flowers red, and without ſmell; its ſpikes in general two in number, one of which is ſmaller than the other, and both of them cloſe together at the top of the ſtalk, without peduncles, and as it were concealed within the uppermoſt leaves. This deſcription he has afterwards introduced unaltered into his larger Hiſtory of Rare Plants.

Caſpar Bauhin has quoted both theſe paſſages of Cluſius under his *Trifolium montanum purpureum majus*, in his Pinax; from which it indeed appears probable that he meant the ſame plant, but it is not quite certain; as he adds, *Trifolii altera ſpecies major*, Geſn. and

Trifolium

Trifolium aliud montanum majus, Thal. who appear to treat of ſpecies different from thoſe of Cluſius. Geſner ſays only that his Trifolium is larger and more common than *pratenſe:* but theſe remarks, though brief, give more reaſon to ſuppoſe he meant *Trifol. medium*, than *alpeſtre*; which latter is rather a ſcarce plant, and but little reſembling our common clover. On the other hand, Thalius deſcribes his Trifolium as having *oblongum quaſique ſpicatum capitulum*; adding that the Trifol. ſpicatum, which Tragus calls *Cytiſus*, only differs from it by having longer leaves as well as ſpikes. Now the Cytiſus of Tragus being *Trifol. rubens* α, it is alſo probable that the plant of Thalius is its variety β; and if this be the caſe, C. Bauhin would have done better had he placed this quotation under his *Trifolium ſpica oblonga rubra*. Perhaps this author, never ſcrupulous in his quotations, meant, however, by his firſt-mentioned Trifolium, the real *alpeſtre*.

But, at all events, Bauhin has been indiſcriminately quoted by every ſucceeding writer that had occaſion to treat of either *Trifolium alpeſtre* or *medium*. Among the authors more immediately ſucceeding him, I have had an opportunity of conſulting John Bauhin, Ray, Ruppius, Tournefort, and Boerhaave. Both the firſt-mentioned, in their Hiſtoriæ Plantarum, have copied the deſcription of Cluſius; and thus there is no doubt but their Trifolium was the true *alpeſtre*. But Ray has made a miſtake in adding *Ger. Em.* 1186. 4, and *Park.* 1103. 1; for both theſe treat of *Trifolium ſpica oblonga rubra, C. B.* under which name he has likewiſe quoted them, and conſequently twice on the ſame page, and under two different ſpecies. Here I muſt alſo notice another miſtake committed by Ray, or rather, perhaps, by his editor Dillenius. In his Hiſtory, aswell as both the firſt editions of his Synopſis, he has deſcribed a Trifolium which is the real *medium*, without referring to

any preceding author. But in the third edition we find quoted ſuch as have intended the *Trifol. alpeſtre.* Ruppius has done the ſame, remarking at the ſame time that his *Trifolium ferè ſimile eſt illi quod ſeritur in agris ad jumentorum pabulum*; and thus it can be no other than the *medium.* Tournefort and Boerhaave, as uſual, have no deſcription, and conſequently we cannot judge but from their quotations; and if they knew the meaning of their authors, they certainly intended the *alpeſtre.* Yet Boerhaave has added *Moriſ.* 2. 139. 1, which is certainly an error, as Moriſon there treats of *Trifol. rubens* β.

Among recent authors, I mean ſuch as wrote after the reformation of botany by Linnæus, and until he named the *Trifol. alpeſtre*, I have ſtudied Van Royen, Haller, Scopoli, and Hudſon. The firſt of theſe has given us only the ſpecific differences of his plants, which afford no great information; but ſtill, in calling its *folia ovato-oblonga, integerrima*, he ſeems rather to hint at the *Trifol. medium.* That Haller, Scopoli, and Hudſon had alſo this in view, is beyond a doubt, as I ſhall ſoon prove. I will juſt obſerve here, that Haller, under this head, has not only brought in ſeveral varieties, which indeed I have not ſeen, but that appear to be different ſpecies; but, according to his uſual practice, has injudiciouſly huddled together a vaſt number of ſynonyms, particularly in his Stirpes Helveticæ, which belong to at leaſt three ſeparate ſpecies of Trifolium, viz. *rubens* β, *alpeſtre*, and *medium.*

Nearly the ſame confuſion is obſervable in his edition of Ruppius; for, after having copied the above-mentioned deſcription of *Trifol. medium* by that author, he adds a circumſtance that belongs to the *rubens.* I have at leaſt not yet ſeen any ſpecies beſides this laſt, of which it can be ſaid, *vaginis petiolorum floralium latioribus a vulgari pratenſi differt.* That Haller alſo really meant the *rubens*, I am further induced to believe, from his having, in this edition, left out

Trifolium

Trifolium montanum, ſpica longiſſima rubente, C. B. which is found in both the preceding ones; and alſo from his having added the figure of Rivinus, TAB. 12, which indeed repreſents the *alpeſtre*, but for want of attention might eaſily be miſtaken for the *rubens* β.

At laſt Linnæus introduced *Trifol. alpeſtre* into the ſecond edition of Species Plantarum. But this, inſtead of ſettling the confuſion, ſerved rather to increaſe it. For, beſides the genuine ſynonyms of Cluſius and J. Bauhin, he has alſo added the uncertain ones of Van Royen and C. Bauhin, together with ſome obſervations, which, though very brief, ſtill unfortunately regard three diſtinct ſpecies, viz. *alpeſtre*, *medium*, and *pratenſe*. Afterwards he inſerted this into the twelfth edition of Syſt. Naturæ, with the following alteration—that the word *ſeſſilibus* in the ſpecific character was left out, as was neceſſary, when he confounded it with *medium*, which frequently has pedunculated ſpikes. A more ample deſcription was alſo made, with a view of diſtinguiſhing it from the *pratenſe*. But the diſtinguiſhing marks, taken chiefly from the ſtipulæ, may ſuit the *alpeſtre* as well as the *medium*, although this latter bears a ſtronger reſemblance to *pratenſe* than the former does.

Of all the authors who from that time have treated of the *Trifol. alpeſtre*, I am not certain that any one beſides Jacquin, Allioni, and perhaps Doerrien, had the real one in view. I ſay nothing of Murray and Reichard; as what they have inſerted into their editions of the Syſtem, is nothing further than copies from the twelfth edition, except their having ſtill more confounded it with the *medium*, by quoting other authors, who were miſtaken themſelves.

Thus profeſſor Jacquin is the firſt perſon to whom we are indebted for a perfect and juſt idea of *Trifol. alpeſtre*, from his good figures and deſcriptions, firſt in his obſervations, and afterwards in his Flora Auſtriaca. But his quotations are not all to the purpoſe;

poſe; for, in my opinion, independent of the equivocal C. Bauhin, neither Van Royen, Haller, nor Crantz are properly cited. Of the firſt of theſe I have already ſpoken; and, with regard to the three latter, Haller, meaning to diſtinguiſh his Trifolium from the *pratenſe*, mentions, indeed, nothing but what ſerves for this purpoſe; nevertheleſs, when he ſays that it has *vaginæ in latiuſcula foliola terminatæ*, or *ſtipulæ lanceolatæ*, *folia ſupernè raro maculata*, *calyx glaber*, & *florum ſpica obeſior*, he can hardly intend this for any other than *medium*. The ſame is the caſe with reſpect to Crantz, who tells us that his plant has *caules ramoſi*, *anguloſi*, *vaginæ petiolorum ſtriis rubentibus*, *folia inferiora et media integerrima*, *ſed ſuperiora ciliato-ſerrata*, and *calyx baſi dentibuſque coloratis*; all of which does not accord with the *alpeſtre*, except that the vaginæ are ſometimes, though very ſeldom, marked with a few red ſtreaks, whereas thoſe of the *medium* are almoſt always ſo.

Before Jacquin, Rivinus had in the laſt century given us a pretty good figure of *Trifol. alpeſtre*. But although Haller in his Stirpes Helveticæ referred to him, he has nevertheleſs happened afterwards to be conſtantly overlooked; probably becauſe the plant was not well known until Jacquin publiſhed his obſervations. Thus we have now three figures of this Trifolium, all of which are original.

Though profeſſor Allioni has not given us any deſcription, yet, as he has admitted into his Flora the *Trifol. flexuoſum* of Jacquin, there is reaſon to ſuppoſe his *alpeſtre* may be the real one; though he alſo has quoted all the authors ſet aſide by Jacquin, and whom I have already mentioned; adding Scopoli likewiſe, who certainly means the *Trifol. medium*, though he terms it *alpeſtre*; for he ſays that it has a *caulis ſubangulatus*, *folia ſubtus pallidiora*, *tumor calloſus inter ramos et caulem*, and *calyx glaber ſtriis rubris exaratus*.

Madame Doerrien, as ſhe immediately before mentions a Trifo-

lium which appears to be *medium*, muſt certainly by her *alpeſtre* underſtand another ſpecies, and perhaps the true one; at leaſt ſhe deſcribes the leaves as having ſhort footſtalks, and being deſtitute of white ſpots; and the teeth of the calyx, eſpecially the lowermoſt, very long and hairy. On account of this laſt expreſſion, her plant might rather be ſuppoſed *Trifol. rubens*; but this conjecture falls to the ground, when ſhe ſays that the heads of the flowers are roundiſh.

The other modern authors who have treated of *Trifol. alpeſtre*, ſeem all to have erred. But as in all probability they have not all had the ſame ſpecies in view, any more than has been ſhewn to have been the caſe with the old writers, I proceed, in order to preſent in a clear point of view this plant, which all along has been ſo confuſedly deſcribed, to enumerate all the *Trifolia* with which from remoter times to the preſent day it has been confounded, and which are the following, viz.

1. *Trifolium rubens* β.

As undoubted ſynonyms of which I may mention here—

Trifolium majus flore purpureo. *Ger. Em.* p. 1186. n. ‡ 4. *

Trifolium montanum majus purpureum. *Park. Theatr.* p. 1103, n. 1. * Et Trifolium montanum majus flore purpureo. *Ibid.* p. 1104, n. 1. *fig. ſup. integr.*

Trifolium purpureum montanum majus ſpica oblonga. *Mor. Hiſt.* ii. p. 139, n. 1. * Et Trifolium Lagopoides montanum, 3. Clus. *Ibid.* ſect. 2, tab. 12, fig. 1, *ſec. ord.*

All theſe authors exhibit one and the ſame figure taken from Cluſius; and of which, in the next article of *Trifol. medium*, I ſhall have an opportunity of ſpeaking further. As I have ſaid before,

Gerard and Parkinſon are cited by Ray, and Moriſon by Boerhaave.

To this place might perhaps alſo be referred—

Trifolium aliud montanum majus. *Thal. Herc.* p. 123, ſq. *

Trifolium folio longo flore purpureo Riv. *Rupp. Jen. Ed. Hall.* p. 254, ſq. *

Trifolium ſpicis ſubgloboſis villoſis terminalibus ſeſſilibus, caule erecto, foliis lanceolatis ſerrulatis. *Gmel. Sib.* iv. p. 22, n. 20.

Thalius and Ruppius I have before mentioned; and have now only to add, that Haller alſo in his Stirpes Helveticæ has quoted the firſt under *Trifol. rubens* β, p. 584, n. 11. * As to Gmelin, it is indeed uncertain what he meant, as he has added no deſcription; but if his quotation of *Trifolium ſpica oblonga rubra*, *C. B.* be true, his Trifolium is not *alpeſtre*, but *rubens*. It is poſſible too that he may have confounded theſe two ſpecies, which ſo nearly reſemble each other, that miſtakes might eaſily be made, and are the more pardonable. Notwithſtanding this, they are really diſtinct; for, beſides the *Trifolium rubens* being in general larger, its leaves are on both ſides free from hairs; and in the edges they are finely ſerrated by means of the veins running out into ſmall curved points directed towards the top, ſhorter and longer alternately, exactly as in *Trifol. montanum*; both vaginæ and ſtipulæ, particularly of the floral leaves, are much larger, and not hairy; the former ſwelling, and the latter ſomewhat ſerrulated: the ſpikes in the beginning ſeſſile, and concealed within the floral vaginæ, exactly as in *Trifol. alpeſtre*; but afterwards they grow more or leſs pedunculated, oval, oblong, or cylindrical: calyx ſmooth, but its teeth hairy; and the lowermoſt of theſe teeth are as long as the whole flower.

