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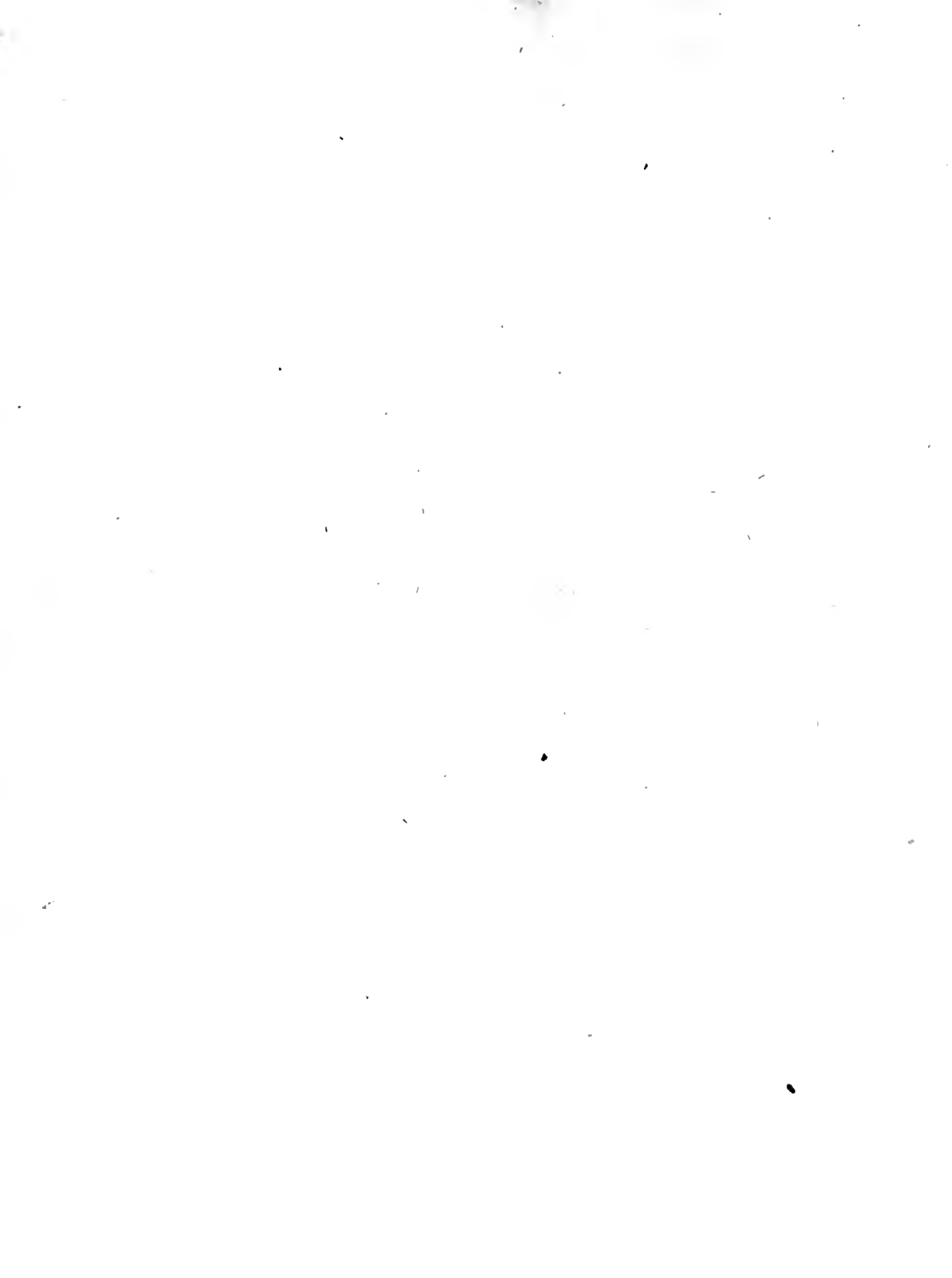
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TRANSACTIONS

OF THE

L I N N E A N S O C I E T Y. *K*



V O L U M E I.

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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
lived

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 without 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 ingenious 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.

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 excellent

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 *Phytobafanos*, 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 *Ecphrafis* 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 criticized 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 *Lyncei* 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 Matthioli with many additions; and has illustrated about 600 new or heretofore mistaken plants in his Prodrômus, 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