2. *Trifolium medium.*

Although I am but little ſurpriſed at the earlier authors having ſometimes miſtaken the *Trifol. rubens* for *alpeſtre*, I very much wonder that the modern ones could confound *alpeſtre* with *medium*, or regard this latter as the true *alpeſtre*. Nevertheleſs this has frequently been the caſe; for, after it had been named by Linnæus, I have found about twenty authors mentioning a Trifolium which they call *alpeſtre*, only two or perhaps three of whom, as I have ſaid above, may with certainty be affirmed to have treated of the genuine one. Moſt of the reſt, to judge by their writings, have had the *Trifol. medium* in view, though, excluſive of its ſtipulæ and the characteriſtics common to the whole genus, it bears very ſmall reſemblance to the *alpeſtre*: for its ſtem is flexuoſe, angular and branched; the footſtalks longer and divaricated; the leaves broader; the ſpikes generally pedunculated; calyx moſtly ſmooth, and its teeth larger, &c. Whereas the *Trifol. alpeſtre* has a ſtraight, round, and ſimple ſtem; ſhort and erect footſtalks; narrow and ſtrongly veined leaves; ſpikes conſtantly ſeſſile; a calyx always downy, and all over of the ſame colour; its teeth ſhorter than thoſe of the *medium*, but the lowermoſt one is proportionably longer.

3. *Trifolium pratenſe.*

Linnæus ſays of *Trifol. alpeſtre* that it is *ramis copioſiſſimis luxurians in ſatis*. But I am confident he never ſaw either the *alpeſtre* or the *medium* in a cultivated ſtate; and conſequently that by this expreſſion he points at the *pratenſe*, which is commonly cultivated in Sweden as well as other countries; and, through cultivation, varies into ſuch a reſemblance to *Trifol. medium*, that, without ſtrict and minute examination, they can hardly be diſtinguiſhed. Still the *pratenſe* has always *caules baſi adſcendentes*, and they are not flexuoſe; branches

branches and leaves erect, but not divaricated; vaginæ and ſtipulæ much larger than thoſe of the *medium*, and the ſtipulæ terminating in a ſetaceous awn; the ſpikes ſingle, and without a peduncle; the flowers erect, not divaricated; and the loweſt tooth of the calyx far ſhorter than the tube of the corolla, &c.

As Linnæus confounded *Trifol. medium* with *alpeſtre*, and ſaw it growing in Sweden on all dry hills near foreſts, reſembling the cultivated *pratenſe*, we ſee the origin and reaſon of the above-mentioned expreſſion, *ramis copioſiſſimis luxurians in ſatis*; which however he afterwards excluded, having probably obſerved his miſtake. How far the *Trifol. alpeſtre* is fit for cultivation, I cannot determine; but, as to *medium*, I have reaſon to think it is not. For I have obſerved the ſame ſingularity reſpecting it which profeſſor Jacquin mentions—that, when planted in gardens, in a good and looſe ſoil, it generally grows more ſlender, and particularly its ſpikes become ſmaller; but on eminences, in a dry, hard, and uncultivated clay bottom, it grows ſpontaneouſly very luxuriant.

4. *Trifolium pannonicum.*

To this I think may be referred—

Trifolium alpeſtre. *Gouan. Illuſtr.* p. 52. *

Many cultivated plants being ſeen producing variegated flowers, it has been ſuppoſed that the ſame might alſo be the caſe with reſpect to the wild ones. But on ſtricter ſearch it will be found, that in this point plants are moſtly in the ſame predicament with animals, the tame or domeſticated individuals of which vary greatly as to colour, but not the wild ones. It has alſo been diſcovered that various plants with differently-coloured flowers, which have been long eſteemed only varieties of each other, are really diſtinct ſpecies; and that, on more minute examination, beſides the difference

of

of colour firſt obſerved, they alſo differ in other reſpects, particularly as to their parts of fructification. Thus when profeſſor Gouan ſays of his *Trifol. alpeſtre*, that it has *flores ochroleuci*, there is reaſon to ſuſpect its not being the real one; and as we have no other ſpecies than the *ochroleucum*, *pannonicum*, and *montanum*, which anſwer to this deſcription, and are otherwiſe as to their form and appearance nearly related to the *alpeſtre*, it may naturally be ſuppoſed that he meant one of theſe three: now it cannot be either the *ochroleucum* or the *montanum*, as he has ſeparately mentioned theſe in the ſame place; conſequently his *Trifol. alpeſtre* muſt either be the *pannonicum*, or a new ſpecies.

TRIFOLIUM MEDIUM.

If my conjecture already mentioned reſpecting Geſner be juſt, he is the firſt author who treats of this Trifolium. But the firſt certain account of it was given by Ray in his Hiſtory; and it is evident, from his deſcription, that he meant the real one. As in its appearance it reſembles the *pratenſe*, he has juſtly compared them together, ſaying, that the *medium* is in all reſpects larger; that the leaves are not always marked with white ſpots, and that they have more conſpicuous veins, particularly on the under ſide; that the ſpikes are more round, having long peduncles; and that the flowers are of a deeper purple. But he commits an error in believing it to be the ſame as that cultivated in meadows: yet he has altered this in the firſt edition of his Synopſis; and in the ſecond he kept them ſeparate, as did alſo Dillenius in the third edition. He is the firſt who added the ſynonymous appellations of other authors, but unfortunately fixed upon theſe three, Cluſius, J. Bauhin, and C. Bauhin, neither of whom meant the ſame plant as he did, or the *Trifol. medium*; but, on the contrary, the *alpeſtre*; eſpecially the two firſt, as is mentioned above.

After

After Ray, this Trifolium was mentioned by Ruppius, Tournefort, Boerhaave, Van Royen, Haller, Wilſon, Scopoli, Hill, and Hudſon; and theſe are the only writers I have found noticing it, before Linnæus named it. Tournefort and Boerhaave only quoted Ray, and mentioned his plant as ſeparate from *Trifolium montanum purpureum majus, C. B.* which latter, conſequently, they could not take for the *medium*, but rather for the *alpeſtre*, where, if it were to be cited at all, it ought to have its doubtful place. With reſpect to Ruppius, Van Royen, Haller, and Scopoli, I have already ſaid what I thought neceſſary, and that they have all miſtaken it for the *alpeſtre*; at leaſt in this reſpect, that under it they generally quoted ſuch authors as meant the *alpeſtre*. The ſame is done by Wilſon and Hill; who, moreover, only copied what they found in the third edition of Ray's Synopſis.

Mr. Hudſon, in his firſt Flora Anglica, called it *Trifol. medium*, giving it a new character, and adding the doubtful quotation of C. Bauhin, as well as the true one of Ray. Mr. Hudſon did not then know that Linnæus, a year ago, had given it the ſame name in his Novitiæ Floræ Suecicæ, which are ſubjoined at the end of the ſecond edition of his Fauna Suecica. At all events, it was not eaſy to diſcover what Linnæus meant; as he neither added character nor deſcription, and afterwards neither mentioned the *Trif. medium* any where in his works, nor referred to this place in the Novitiæ. The extrication of this would alſo have been impoſſible to any but Swedes who could go to Jumkil, where he ſays this Trifolium grows. This place, which is famous for the number of its rare plants, is ſituated about thirteen miles from Upſal. I have viſited it, and found there the *Trif. medium*. Beſides, I have ſeen it under the ſame name, by the authority of Linnæus, in all old Swediſh Herbariums, and eſpecially in his own. Further, as it is in ſome meaſure

meaſure a medium ſpecies between the *alpeſtre* and *pratenſe*, I think I have reaſon to prefer the oldeſt name, and which was given by Linnæus himſelf; though he afterwards changed it for *alpeſtre*, or rather confounded theſe two ſpecies. Hence he ſays, in the ſecond edition of Species Plantarum, that *Trifolium alpeſtre* grows alſo in Sweden; whereas no other than the *medium* is found there.

It appears as if Linnæus had been led into this miſtake by the ſtipulæ, which in both are ſimilar, and very different from thoſe of *Trifol. pratenſe*, though in other reſpects the *alpeſtre* and *medium* have few things in common. However, it ſeems as if ſucceeding botaniſts had generally regarded the *Trifol. medium* as the *alpeſtre*, and confounded the ſynonyms of both; whereas, nevertheleſs, properly ſpeaking, the *medium* has neither *caulis erectus*, nor *folia lanceolata ſerrulata*. But having in various authors obſerved various notions of theſe and other terms, this no longer appears ſingular to me. At all events it is certain that the *Trifol. alpeſtre* of all the Engliſh botaniſts, of Crantz, Scopoli, Pollich, Leers, Muller, Retzius, Lieblein, and perhaps alſo of Gmelin, Scholler, Mattuſchka, Reichard, and Willdenow, is no other than the *Trifol. medium*; for I am informed that this latter only, and not the former, grows in England and Scotland, as Dr. Stokes has before obſerved; and the ſame I can ſay of Sweden, Denmark, and Norway. Beſides, the figure of Muller plainly evinces that his *Trifol. alpeſtre* is the *medium*.

That Crantz, Scopoli, Pollich, Leers, and Lieblein have made the ſame miſtake, is evident from their deſcriptions, as with regard to the two firſt I have ſhewn above; and, as to the three latter authors, they compare their Trifolium with the *pratenſe*, ſaying that its ſtem is for the moſt part depreſſed, or almoſt lying on the ground (eſpecially at the baſes), ſomewhat angular, and furniſhed with joints; the leaves are ſeldom ſpotted, and are on the under

ſide

ſide of a lighter green; the flowers of a deeper purple, and the ſpikes nearly globular. Pollich and Leers add, that they are larger, and generally ſhorter, or have longer peduncles, particularly when grown old; and that the calyx is moſtly without hair, and marked with red-brown lines or nerves. But when Leers further adds, that the *foliola* are *lineari-lanceolata*, and *calycis dentes breviſſimi, infimo tubo corollæ dimidio breviore*, the former obſervation ſuits better with *Trifol. alpeſtre*, and the latter with *Trifol. pratenſe*. Lieblein has likewiſe made this remark on the teeth of the calyx, namely, that they are very ſhort.

Scholler in his Flora, and Mattuſchka in his Enumeratio, have only copied what Linnæus has ſaid in the twelfth edition of his Syſtem, under the head of *Trifol. alpeſtre*; but Gmelin in his Stirp. Tubing., Reichard in his Flora, and Willdenow, have no deſcription at all. In his Flora, Mattuſchka has indeed ſaid many pretty things; all of which, however, are equally applicable to *alpeſtre* and to *medium*. Thus it is impoſſible to determine, with any degree of certainty, what ſpecies the Trifolium of theſe authors really is; but, if I am not much miſtaken, they have all intended the *medium*. This, however, I only ſay by way of conjecture, leaving it to time further to elucidate this matter.

With regard to Gorter, who inſerted the Trifolium of Ray as a variety of *pratenſe*; nor with regard to Nonne and Gattenhof, who have mentioned *Trifolium ſpicis villoſis foliis inſidentibus, vaginarum caudis latioribus*, Hall. and added the often-mentioned and doubtful ſynonyms of C. Bauhin and Van Royen; nor, laſtly, with regard to Jenkinſon, who has taken up *Trifol. medium* probably from Mr. Hudſon, and only tranſlated the character he gave of it into Engliſh—have I much more to ſay. Though all theſe authors have no deſcription, Nonne excepted, who has added that inaccu-

rate obſervation of Haller's, out of his edition of Ruppius's Flora Jenenſis, of which I have made mention above, viz. that the *vaginæ petiolorum floralium* are broader than thoſe of the *Trifol. pratenſe*; it ſtill ſeems probable to me, that they all meant the *Trifol. medium*.

At laſt Profeſſor Jacquin has given us information concerning this Trifolium, by means of a ſeparate deſcription, and a good figure of it, in his Flora Auſtriaca, where he calls it *flexuoſum*. But, though fifteen years have now elapſed ſince its publication, ſtill I have found none but the Chevalier Murray, Profeſſor Allioni, and Dr. Stokes, who have referred to it. The firſt of them has placed it under *alpeſtre*, though there were juſt as good reaſons for making this a diſtinct ſpecies as many other new plants which he has inſerted in the fourteenth edition of the Syſtem. Profeſſor Allioni has ſaid no more concerning it, than that it grows in Piedmont, and has an annual root; which remark ſurpriſes me the more, as it is deſcribed by all others to be perennial: a circumſtance I can prove by my own experience. Dr. Stokes has given us pretty good obſervations on the ſubject, collected from various quarters. Beſides theſe three authors, no others who have written after the publication of Profeſſor Jacquin's figure, have attended to it, although they have meant the ſame plant. Some of them had perhaps not then ſeen this figure, but all cannot plead this excuſe.

Thus, though Profeſſor Jacquin is the firſt who has given us a proper idea of *Trif. medium*, and taught us to ſeparate it from the real *alpeſtre*, ſtill I cannot conceive but that he has confounded it, at the ſame time, with another equally diſtinct ſpecies: for he has quoted as ſynonymous *Trifolium majus* iii, Cluſ. and, to the beſt of my judgment, this is the *rubens* β. For this I will give my reaſons, which I ſhall chiefly take from the very deſcription of Cluſius.

He

He ſays of this Trefoil of his, that it is by far larger than the next preceding, viz. the *alpeſtre*; that it has alſo thicker ſtems; that its leaves are *ſtriata, dorſo magis eminente et elato, laxa quadam veluti vagina caulem amplectentia, duplo longiora et per oras denticulata*; and, laſtly, that the ſpike is *oblongior* and *major*. All this, and eſpecially what he ſays of vaginæ and foliola, does by no means agree with *Trifol. medium*. He mentions, indeed, at the ſame time, that the ſtalks are *nodoſi*, or have *genicula*, and that the calyx is hairy; but by the firſt I do not believe he underſtands any flexure but the joints *(nodi)*, which in the *Trifol. rubens* are larger than in any other, owing apparently to the very large, and as it were inflated, vaginæ of the ſtipulæ. And as to the latter obſervation, the calyx of the *Trifol. rubens* is indeed always naked; but ſo is, for the moſt part alſo, that of the *medium*. Still both of them have hairs on the teeth of the calyx; but the *rubens* has thoſe hairs both longer and in greater abundance; which, being divaricated, almoſt cover the calyx, ſo that at firſt ſight it appears to be all over hairy. Cluſius therefore may be excuſed for thus deſcribing it.

This author immediately after ſubjoins his *Trifolii majoris* iii *altera ſpecies*, of which he only obſerves, that *vel magnitudine vel foliorum et florum forma aut colore, nihil aut quam minimum differt. Folia tamen anguſtiora illorum longitudinem aliquantum excedere videntur, et florum ſpica longior eſſe*. This being by common conſent *Trifol. rubens* α, the next preceding can be no other than the variety β. For it is not probable that Cluſius, who for his time was very accurate, ſhould have found ſo great a likeneſs between two plants ſo different as *Trifol. rubens* and *medium* are. Beſides, as he has four ſpecies of his *Trifol. majus*, which he compares together, ſaying that, as to their external appearance, they are all ſimilar; the chain will be uninterrupted, if they are ſuppoſed to be *Trifolium montanum*, or perhaps

pannonicum, *alpeſtre*, *rubens* β, and *rubens* α; but it will be broken if, inſtead of *rubens* β, the *medium* is inſerted, whoſe form and appearance are very different from all the other three. It is true, the figure of his *Trifolium majus* iii. ſeems rather to reſemble the *medium* than the *rubens*, being hairy and ſomewhat branched. But the ſame may be ſaid of his figure of *Trifolii majoris* iii *altera ſpecies*: and thus neither of theſe figures of Cluſius can be taken for *Trifol. rubens*, or elſe both of them muſt. I believe, however, the latter opinion is the ſafeſt, as his deſcriptions ſo well agree with *Trifol. rubens*, and as it is not yet perfectly certain whether this plant does not at times become branched. Laſtly, as to the hairs which Cluſius has repreſented in the edge of his figures, I believe they are rather meant to repreſent their fine teeth, than any hairineſs.

Having endeavoured to prove that the *Trifolium majus* iii of Cluſius ought to be conſidered as the ſecond variety of *Trifol. rubens* with broader leaves and ſhorter ſpikes, I ſhall conclude by citing a few ſynonyms, as an addition to thoſe quoted in the preceding article of *Trifol. alpeſtre*. Theſe are—

Trifolium maximum purpureo flore. *Cluſ. Pann. p.* 760, *n.* 3. * Et Trifolium majus iii. *Ibid. p.* 762. *Et ejuſd. Hiſt.* vi. *p.* 245, *n.* iii *.

Trifolium ſpica oblonga rubra. *Bauh. Pin. p.* 328. *Ray, Hiſt.* i. *p.* 944, *n.* 7. *

Trifolium purpureum majus, folio et ſpica breviore. *Bauh. Hiſt.* ii. *p.* 375, *fig. inf.*

Trifolium majus tertium purpureum, Cluſio. *Bauh. Hiſt.* ii. *p.* 375. *

The figure of John Bauhin, as well as thoſe of Gerarde, Parkinſon, and Moriſon, as already mentioned, are only re-impreſſions of the original of Cluſius, whoſe deſcription is likewiſe copied in

part by Gerarde and Parkinſon, but entirely by Ray, Moriſon, and J. Bauhin in the laſt-mentioned place, where it is not accompanied by a figure. But this the author has inſerted in the former place along with the figure of *Trifol. rubens* α, which variety he has alſo deſcribed there himſelf. Dr. Stokes, after the example of Profeſſor Jacquin, has quoted under his *Trifolium flexuoſum*, not only the figure of Cluſius, but alſo thoſe of Gerarde, Parkinſon, and J. Bauhin, to which he has added another by Parkinſon, which repreſents the upper part of *Trifol. pannonicum*, or elſe the *montanum*.

TRIFOLIUM PRATENSE.

Although we have but few figures of *Trifol. alpeſtre* and *medium*, viz. three of the former and two of the latter, thoſe of the *pratenſe* are more numerous. If I were to ſay I had ſeen upwards of ſixty myſelf, it might perhaps, true as it is, ſound extravagant. Of theſe, fifteen or ſixteen may be eſteemed originals, and all the others either copies, or only re-impreſſions from the ſame plates of thoſe publiſhed before. This laſt was moſt cuſtomary in the two laſt centuries. And thus theſe figures conſtitute ſeveral ſets, which I ſhall briefly touch on, adding a few obſervations on their merit, and how far they may deſerve to be quoted.

In an old book called Ortus Sanitatis, printed at Venice, 1426, in folio, appears a Trifolium, which I ſuppoſe to be meant for the *pratenſe*; though, from the barbariſm of thoſe times, both figure and deſcription are ſo indifferent, that nothing certain can be affirmed reſpecting them. In the deſcription, ſeveral ſpecies certainly are confounded; and the figure, though the foliola reſemble thoſe of *Trifol. pratenſe*, and the ſpike is ſeſſile between the floral leaves, ſtill erroneouſly repreſents two oppoſite leaves nearly in the middle of the ſtem. In a later edition of this book, publiſhed 1517,

occurs

occurs the ſame figure and deſcription. In the third tome of Brunfelſii Herbarium, printed in Latin at Straſburg, 1536, in folio, I have ſeen another and better figure; which, under the name of *Brunella*, ſeems to repreſent *Trifol. pratenſe*. Still the figure is not diſtinct enough to enable me to judge of it with abſolute certainty.

But the firſt evident figure of this Trifolium that I have ſeen, is found in Roeſslin's Herbal, printed in German, at Frankfort on the Mayne, by Egenolphus, 1532, in folio. It is ſmall, but repreſents the plant tolerably with one ſingle ſtem, with proper leaves, and a ſeſſile ſpike. Of this figure I have found thirteen re-impreſſions, which are in Egenolphi Imagines et Effigies, a work which contains only figures, and of the former of which there are three editions; in Dorſtenii Botanicon, in two places, under the name both of *Epithymum* and *Trifolium*; in both the Latin editions of Dioſcorides by Ryff or Rivius; and in the Hiſtory of Lonicerus in Latin, as alſo in his German Herbal, of which I have ſeen two editions, under Uffenbach's name; and in this century, another by Ehrhart. The figures of Egenolphus and Rivius, as alſo thoſe of Lonicerus himſelf, are in general coloured.

Fuchſen, or, as he is more commonly called, Fuchſius, in his Hiſtory in Latin, printed at Baſil, 1542, in folio, gave us a new and a good figure of this Trifolium, repreſented in its natural ſize and poſition, with ſeveral ſtems; and it is not much to our honour that this is ſtill almoſt the beſt extant. The only thing that might be ſaid againſt it, is, that a few of the ſpikes are repreſented pedunculated, and the floral leaves are not always oppoſite and ſeſſile, as they ought to be. Of this figure we have a coloured re-impreſſion in the German Herbal of this author; of which afterwards, firſt Tragus in his Hiſtory, and after him Dodonæus in his

his Imagines, have each given us a copy on a ſmaller ſcale, engraved ſo that the figure is reverſed. Neither of them can be called good, but that of Dodonæus is the beſt; and of this we find a re-impreſſion in the ſecond edition of his Imagines, as alſo in the French, Dutch, and Engliſh tranſlations of his Pemptades, and in both editions of Turner's Herbal. At laſt John Bauhin, in his Hiſtory, has given us a new and ſmall copy of the figure of Fuchſius, altered for the worſe, though not reverſed.

Matthiolus, in his Commentary on Dioſcorides, publiſhed in Latin at Venice, 1554, in folio, began a new ſet of figures. He repreſents the plant, diminiſhed, pretty well, with many ſtems from the ſame root; but, as to the floral leaves, he has committed the ſame fault with Fuchſius, and rather in a greater degree. It appears to me as if he had had the figure of the latter by him when he made his own, for they have an imperfect reſemblance to each other, except that the figure of Matthiolus has the points of the foliola rounder, and the ſpikes longer. This figure has afterwards been reprinted, or with more or leſs variation copied, in various works. Exact re-impreſſions of it I have ſeen in the ſecond Latin edition of the Commentary of Matthiolus, in the Latin Compendium of the ſame author, in the French tranſlation by Moulin, and the Italian one by Coſtantini, and another later in the ſame language; further, in the Hiſtoria Lugdunenſis, which Linnæus calls Dalechampii, and the French tranſlation of it; and, laſtly, in the Dioſcorides in Spaniſh, by De Laguna. It muſt be remarked that Matthiolus, in his Compendium, has committed two errors; firſt, in tranſpoſing the figures of *Trifol. pratenſe* and *montanum*; and, ſecondly, that in the deſcription belonging to the latter, but inſerted under the former, he mentions it as having purple flowers.

Of

Of the copies of Matthiolus's figures I have ſeen three kinds. A larger one, in the Latin edition of his Commentary, in 1565, ſomewhat improved, and repreſenting the plant nearly in its natural ſize: this has been copied in the Italian tranſlations of this work, in the years 1568 and 1604. Secondly, one of the ſame ſize with the original, in the Latin Epitome of Matthiolus, by Camerarius; but inferior in this reſpect, that all the ſpikes are repreſented oval, and pedunculated, or without floral leaves. Nevertheleſs it has been reprinted by Uffenbach in his German tranſlation of Durantes's Herbario, by Becker in his Parnaſſus, and by Zvingerus in his Theatrum, both of them in German. Thirdly, one kind much ſmaller than the original one, but otherwiſe perfectly ſimilar, found in the French tranſlations of Matthiolus's Commentary, by Pinet. Camerarius has altered one of the abovementioned faults committed by Matthiolus in his Compendium, and reſtored the figures of *Trifol. pratenſe* and *montanum* to their right places; but he has retained the other, ſaying, that *Trifol. montanum* has purple flowers.

Another ſet of figures of the *Trifol. pratenſe* originated with Tabernæmontanus, in his Herbal, printed in German at Frankfort on the Mayne, 1588, in folio. His figure is of the ſame ſize as the original or firſt one by Matthiolus, to which it bears ſome reſemblance; but is better in this reſpect, that all the ſpikes are furniſhed with cloſe floral leaves, which however rather appear to repreſent a large calyx than real leaves. Re-impreſſions of this figure I have ſeen in eight places, viz. in Tabernæmontani Icones, and four later editions of his Herbal, the firſt of which was publiſhed by Caſper Bauhin, and afterwards reprinted; the third by Hieron. Bauhin, likewiſe reprinted in this century; further in Gerarde's Herbal, and in Caſper Bauhin's edition of the Commentary

tary of Matthiolus in Latin, of which I have ſeen a ſubſequent edition.

The ten remaining figures of *Trifol. pratenſe* are all to be regarded as originals, and are publiſhed by Rivinus, Zannichelli, the author of Spectacle de la Nature, Blackwell, Weinman, Kniphof, Knorr, Regnault, Zorn, and Profeſſor Vahl. All theſe are genuine in this reſpect—that they are intended to repreſent the honey-ſuckle Trefoil, as is evident from their poſture, ſtipulæ, foliola, and cloſe floral leaves, &c. But that of Kniphof is, as uſual, a very poor one; which indeed I would have paſſed over in ſilence, but that it has been referred to by more than one author. The figures of Zannichelli, Weinman, and Zorn are ſomewhat better; and thoſe of Blackwell and Regnault tolerably good: but both theſe authors, as well as Zorn, have been unfortunate in repreſenting the ſegments of the calyx very different from nature. The figures of Rivinus and Knorr are pretty good. That in Spect. de la Nature is an indifferent one, and appears to be made from the cultivated variety: indeed it is pity that the otherwiſe good figure of Profeſſor Vahl ſeems to be alſo drawn from a cultivated ſpecimen; for the whole of its poſture nearly approaches to that of *Trifol. medium*, the leaves being too much pointed to repreſent the wild plant. But its principal diſtinguiſhing characteriſtics, the broad and awned ſtipulæ, as well as the ſeſſile ſpike placed between two oppoſite ternate ſeſſile leaves, are very well expreſſed.

Of all the figures now mentioned, Linnæus himſelf has quoted none but that of Camerarius, in both editions of the Flora Suecica and Species Plantarum; that of John Bauhin only in Hortus Cliffortianus; and that of Rivinus alone in his firſt Flora. To particularize which of theſe figures all

other authors have referred to, would be too tedious; it ſuffices to mention, that I have ſeen a few of each ſet quoted, but, what is ſurpriſing, moſtly thoſe of inferior merit; whereas the good one of Fuchſius has been in this century quoted by no one but Haller and Dr. Stokes.

It ſeems, therefore, that the *Trifol. pratenſe*, as having been known from the earlieſt ages, and being one of the moſt common plants in Europe, ought to have been exempt from the confuſion in which many others are involved, and which is more excuſable when ſome rare or leſs known plant is in queſtion. Still it ſtands unfortunately in the ſame predicament; and Caſpar Bauhin, according to his uſual practice, began the confuſion: for his *Trifolium pratenſe purpureum*, with his perplexed deſcription and miſplaced citations, comprehends at leaſt three diſtinct ſpecies, beſides the genuine *pratenſe*; under which laſt his *Trifolium pratenſe purpureum* is generally quoted by moſt authors, who thereby have authoriſed the blunder of Bauhin, not to mention other ſeparate miſtakes committed by ſome of them. I therefore eſteem it neceſſary in this place to enumerate all the plants which I have found miſtaken for the *Trifol. pratenſe*, or confounded with it. But I ſhall previouſly ſpeak of

Trifolium pratenſe purpureum minus, foliis cordatis. *Ray. Syn.* iii. p. 328, n. 5. * tab. 13, fig. 1.

This Haller has introduced as a different ſpecies in his Stirp. Helv. p. 585, n. 13*, but in his Hiſt. i. p. 164, n. 378*, he has inſerted it as a variety of another Trefoil, which certainly is the *ochroleucum*; and on the other hand adduced the authors really belonging to this latter, under *Trifol. pratenſe*, as I am going to obſerve. Linnæus, probably miſled by Haller, has alſo brought in this plant of Ray's, under his *Trifol. ochroleucum*, in Syſt. Nat.

tom.

tom. iii. p. 233. * But the Engliſh botaniſts, who ought to be better acquainted with it, ſeparate it from the *Trifol. ochroleucum*, ſince, beſides other differences, it has purple flowers; and they make it a variety of *Trifol. pratenſe*, on account of its having a ſimilar, though ſtarved appearance; the ſtipulæ being in like manner awned, and the teeth of the calyx likewiſe nearly equal, as Dr. Sibthorp and Mr. Hudſon have informed me. But it differs in other reſpects very materially; having the leaves oppoſite; the foliola ſmall, ſhort, and inverſely heart-ſhaped; and the peduncle very long, and deſtitute of floral leaves.

The other plants that have been confounded with *Trifol. pratenſe*, though widely differing from it, are the following, viz.

1. *Melampyrum arvenſe.*

Trifolium majus. *Brunf. Herb.* tom. iii. p. 47.

This paſſage in Brunfels, Caſpar Bauhin has quoted under his *Trifolium pratenſe purpureum*. But to judge from the figure annexed, for there is no ſuch thing as deſcription, the plant is by no means any Trefoil, though called ſo, but certainly a Melampyrum; as John Bauhin has already remarked in his Hiſtoria, tom. ii. p. 375, and which Haller in his Stirp. Helv. p. 626, n. 2, has taken for the *arvenſe*, which indeed it appears to be. This figure of Brunfels's is a re-impreſſion of one in his Herb. ii. p. 58, where it has only obtained a German name.

2. *Trifolium repens.*

Trifolium pratenſe. *Lob. Adv.* p. 380. *Hiſt.* p. 493. (ed. Lat. 1576.) P. ii. p. 35. (ed. Belg. 1581.) *Icon.* ii. p. 29. *Dodod. Pempt.* p. 556. (ed. 1583.) p. 565. (ed. 1616.) et p. 898. (ed. Belg. 1644.) *Ger. Emac.* p. 1185, n. 1.

Trifolium pratenſe vulgare purpureum. *Park. Theatr.* p. 1110, n. 1.

Lobel, in his Adverſaria, has indeed no figure; and gives a deſcription which comprehends at leaſt two ſpecies, the *Trifol. repens* and *pratenſe*. But that he chiefly had the *repens* in view, appears from his ſubſequent Hiſtoria or Obſervationes, in which he has given a pretty good figure of this plant, and at the ſame time referred to the above-mentioned Adverſaria. Of this original figure by Lobel, re-impreſſions have afterwards been made in all the above works. It bears ſo near a reſemblance to the *Trifol. repens*, as to leave us no room to doubt: and for this reaſon it appears to me the more ſurpriſing, that ſo many both ancient and modern authors could refer to it for the *pratenſe*, which it in no manner reſembles. Thus I have ſeen Lobel cited by Caſpar and John Bauhin, by Moriſon, by Haller, in Stirp. Helv. and by Knorr; Dodonæus by Haller, both in his Stirpes and Hiſtoria, by Linnæus, in both the editions of Flora Suecica, by Gorter, in both the editions of Flora Belgica, by Knorr, in his Theſaurus, by Mr. Hudſon, in the laſt edition of Flora Anglica, and by Profeſſor Vahl, in Flora Danica; Gerarde by Mr. Hudſon, in both the editions of his Flora, and by the Rev. Mr. Relhan, in the Flora Cantabrigienſis; and, laſtly, Parkinſon by Ray, both in his Hiſtoria, and in all the three editions of his Synopſis, by Haller, in his Stirpes, by Wilſon, Hill, and Mr. Hudſon, in both places.

Haller happened firſt, either by an error in writing or printing, to miſquote the laſt Latin edition of Dodonæi Pemptades, viz. p. 365 inſtead of 565; and, after him, this fault has been invariably copied by all the above-mentioned authors, except Gorter, who altered it in the laſt edition of his Flora Belgica. Haller alſo recommends the figure by Dodonæus as a good one, but Crantz criticiſes

ticiſes it as bad; and Dr. Stokes is the firſt who has remarked that this, as well as thoſe by Lobel, Gerarde, and Parkinſon, does not belong to *Trifol. pratenſe*, but to *repens*.

Gerarde, in his Herbal, has a genuine figure as well as deſcription of *Trifol. pratenſe*; the former taken from Tabernæmontanus, as I have ſaid above. But Johnſon, who publiſhed a new, and, as himſelf called it, improved edition of Gerarde, thought this figure not good enough; and therefore inſerted in its room the figure above cited, which repreſents the *Trifol. repens*, and is borrowed either from Lobel or Dodonæus; at the ſame time retaining Gerarde's deſcription: and thus unluckily confounded plants ſo different as the creeping and purple Trefoil are. Parkinſon, who afterwards publiſhed his Theatrum, copied the laſt edition of Gerarde; and, as he ſaw the flowers were there deſcribed purple, he thought it beſt to inſert that circumſtance in the very title: by this means the white *Trifol. repens* came to be called by him *purpureum*.

3. *Trifolium ochroleucum.*

Trifolium montanum majus, flore albo ſulphureo. *Merr. Pin.* p. 121.

Trifolium lagopoides annuum hirſutum, pallidè luteum ſeu ochroleucum. *Mor. Hiſt.* ii. p. 141, n. 12. * Et Trifolium lagopoides, fl. ochroleuco. *Ibid.* ſect. 2, tab. 12, fig. 12.

Trifolium pratenſe hirſutum majus, flore albo ſulphureo ſeu ochroleuco. *Ray. Hiſt.* i. p. 943, n. 8. * Et *Syn.* iii. p. 328, n. 3. *

Triphylloides alpina, flore albo. *Ponted. Anthol.* p. 241.*

Trifolium Lagopoides flore ſubluteo. *Vaill. Par.* p. 195, n. 5.

All

All theſe five authors Haller has quoted in his Stirp. Helv. p. 586, under var. β, flore albo of *Trifol. pratenſe*. But in his Hiſtory, tom. i. p. 164, he has only cited Moriſon and Ray under var. δ, flore ochroleuco, of the ſame Trefoil. Of this laſt, Linnæus alſo in the beginning conſidered the plant of Pontedera to be a variety, as appears from his Flora Lapponica and Hortus Cliffortianus; but afterwards he juſtly omitted this quotation.

That Merrett's Trifolium is the *vchroleucum*, is very probable from its being a native of England; and that Ray meant the ſame, is evident beyond doubt from his deſcription: but with reſpect to Moriſon, the matter is not ſo clear; for both his deſcription, in which occur the terms *folia acuta*, and his figure, which repreſents the leaves narrow, lanceolate, and pointed inſtead of rounded at the ends, appear rather to indicate the *Trifol. pannonicum*, though the ſpecimen in Bobart's collection at Oxford is *Trifol. ochroleucum*. It is far more difficult to make out what Pontedera aimed at; for, from his prolix deſcription, nothing further can be concluded, than that the leaves, principally in the margin, as well as the whole calyx, are hairy; the flowers white and monopetalous; and that the ſeed-veſſels generally contain one ſeed. Hence it follows, however, that his plant can neither be *Trifol. repens* nor *montanum*: and, independent of theſe two, I can think of no other capable of being called in queſtion, except the *Trifol. ochroleucum* and *pannonicum*. But, as the above-mentioned characters are equally applicable to both of them, and as theſe two laſt-mentioned plants themſelves are ſo nearly related as to be ſcarcely diſtinguiſhable but by their ſize, and the ſhape of their leaves, it is impoſſible to determine which of them Pontedera had in view. The plant of Vaillant is ſtill more difficult to aſcertain, for he has given no deſcription at all.

4. *Tri-*

4. *Trifolium montanum.*

Trifolium pratenſe ii. *Dur. Herb.* p. 1014. (*ed. Germ. Uffenbach.* 1619. Franc. ad Moen. 4°.)

This Trefoil, which undoubtedly is the *montanum*, C. Bauhin has quoted under his *Trifolium pratenſe purpureum.* But as he is in every reſpect inaccurate, he has termed it *Trifolium pratenſe alterum*; and called his author by his Chriſtian name *Caſtore*, inſtead of his ſurname *Durante.*

In all old authors, the *Trifol. montanum* always follows after the *pratenſe*, under the name of *album* or *acutum*, or elſe, which is the moſt common, *pratenſe alterum* or *pratenſe album:* and the figures of it have likewiſe had the ſame fate and changes, as I have before mentioned of thoſe of the *pratenſe.* However, the *montanum* was not ſo early known; for it does not occur in Roeſslin's Herbal, nor in the firſt edition of Egenolphi Imagines, or of Loniceri Hiſtoria. Among this ſet of figures it appears for the firſt time in Ryff's edition of Dioſcorides, printed at Frankfort on the Mayne, by Egenolphus, in 1543, folio: otherwiſe, the firſt figure I have ſeen of it is in Fuchſii Hiſtoria publiſhed the preceding year. This is not only good, but the beſt of thoſe that have fallen under my inſpection.

While on the ſubject of *Trifol. montanum*, I muſt not paſs over in ſilence the careleſſneſs of C. Bauhin with reſpect to this plant, as indeed to almoſt all others: for he has quoted *Trifolium majus* i. *Cluſ. Pann.* p. 761, and *Hiſt.* vi. p. 245, both under his *Trifolium montanum album*, *Pin.* p. 328, which probably is the genuine *montanum*; and under his *Trifolium pratenſe album*, *Pin.* p. 327, which all authors have taken for the *repens.* Further, under this his *Trifolium pratenſe album*, he has cited Fuchſius, Matthiolus, Lonicerus, Turner, Camerarius, and Laguna, all of whom certainly meant the

Trifol. montanum; Lobelii Adverſaria, and Thalius, who appear to have had the *repens* in view, at leaſt Lobel; Durante, who has drawn the *Trifol. pratenſe*; and, laſtly, Tragus and Dodonæus, who on this ſubject are ſo inexplicit, that I cannot determine their meaning. The queſtion is then, where is the *Trifolium pratenſe album* of Bauhin to be quoted, whether under *repens*, *pratenſe*, or *montanum*? I think, moſt probably under the laſt-mentioned, if at all; as moſt of the authors quoted by him had this ſpecies in view.

5. *Trifolium, an incarnatum?*

Trifolium pratenſe purpureum vulgare. *Mor. Hiſt.* ii. p. 138, n. 5. * Et Trifolium pratenſe purpureum. Ibid. ſect. 2, tab. 12, fig. 6.

This plant of Moriſon's, generally taken for *Trifol. pratenſe*, I have ſeen cited in three different manners. Boerhaave in the ſecond edition of his Hortus Lugdunenſis, Haller in his Stirp. Helv. and Seguier in his Plantæ Veronenſes, mention the page without taking notice of the figure; whereas Lightfoot and Relhan only refer to the figure. Linnæus quotes both.

As Moriſon under the deſcription has not directed us to the figure, nor at the ſaid figure referred to the body of the work for a deſcription of it, we are very uncertain whether in thoſe two places he had the ſame plant in view. His confuſed deſcription, which is for the moſt part borrowed from C. Bauhin, affords but trifling or rather no information. And although Moriſon, in thus confounding ſeveral ſpecies together, may ſtill have meant to point at the true *Trifol. pratenſe*, yet his figure will by no means ſuit that plant; but rather reſembles *Trifol. incarnatum*, and perhaps it is even drawn from this ſpecies: but, if ſo, it betrays great careleſſneſs in Moriſon, who has, in two places beſides, deſcribed and drawn the laſt-mentioned Trefoil; viz. under *Trifolium*

lium purpureum et annuum, folio hirſuto rotundo, Trifolii pratenſis albi forma, Mor. Hiſt. ii. p. 140, n. 3. * Et *Trifol. lagopoides Trifolii pratenſis folio,* Ibid. ſect. 2, tab. 12, fig. 3. And under *Trifolium purpureum lagopoides hirſutum annuum rotundifolium, ſpica dilutè rubente,* Mor. Hiſt. ii. p. 140, n. 6. * Et *Trifolium lagopoides rotundif. hirſut.* Ibid. ſect. 2, tab. 13, fig. 6, a leaf only. The complete figure repreſents *Trifol. anguſtifolium.* This Linnæus has not quoted; but the whole of the paſſage immediately preceding, which belongs to *Trifol. incarnatum*, he has inſerted under his *Trifol. ſquarroſum.*

Finding myſelf unable to extricate this confuſed *Trifolium pratenſe purpureum* of Moriſon's, I wrote a letter ſome time ago to Profeſſor Sibthorp at Oxford, aſking the favour of him to examine the old Herbariums under his care, in order to diſcover whether they might not throw ſome light on the matter. His anſwer is as follows: "The plant in Bobart's Herbarium, under this title of Moriſon's, "is *Trifol. ochroleucum*; which, however, as I never ſaw it with "purple flowers, I can ſcarcely think Moriſon meant. But there "is a paſſage in the deſcription of his Trifolium lagopoides an-"nuum hirſutum pallidè luteum ſeu ochroleucum, p. 141, n. 12, "which ſeems to point at his Trifolium pratenſe purpureum; "namely, *Vide ejuſdem iconem in tab. duodecima, ante lagopoides penna-*"*tum, et refer huc propter colorem, extra gregem Trifoliorum ſpicatorum* "*ſeu lagopoideorum flore purpureo illic donatorum.* The figure I confeſs "has a conſiderable reſemblance to that of Trifol. incarnatum; "but this has an annual, not a perennial, root."

6. *Trifolium mihi ignotum.*

Trifolium pratenſe. *Gmel. Tubing.* p. 227. *

This is quoted by Reichard in his Syſtema Plantarum; but as Gmelin ſays that it has *caulis procumbens, folia lanceolata,* and *capi-*

tulum ſolitarium aut geminum, there is reaſon to doubt its being *Trifol. pratenſe*; but when he further adds, that it has *ſtipulæ lineares crenatæ*, it is evident he cannot mean this ſpecies. Had he not at the ſame time made ſeparate mention of *Trifol. rubens*, I ſhould have ſuppoſed he here hinted at it under the wrong name of *pratenſe*. At leaſt I do not for my part know of any other ſpecies with crenated ſtipulæ, which Gmelin can poſſibly have intended.

* * * * * * *

HAVING thus finiſhed the hiſtory of the *Trifolium alpeſtre*, *medium*, and *pratenſe*, and pointed out with what plants they have in former, as well as preſent times, been confounded, it remains for me to deſcribe them botanically, and under each to inſert the proper ſynonyms. With a view of duly diſtinguiſhing the *Trifol. alpeſtre* and *medium*, which have always been miſtaken for one another, I ſhall bring in all the authors I have ſeen that mention them. But with reſpect to *Trifol. pratenſe*, I think I need only take notice of thoſe who have either figures or deſcriptions, or who have been cited by Linnæus and Reichard; and yet their number is ſo very great, that I almoſt fear to mention them. In order to prevent all further confuſion in future, I have found it neceſſary to give each of theſe Trefoils a new character, as their preſent ſpecific differences are not ſufficient to diſtinguiſh them from all others, ſtill leſs from one another. I ſhall now retain the ſame order as above, ſince I think that to be the moſt natural.

1. TRIFOLIUM *alpeſtre*, ſpicis denſis, corollis ſubæqualibus, ſtipulis ſetaceis divergentibus, foliolis lanceolatis, caulibus ſtrictis ſimpliciſſimis.

Trifolium

Trifolium alpeſtre. *Linn. Spec. Plant. ed.* 2, *p.* 1082. * *Syſt. Nat. ed.* 12, *tom.* ii. *p.* 502. * *Mant. Plant.* ii. *p.* 451. *Murr. Syſt. Veg. ed.* 13, *p.* 573, * *et ed.* 14, *p.* 688. * *Reich. Syſt. Plant. P.* iii. *p.* 553. * *Jacqu. Obſ.* iii. *p.* 14, * *tab.* 64. *et Fl. Auſtr. vol.* v. *p.* 15, *ſeq.* * *tab.* 433. *Allion. Pedem. tom.* i. *p.* 304, *n.* 1101.

Trifolium majus purpureo flore ii. *Cluſ. Pann. p.* 760. *

Trifolium majus ii. *Cluſ. Hiſt. libr.* vi. *p.* 245. *

Trifolium majus Cluſii ſecundum, non album, ſed rubrum. *Bauh. Hiſt. tom.* ii. *p.* 375. *

Trifolium montanum purpureum majus, C. B. *Ray. Hiſt. tom.* i. *p.* 944, *n.* 6. * *Tournef. Inſtit. p.* 404. *Boerh. Lugd. ed.* 2, *P.* ii. *p.* 30, *n.* 1.

Trifolium fol. long. fl. purp. *Rivin. Tetr. tab.* 12, *fig. ſin.*

Dubia.

Trifolium alpeſtre. *Doerr. Naſſ. p.* 236, *n.* 7. *

Trifolium montanum purpureum majus. *Bauh. Pin. p.* 328.

Habitat in locis ſiccis montanis **ſylvaticis** Hungariæ, Auſtriæ, Bohemiæ, Moraviæ, Stiriæ, *Cluſius*, *Jacquin*, Pedemontii, *Allioni*, et forſan Naſſoviæ, *Doerrien.*

Radix obliquè deſcendens, infra tellurem repens, fuſca.

Caules ſtricti, ſimpliciſſimi, teretes, pallidè virides.

Stipulæ longæ, ſetaceæ, uni-nerves, villoſæ, cauli approximatæ, a ſe invicem divergentes, vaginantes: vaginis anguſtatis, ſemiamplexicaulibus, margine utrinque rectis, initio villoſis ciliatiſque, dein glabris et vix niſi in ſinubus inter ſtipulas petiolumque ciliatis.

Petioli ſubæquales, breviſſimi, longitudine ſtipularum, erecti.

Foliola ſubæqualia, ejuſdem figuræ, lineari-lanceolata, acutiuſcula et faſciculo pilorum terminata; ſupra evidentius ſubtus obſoletius venoſa, verſus oras e crebrioribus majoribuſque venis concurrentibus quaſi ſtriata; margine ad tactum ſcabra, oculis nudis ſubintegerrima, ſed armatis ſubtiliter denticulata, et paucis brevibuſque pilis inſtructa.

Spica ovalis, vel ſolitaria et ſeſſilis intra folium florale dependens, vel plerumque gemina, et tum altera in proprio folio breviter pedunculata ſeriuſque florens præcociorem deprimit.

Flores erecti, denſe imbricati.

Perianthium villoſiſſimum, ochroleucum; ſtriis parum obſcurioribus. *Dentes* pallidè virides, *ſuperiores* bini æquales et tubo perianthii breviores, *inferiores* bini etiam æquales ſed ſuperioribus paulò longiores et tubum perianthii ut plurimum æquantes, *infimus* longitudine tubi corollæ ſed proximis dentibus duplo longior et interdum ultra.

Corolla inodora, tota ſaturatè purpurea: alis vexillo vix brevioribus, carinâ verò parum longioribus.

Congruit qua ſtaturam et habitum præſertim Trifoliis *rubenti*, *montano* et *pannonico*, quæ vero ab illo ſatis differunt; nempe—

Rubens vaginis inflatis ſtipuliſque ſubſerratis multo majoribus; foliolis ſpinuloſis e venis excurrentibus in hamulos ad apicem folioli verſos, alternos minores; ſpicis longis pedunculatis; perianthio glabro, dentibus quatuor ſuperioribus baſi dilatatis breviſſimis, inferioribus binis paullulò longioribus, infimo filiformi, longitudine totius corollæ, et proximis dentibus ſaltem triplo longiori.

Montanum caulibus angulato-ſtriatis, multifloris; foliolis iiſdem ac in Trifolio rubenti; ſpicis pedunculatis; perianthio glabriuſculo,

culo, dentibus quatuor ſuperioribus æqualibus, infimo parum longiori; corollis tetrapetalis albis, vexillo ſubulato.

Pannonicum caulibus ſubangulatis, ſæpè ramoſis; ſtipulis ſubulatis ciliatis; foliolis utrinque villoſis, obſoletè venoſis; ſpicis majoribus pedunculatis; dentibus perianthii quatuor ſuperioribus ſubæqualibus vel inferioribus binis parum longioribus; corollis albidis. His, præter alia, etiam differt *Trifolium ochroleucum* pannonico ſimillimum.

2. TRIFOLIUM *medium*, ſpicis laxis, corollis ſubæqualibus, ſtipulis ſubulatis conniventibus, caulibus flexuoſis ramoſis.

Trifolium medium. *Linn. Fn. Suec. ed.* 2, *p.* 558. *Hudſ. Angl. ed.* 1, *p.* 284. *Jenk. Brit. Pl. p.* 178.

Trifolium flexuoſum. *Jacqu. Auſtr.* iv. *p.* 45, * *tab.* 386. *Allion. Pedem.* i. *p.* 305, *n.* 1105. *Wither. Bot. Arr. ed. Stok. p.* 795, ſq. *

Trifolium alpeſtre. *Crantz. Auſtr. Faſc.* v. *p.* 407, *n.* 5. * *Scop. Carn. ed.* 2, *tom.* ii. *p.* 79, *n.* 924. * *Leerſ. Herborn. p.* 160, *n.* 575. * *Lightf. Scot. p.* 406. * *Robſ. Brit. Fl. p.* 137, *n.* 8. *Poll. Palat. tom.* ii. *p.* 335, *n.* 702. * *Mull. Fl. Dan. Faſc.* xii. *p.* 3, *tab.* 662. *Hudſ. Angl. ed.* 2, *p.* 326. *Retz. Prodr. p.* 141, *n.* 819. *Liebl. Fuld. p.* 303, ſq. * *Relh Cant. p.* 281, *n.* 539. *

Trifolium pratenſe β. *Gort. Belg. ed.* 1, *p.* 212, et *ed.* 2, *p.* 195. Trifolium, *n.* 6. * *Doerr. Naſſ. p.* 236.

Trifolium ſpicis villoſis, foliis inſidentibus, vaginarum caudis latioribus. *Hall. Stirp. p.* 585, *n.* 12. * *Boehm. Lipſ. p.* 135, *n.* 318. * *Nonn. Erford. p.* 155, *n.* 5. * *Gattenh. Heidelb. p.* 177.

Trifolium

Trifolium corollis monopetalis æqualibus, ſpicis ſubrotundis, ſtipulis lanceolatis, foliis integerrimis. *Scop. Carn. ed.* 1, *p.* 525, *n.* 3. *

Trifolium foliis ovatis nervoſis, ſupremis conjugatis, vaginis lanceolatis. *Hall. Hiſt. tom.* i. *p.* 163, *n.* 376. *

Trifolium pratenſe purpureum majus. *Ray. Hiſt.* i. *p.* 944, *n.* 3. * Et *ejuſdem Syn. ed.* 1, *p.* 134, *n.* 5. *

Trifolium purpureum majus, foliis longioribus et anguſtioribus, floribus ſaturatioribus. *Ray. Syn. ed.* 2, *p.* 194, *n.* 6, * et *ed.* 3, *p.* 328, *n.* 7. * *Tournef. Inſt. p.* 404. *Boerh. Lugd.* ed. 2, *P.* 2, *p.* 31, *n.* 8. *Wilſ. Syn. p.* 210, *n.* 7. * *Hill. Brit. p.* 381. *

Trifolium flore rubro majus, folio maculoſo. *Lind. Wikſb. p.* 38. (*ed.* 1716.)

Trifolium montanum purpureum majus, C. B. *Rupp. Jen. ed.* 1, *p.* 247; et *ed.* 2, *p.* 207. *

Dubia.

Trifolium alpeſtre. *Gmel. Tubing. p.* 228. *Scholl. Barb. p.* 168, *n.* 595.* *Mattuſch. Fl. Sil. p.* 165, *n.* 542. * Et *ejuſdem Enum. p.* 186, *n.* 690. * *Reich. Moeno-Franc. P.* 2, *p.* 46, *n.* 521. *Willden. Berol. p.* 242, *n.* 749.

Trifolium ſpicis villoſis ſubovatis, caule erecto, foliis ovato-oblongis integerrimis. *Roy. Lugd. p.* 380. *n.* 21.

Trifolii pratenſis altera ſpecies major. *Geſn. Hort. p.* 285.

Habitat in locis ſiccioribus elatis, præſertim fruticoſis, ſylveſtribus cretaceis et argilloſis, in Anglia, Scotia, Suecia, Dania, Auſtria, Carniolia, Pedemontio, Hollandia, Helvetia, et variis Germaniæ partibus.

Radix obliquè descendens, infra tellurem repens, fusco-cinerascens.

Caules suffruticulosi, infernè obliqui subtrigoni (siccati exactè trigoni), supernè erectiusculi teretes, geniculato-flexuosi, ramosi: ramis e tumore axillari callosо adsurgentibus, saturatè virides, interdum hic illic rubentes.

Stipulæ longæ, subulatæ, 3—5 nerves, glabræ, ciliatæ, a caule divergentes, inter se conniventes, vaginantes: vaginis angustatis, subamplexicaulibus, margine utrinque rectis, initio villosis, dein glabris ciliatis.

Petioli inæquales, inferiores stipulis multo longiores, superiores ferè breviores, omnes subdivergentes.

Foliola inæqualia, initio et infernè ovata, dein et medio oblonga, tandem et supernè ferè lanceolata et sæpè subattenuata, foliorum infimorum multo minora obtusissima et interdum retusa, reliquorum majora et acutiora, omnia supra obsoletius subtus evidentius venosa, supra etiam lunulis binis pallidis longitudinalibus et ad apices contiguis frequenter notata, versus oras e venis concurrentibus substriata, margine villis pluribus longiusculis appressis instructa, ad tactum vix scabra, oculis nudis integerrima, sed armatis tenuissimè denticulata, præsertim in foliis superioribus.

Spica initio spheroides, tandem globosa vel ovalis, solitaria vel gemina; alterâ plerumque serius florente, sessilis vel pedunculata, una vel utraque; pedunculis inæqualibus, unico vel duobus foliis floralibus suffulta ut plurimum dependentibus.

Flores divergentes, laxè imbricati.

Perianthium compressiusculum, glabrum vel rarius pilosum, pallidum et sæpè hic illic purpurascens, præsertim in spicæ vertice: striis saturatè viridibus et interdum purpureis. *Dentes* virides et

plerumque

plerumque ſimul qua partem rubentes, *ſuperiores* bini æquales et tubo perianthii breviores, *inferiores* bini etiam æquales ſed ſuperioribus longiores et tubum perianthii vel æquantes vel paullum excedentes, *infimus* longitudine tubi corollæ, ſed proximis dentibus multo, non tamen duplo, longior.

Corolla odorata: vexillo alis vix longiore ſubmucronato, ſtriis ſaturatius purpureis inſtructo; alis pallidioribus carinâ parum longioribus.

Differt a Trifolio alpeſtri abundanter, ut e deſcriptione utriuſque comparata facilè patet. Sed præterea ab eo etiam diſtinguitur *partibus* plurimis majoribus et colore obſcuriori præditis; *radice* magis lignoſa et terræ tenacius inhærente; *caulibus* diffuſis et vix umquam ſolitariis; *ſtipulis* latioribus, ut et vaginis, quæ venis inſuper crebrioribus gaudent ſæpiuſque purpureis; *petiolis* ſubpiloſis et non villoſis; *folio* florali ſæpius unico; *foliolis* multo latioribus et pleriſque oblongis, ſubtus glauceſcentibus nervoque minori inſtructis, verſus oras obſoletius ſtriatis: *ſpica* donec integra floreat, vertice depreſſa, et plantæ cultæ minori; *perianthio* ſtriis magis elevatis remotiſque, dentibus minus piloſis et infimo proportione breviori, utpote longitudinem dentium proximorum duplam non attingente; *corolla* dilutius purpurea, præſertim in alis, et ceteroqui qua magnitudinem formamque ſimillima illis in Trifolio rubenti.

3. TRIFOLIUM *pratenſe*, ſpicis denſis, corollis inæqualibus, dentibus calycinis quatuor æqualibus, ſtipulis ariſtatis, caulibus adſcendentibus.

Trifolium pratenſe. *Linn. Spec. Plant.* ed. 1, p. 768, * et ed. 2, p. 1082. * *Flor. Suec.* ed. 2, p. 259, n. 666. *

Syſt.

Syſt. Nat. ed. 10, tom. ii. p. 1177, et ed. 12, tom. ii. p. 502. *Mant. Plant.* ii. p. 451. *Murr. Syſt. Veg.* ed. 13, p. 572, et ed. 14, p. 688. *Reich. Syſt. Plant.* P .iii. p. 552.* *Kniph. Cent.* i. n. 91. *Mill. Dict.* ed. 8, n. 1. *Hudſ. Angl.* ed. 1, p. 284, et ed. 2, p. 325. *Neck. Gallo-Belg.* tom. ii. p. 315. *Gmel. Sib.* tom. iv. p. 22, n. 29.* *Crantz. Auſtr.* v. p. 407, n. 6. * *Scop. Carn.* ed. 2, tom. ii. p. 79, n. 923. * *Regn. Botan. Leers. Herborn.* p. 160, n. 574. * *Lightf. Scot.* p. 404. * *Poll. Palat.* tom. ii. p. 333, n. 701. * *Mattuſch. Fl. Sil.* p. 159, n. 541. * *Doerr. Naſſ.* p. 235, n. 5. * *Zorn. Icon.* cent. i. p. 56*, tab. 93. *Gattenh. Heidelb.* p. 177. * *Liebl. Fuld.* p. 302. * *Cappel. Helmſt.* p. 126, ſq. * *Relh. Cant.* p. 280, n. 538. * *Wither. Bot. Arr.* ed. *Stok.* p. 794, ſq. *——————

Egenolph. Imag. p. 139 (ed. ut vid. tert. ſine impr. anno) et ejuſd. *Effig.* p. 144 (ed. 1562). *Lonic. Hiſt.* tom. i. p. 104½ (ed. Lat. 1551) et ejuſdem *Herb.* P. ii. p. 180, fig. ſin. (ed. Germ. 1564), p. 249, fig. ſin. (ed. Germ. Uffenbach. 1630, alt. 1679, et Ehrhart. 1737). *Trag. Hiſt.* p. 586. *Dodon. Imag.* P. ii. p. 39 (ed. 1554 et 1559) et ejuſd. *Hiſt.* p. 338 (ed. Gall. 1557), p. 423 (ed. Belg. 1563), p. 494 (ed. Angl. 1578). *Matth. Comm.* p. 394 (ed. Lat. 1554), p. 439 (ed. Lat. 1559), p. 835 (ed. Lat. 1565), p. 883 (ed. Ital. 1568 et 1604), p. 609 (ed. Lat. C. Bauh. 1598, et alt. 1674), p. 321 (ed. Gall. 1620, p. Pinet.), p. 330 (ed. Gall. alt. 1680), p. 491 (ed. Ital. 1621 et 1712). *Camer. Epit.* p. 582. *Tabernæm. Herb.* P. ii. p. (ed. 1588), p. 235 (ed. C. Bauh. 1613), p. 225 (ed. ejus alt. 1625), p. 908 (ed. Hier. Bauh. 1664, et alt. 1731), et ejuſd. *Icon.* p. 523. *Ger. Herb.*

p. 1017, n. 1.* *Bech. Parn.* P. ii. *Phythol.* p. 384. *Lagun. Dioscor.* p. 341. *Zving. Theatr.* p. 748.

Trifolium pratense i. *Matth. Comm.* p. 472 (ed. Gall. 1572, p. Moulin). *Durant. Herb. l. Hort. Sanit.* p. 1014 (ed. Germ. Uffenb. 1619).

Trifolium pratense i. Matthioli, *Dalech. Hist.* P. 2, p. 1354 (ed. Lat. 1587), p. 241 (ed. Gall. 1615).

Trifolium spicis villosis, caule diffuso, foliolis integerrimis. *Linn. Hort. Cliff.* p. 375, n. 16.* *Virid. Cliff.* p. 76. *Fl. Suec.* ed. 1, p. 222, n. 615. *Roy. Lugd.* p. 380, n. 20. *Dalib. Paris.* p. 222.

Trifolium spicis villosis, foliis insidentibus, vaginarum caudis capillaribus. *Hall. Stirp.* p. 585, n. 14.*

Trifolium corollis monopetalis inæqualibus, spicis subrotundis, stipulis setaceis, foliis integerrimis. *Scop. Carn.* ed. 1, p. 524, n. 1.*

Trifolium caule obliquo, foliis ovatis hirsutis, supremis conjugatis, vaginis aristatis. *Hall. Hist.* tom. i. p. 163, n. 377.*

Trifolium vulgare. *Blackw. Herb.* tab. 20.

Trifolium. *Roess. Herb.* p. 297. *Egenolph. Imag.* p. 10 (ed. 1536). *Dorst. Botan.* p. 288, D. (ed. Lat. 1540). *Rivin. Tetr.* tab. 11, fig. sin.

Trifolium pratense purpureum. *Fuchs. Hist.* p. 817 (ed. Lat. 1542) et ejusd. *Herb.* tab. 468 (ed. Germ. 1543. *Turn. Herb.* P. ii. p. 157½ (ed. 1562 et 1568). *Rudb. Hort. Upsal.* p. 40 (ed. 1666), p. 111 (ed. 1685). *Ray. Hist.* i. p. 943, n. 2.* *Magnol. Charact.* p. 293.* *Wilds. Syn.* p. 209, n. 4.* *Knorr. Thesaur.* P. ii. p. 121, sq.* tab. T. 3.

Trifolium purpureum. *Ryff. l. Riv. Dioſcor.* p. 258 (ed. 1543), p. 257 (ed. 1549). *Egen. Imag.* p. 126 (ed. 1546).
Trifolium pratenſe alterum. *Matth. Comp.* p. 522.
Trifolium purpureum vulgare. *Bauh. Hiſt.* ii. p. 374.
Trifolium pratenſe flore purpureo. *Frank. Specul.*
Trifolium flore purpureo. *Till. Aboëns.*
Trifolium pratenſe purpureum minus, folio maculoſo. *Lind. Wikſb.* p. 38 (ed. 1716).
Trifolium pratenſe, flore monopetalo. *Tournef. Inſtit.* p. 404. *Boerh. Lugd.* ed. 2, P. ii. p. 31, n. 7. *Zannich. Iſtor.* p. 264, n. 1, * tab. 185. *Linn. Fl. Lapp.* p. 221, n. 273.
Trifolium pratenſe rubrum. *Weinm. Phyt. Iconogr.* vol. iv. N°. 980. ♂.
Triphylloides pratenſis, flore purpureo. *Ponted. Anthol.* p. 241. *Segu. Veron.* vol. i. p. 274.
Epithymum. *Dorſt. Botan.* p. 114.

Var. β. ſativa. *Hall. Stirp.* p. 586, et *Hiſt.* i. p. 163.
Trifolium pratenſe. *Vahl. Fl. Dan.* Faſc. xvii. p. 6, tab. 989.

Trifolium pratenſe γ. *Hudſ. Angl.* ed. 1, p. 284, et ed. 2, p. 325. *Wither. Bot. Arr.* ed. Stok. p. 795. *
Le Trefle. *Spect. de la Nat.* tom. iii. *Icon.* A. ad p. 26 (ed. 1735).
Trifolium purpureum majus ſativum, pratenſi ſimile. *Ray. Syn.* ii. p. 194, n. 5, * et ed. 3, p. 328, n. 6. * *Wilſ. Syn.* p. 210, n. 6. * *Hill. Brit.* p. 381. *

Var. γ. flore albo. *Hall. Hiſt.* i. p. 164, cfr. *Mattuſch. Enum.* p. 186, n. 689. *Wither. Bot. Arr.* ed. Stok. p. 795.

Dubia.

Trifolium pratenſe purpureum. *Bauh. Pin.* p. 327. *
Trifolium. *Ort. Sanit.* cap. 476 (ed. 1426 et 1517).
Brunella. *Brunf. Herb.* tom. iii. p. 26.

Habitat in pratis et paſcuis per totam Europam copiosè; etiam in Siberia, *Gmelin*, et America Septentrionali, Herb. Banks. Locis pinguioribus, humidiuſculis et apricis præſertim lætatur; nec tamen ſterilia, ficciora atque umbroſa reſpuit.

Radix ferè perpendiculariter deſcendens, infra tellurem vix repens, granulata, cinerea.

Caules adſcendentes, infernè altero latere planiuſculi (ſiccati trigoni), ceterum teretes, ſupernè ſtriati, ſæpius ſubramoſi; ramulis patentibus, tumore axillari deſtitutis; virides, rarius rubicundo-tincti.

Stipulæ breves, latæ, venoſæ, glabræ, conniventes, ariſtatæ: ariſta capillari viridi apice præſertim piloſa, vaginantes: vaginis dilatatis, amplexicaulibus, margine utrinque arcuatis, glabris, rarius ſubpiloſis.

Petioli inæquales, plerumque longiſſimi et ſtipulis multoties longiores, patentes.

Foliola inæqualia, ovata vel ovalia, obtuſa, foliorum infimorum multò minora, ferè orbiculata, retuſa, omnia ſupra depreſſo-ſubtus elevato-venoſa, ſupra etiam macula centrali ſubſagittata pallida plerumque notata, ſubciliata, integerrima vel interdum leviter et acutè crenulata.

Spica ovata, obtuſa, ſolitaria vel rariſſimè gemina, interdum pedunculata, plerumque vero ſeſſilis intra folia duo floralia oppoſita erecta.

Flores erecti, densè imbricati.

Perianthium ſericeum, pallidum et interdum qua partem purpureum: ſtriis ſaturatè viridibus vel rubris, rarius fuſcis. *Dentes*

virides et ſæpè magis minuſque rubentes, *ſuperiores* quatuor æquales, longitudine tubi perianthii, *infimus* paullò longior, ſed tubo corollæ brevior, fructu maturo *illi* patentiſſimi, *hic* erectus.

Corolla odorata: vexillo alis longiore truncato et ſæpè emarginato, ſtriis ſaturatius purpureis inſtructo; alis pallidioribus, carina longioribus.

Differt a Trifolio medio vehementer, ut comparata utriuſque deſcriptio facilè evincit, ſed inſuper huic etiam eſt diſſimile *radice* multò minori; *caulibus* non flexuoſis, plantæ ſpontaneæ humilioribus, magis procumbentibus, ſæpè ſolitariis, haud rarò ſimpliciſſimis, ramuliſque ſi adſunt paucioribus; *ſtipulis* parvis et aliter formatis; *vaginis* multò majoribus, non ciliatis, et ſæpius rubro- vel fuſco- venoſis; *foliis* floralibus ſemper binis; *foliolis* brevioribus, pleriſque ovatis, obtuſioribus, ſæpius albido-maculatis, obſoletius venoſis; ſupra venis plantæ vivæ depreſſis, ſiccatæ vero paullulum elevatis; *ſpica* minori, multò rarius pedunculata geminaque, et vertice non depreſſa; *perianthio* nunquam prorſus glabro; *corolla* minori, multò magis inæquali, plerumque pallidius purpurea, ſaltem alis apice non, ut in Trifolio medio, coloratioribus; *vexillo* anguſtiori; et tandem quod prius floreat.

Var. β. planta agreſti multò major magiſque glabra, caulibus pluribus; foliolis acutioribus; ſpica ſæpius pedunculata non adeo rarò gemina; perianthio plerumque villoſiori, dente infimo proportione longiori; vexillo aliſque corollæ magis divergentibus; ſtylo frequenter breviori; legumine ſæpè diſpermo. In hoc ſtatu culto, quum caules ſint diffuſi et ad flexionem quaſi tendant, e longinquo *Trifolium medium* adeò refert, ut pro eo facillimè accipi queat;

queat; ſed propiori inſpectione, ſtipulis præſertim dentibuſque calycinis longè diverſis, ſine ulla difficultate poteſt dignoſci.

Var. γ. non niſi corollis albis differt, in ſatis interdum occurrit, inter plantas agreſtes multò rarior eſt; ex Angliæ comitatu Derbienſi allatam vidi in Herb. Banks.

Præter has varietates, *Trifolium pratenſe* foliolis etiam quaternis, licet rariſſimè, reperiri, inter omnes conſtat.

* * * * * *

IN examining *Trifolium alpeſtre*, *medium*, and *pratenſe*, I have found them agree in very many reſpects. To prevent tautology, I have taken care to avoid mentioning in their deſcriptions any circumſtance common to all theſe three ſpecies; but, for the ſake of a more complete knowledge of the genus, I ſhall here in one place enumerate them all. However, as I have not had an opportunity of ſeeing *Trifol. alpeſtre* living, I cannot with abſolute certainty determine the nature of its ſtamina, piſtilla, ſeed-veſſels, and ſeeds; but what I ſhall mention with reſpect to theſe parts of fructification, I have chiefly taken from *Trifol. medium*, and particularly from the *pratenſe*. But as to the reſt, I know they agree in the following circumſtances.

Radix perennis, teretiuſcula, ramoſa.

Caules ex eadem radice plerumque plures, ſpithamæi, pedales et ultra, folioſi, infernè glabri, ſupernè villoſi vel magis minuſve piloſi.

Folia alterna, vaginis inſidentia, petiolata, ternata; floralia ſeſſilia vel breviter pedunculata, plerumque duo oppoſita; altero ſemper minore.

Vaginæ membranaceæ, integerrimæ, ochroleucæ, nervoſo-venoſæ (*vaſis*

(*vaſis* nempè ſimplicibus, verſus oras repetito-dichotomis, viridibus vel purpureis, et in Trifolio *pratenſi* interdum fuſcis), terminatæ *Petiolo* intermedio, et excurrentes in *Stipulas* laterales integerrimas et virides, in Trifolio autem *pratenſi* ſæpè rubro- vel fuſco- venoſas. Vaginæ ſtipulæque florales ceteris multò ampliores.

Petioli ſupra canaliculati, ceterum ſtriatuli, villoſi vel magis minuſve piloſi.

Foliola ſubſeſſilia, nervoſo-venoſa ut vaginæ, ſupra glabra ſubtus ſubvilloſa, inprimis juniora, et pallidiora; floralia minora anguſtiora et plerumque lanceolata.

Spicæ terminales: floribus ſeſſilibus in rachi ſubangulata aphylla villoſa.

Perianthium turbinato-cylindricum, monophyllum, tubuloſum, abbreviatum, inferum, perſiſtens, decemſtriatum; ſtriis elevatis; quinquedentatum; dentibus ſinu rotundato remotis, ſetaceis, piloſis, rectis, infimo interdum adſcendenti in Trifolio *medio*, et forſan etiam *alpeſtri*.

Corolla monopetala, purpurea, marceſcens, papilionacea; vexillo reflexo aliſque patentibus obtuſis, carina coloratiore.

Filamenta decem, hyalina, apice vireſcentia, unum totum liberum capillare, novem in membranam germen involventem infernè connata, ſupernè libera, primum ſubulata et dein apice incraſſata.

Antheræ ſubrotundæ incumbentes flavæ.

Germen ovatum vel oblongum glabrum vireſcens.

Stylus unicus, deorſum attenuatus, adſcendens, hyalinus.

Stigma ſimplex deflexum obtuſum praſinum.

Legumen ovale vel oblongum compreſſiuſculum glabrum monoſpermum,

ſpermum, in perianthio, cujus faucem ſquamulæ claudunt, occultatum corollaque emarcida cinctum, atque ſtylo perſiſtente mucronatum, in latere verſus apicem dehiſcens, ſemine maturo cineraſcens vel flavicans.

Semen ſubreniforme, compreſſiuſculum, glabrum, nitidum, ſubflaveſcens.

XXVI. *An*

XXVI. *An Account of ſeveral Plants preſented to the Linnean Society, at different Times, by Mr. John Fairbairn and Mr. Thomas Hoy, Fellows of the Linnean Society. By the Preſident.*

Read March 1, 1791.

1. COSTUS ſpecioſus.

COSTUS foliis ſubtus ſericeo-villoſis.

C. arabicus. *Jacqu. Ic. Rar. vol.* i. *t.* 1. *Collect. vol.* 1. 143.

Bankſea ſpecioſa. *Konig. Monandr.* 75.

Tsjana-kua. *Rheed. Mal. vol.* xi. 15, *t.* 8?

Herba ſpiralis hirſuta. *Rumph. Amb. vol.* vi. 143, *t.* 64, *f.* 1?

Native of the Eaſt Indies.

Flowered in Sion Gardens in 1790. *Mr. Hoy.* 4

This fine plant has been very improperly confounded with the Coſtus arabicus of Linnæus. The latter is the ſpecies deſcribed in his Hortus Cliffortianus, of which a drawing by Ehret is in the library of Sir Joſeph Banks, but its ſynonyms are even in that work much confuſed. It is probable there may be many ſpecies comprehended under thoſe ſynonyms, nor is our preſent knowledge

of the ſubject ſufficient to extricate their differences. The above ſpecific character is propoſed for the preſent, for want of a better.

It is doubtful whether the above ſynonym of Hort. Mal. belongs to this ſpecies, though much reſembling it, except that in that figure the lower lip of the corolla is perfectly entire, in ours it is trifid and undulated.

Rumphius's *Herba ſpiralis hirſuta* may be our plant; but who can judge from his miſerable diminiſhed figures in ſo nice a point?

Profeſſor Jacquin's magnificent figure, and full deſcription, render all further obſervations unneceſſary; except that he has omitted to mention the ſpiral contortion of the ſtem, remarkable in this plant, and which has led us to the application of Rumphius's ſynonym.

2. STATICE latifolia.

STATICE ſcapo paniculato ramoſiſſimo ſcabro, foliis pubeſcentibus, pilis faſciculato-ſtellatis.

Limonium folio Enulæ, flabellis tenuiſſimis ramoſiſſimis, floribus parvis cæruleis. *Gerber. MSS. Herb. Linn.*

Firſt gathered by Gerber in Ruſſian Tartary, on the banks of the river Don, near Aſoph.

Flowered in Sion Gardens in 1788. *Mr. Hoy.* 4

Leaves all radical, oblong, a foot or more in length, entire, ſlightly undulated, ſometimes emarginated, pubeſcent and ſoft to the touch, being ſprinkled all over with little ſtellated faſciculi of ſoft ſhort hairs.

Stalks very much branched, and ſpreading in every direction, covered with the ſame kind of pubeſcence as the leaves,

but

but rather more harſh; *branches* roundiſh, alternate, terminating in ſimple horizontal racemi. *Bracteæ* ſmall, concave, acute, two together at each diviſion of the panicle, one of which is placed on the outſide of the branch at its baſe, and the other in its axilla.

Flowers moſtly two together, emerging from two ſmall *bracteæ*, like thoſe on the ſtalk; but furniſhed alſo with two larger and more obtuſe *bracteæ*, with a large membranous margin.

Calyx tubular, membranous, five-toothed, whitiſh, with five green angles.

Corolla longer than the calyx, blue.

Antheræ yellow.

This ſpecies ſhould be placed after Statice Limonium.

3. SEMPERVIVUM ſtellatum.

SEMPERVIVUM caule herbaceo pubeſcente, foliis ſpatulatis ſparſis.

Sedum petræum rotundifolium, flore luteo ſtellato Montis Baldi. *Seguier. Veron. vol.* ii. 360, *t.* 17.

Found by John Baptiſt Scarella, on the rocks of Mount Baldus. *Seguier.*

Abundant in Chelſea Garden, where it flowers every year. *Mr. Fairbairn.* ⊙

This whole plant is, as it were, a repreſentation in miniature of Sempervivum arboreum, but more lax and diffuſe. It is abundantly diſtinguiſhed from that ſpecies by its annual root, herbaceous pubeſcent ſtem, and ſpreading panicle. The flowers are yellow, and agree perfectly with the generic character of Sempervivum, not with that of Sedum.

If the ſynonym of Seguier above quoted be right, we learn from thence the native country of this plant, which has long been cultivated at Chelſea; but from whence it was brought is not known.

This Sempervivum is extremely different from the Sedum alſinæfolium of Allioni; but may perhaps be the *Sempervivum alpinum Montis Baldi, foliis lenticulatis, floribus non punctatis*, of Mauritius Hoffman, mentioned by that author in his *Specimen Pedemontanum*, *p.* 16.

4. ASTRAGALUS leucophæus.

ASTRAGALUS cauleſcens procumbens, leguminibus ſubcylindricis rectis glabris, foliolis obcordatis ſubtus villoſis.

Communicated by Mr. Fairbairn from Chelſea Garden, 1788. 24

The native country of this Aſtragalus is unknown. It appears to be an old inhabitant of Chelſea Garden, and was marked with the name of Aſtragalus piloſus in Miller's Herbarium. It has, however, no affinity to the A. piloſus of Linnæus, nor does it even agree with the deſcription of that plant in Miller's Dictionary.

Our plant is allied to A. hamoſus; but differs from that ſpecies in having rounder leaves, more flowers in a ſpike, and eſpecially in having ſtraight, not recurved, pods, only half the length of thoſe of A. hamoſus.

5. MIMOSA myrtifolia.

MIMOSA foliis ovato-lanceolatis obliquis undulatis acuminatis margine cartilagineis: primordialibus pinnatis.

Raiſed

Raiſed from ſeeds brought from New South Wales, in Sion Gardens, where it flowered in 1790. *Mr. Hoy.* ♄

The *Branches* are ſomewhat angular.

Leaves alternate, oblique, of a glaucous green, very much undulated, and near two inches in length, with a ſtrong central rib.

Flowers on the young branches very numerous, fragrant like thoſe of Spiræa Ulmaria, and growing three or four together, in little heads.

Calyx ſmall, green, obſoletely ciliated.

Corolla greeniſh white, ſometimes reddiſh, of four petals.

Stamina numerous.

6. MIMOSA ſuaveolens.

MIMOSA foliis linearibus acuminatis rectis margine cartilagineis: primordialibus pinnatis, ramis triquetris.

Flowered 1790, in Sion Gardens, from ſeeds brought from New South Wales. *Mr. Hoy.* ♄

The *Branches* are moſt acutely triangular, and much compreſſed; their edges bright red.

Leaves alternate, four or five inches long, with a rib and margin like the laſt.

Flowers in axillary *racemi*, yellowiſh white, fragrant, of four petals.

Stamina numerous.

Young *Capſules* ſmooth and glaucous.

This ſpecies, as well as the preceding one, belongs to that ſingular tribe of Mimoſas, for the knowledge of which we are

indebted to the ſouthern hemiſphere, all which have totally different leaves in their adult ſtate from what they produce at firſt ſpringing out of the ground. The ſeedling plants bear conjugated pinnated leaves, like moſt of this genus; but the common footſtalks of the ſucceeding leaves being gradually dilated, at length loſe their foliola, and aſſume the appearance of ſimple entire leaves; nor does the tree afterwards produce any other. We have no deſcription of the ſeedling leaves of Mimoſa ſimplicifolia *(Linn. Suppl.)*, but it is probable they alſo are at firſt of the pinnated kind.

XXVII.

XXVII. EXTRACTS *from the* MINUTE BOOK *of the Linnean Society.*

November 4, 1788. MR. DRYANDER communicated to the Society, from Sir Joſeph Banks, Bart. a ſpecimen of an incomplete Bupreſtis; ſent to Sir Joſeph from the Committee of Warehouſes of the Eaſt India Company, on account of the damage it had done to a bale of muſlins. It was found in its preſent ſtate on opening a bale of piece goods received from Bengal, and appeared to have eaten through fifteen pieces of muſlin, of eight or ten folds in each piece, making itſelf a paſſage of about its own ſize.

This Bupreſtis, in ſize, ſhape, impreſſed *lunulæ* of the thorax, ſhield, and canaliculated abdomen, exactly reſembles the Bupreſtis canaliculata *Fabr. Mant.* p. 181, n. 58, but differs in colour. The B. *canaliculata* wants the two golden ſpots on the thorax, which this has, like thoſe of B. *vittata*. The abdomen of B. *canaliculata* is bright purple on the upper ſide; in this it is of a ſhining green, appearing in certain lights of a dark blue. The under ſide of the ſame part is in B. *canaliculata* of a dull copper colour, in this of a bright green.

The B. *canaliculata* is ſaid to come from *Africa æquinoctialis* (Sierra

(Sierra Leona); but that reſts entirely on the authority of the label in Sir Joſeph Banks's collection, which may poſſibly be erroneous.

Of forty ſpecies of Bupreſtis in the cabinet of Sir Joſeph Banks, none but the B. *canaliculata* has all the joints of the abdomen canaliculated; nor is ſuch a ſhield to be found except in that ſpecies and another, deſcribed from the ſame cabinet by Mr. Fabricius, during his laſt ſtay in England, under the name of *quadridentata*.

December 2, 1788. The Preſident laid before the Society a drawing of a ſingular Pidgeon, accompanied with the following letter from Mr. Latham.

"DEAR SIR,

"WITH this you will receive an accurate drawing, by "Mr. Lewin, of a Luſus Naturæ in a dove-houſe Pidgeon, "now in my collection.

"All I know of the hiſtory of this extraordinary produc- "tion is, that, a few years ſince, a perſon employed to take "all the young birds from their holes, for the uſe of the "table, obſerved this ſingular ſpecimen in one of the neſts, "along with another fledged in the uſual manner, the pro- "duce of one hatch. His curioſity being excited, he brought "it into the houſe; where it lived for a month or longer, "and then died.

"The peculiarity of this ſubject conſiſts in its not having "a ſingle *complete* feather on any part of its body, although "entitled from its age to have been fully fledged; inſtead of "which, every feather is ſtill incloſed in a caſe the whole of

"its

" its length, which in ſome of the greater quills amounts to ſix
" inches. Indeed a kind of fringe appears at the ends of moſt of
" the feathers; and, on diſſecting a feather, the ſhaft is found
" by no means deſtitute of web, but the latter is confined
" merely by the ſurrounding ſheath. It can ſcarcely have
" eſcaped the notice of an obſerver, that when a new feather
" firſt makes its appearance on the body of a bird, a tender
" filmy ſubſtance environs and defends it, during its infant
" ſtate. But no ſooner does the web increaſe to any ſtrength,
" than the film gives way, and the feather continues to grow
" to its perfect maturity.

" That this diſeaſe did not occaſion the bird's death, I am
" certain; as it appeared healthy and well during the time it
" lived.

" I ſhall be happy if the above ſhort hiſtory and drawing
" ſhould prove worthy the notice of the Linnean Society.

" I am, &c.

(Signed) " JOHN LATHAM."

DARTFORD,
November 4, 1788.

March 2, 1790. The Preſident exhibited ſome deſcriptions in Italian, accompanied with rude drawings, of ſeveral rare plants found near Bologna in 1652, appearing to be an original manuſcript of Zannoni, the property of Mr. Thomas F. Forſter, jun. of Threadneedle Street.

F I N I S.

DIRECTIONS FOR PLACING THE PLATES.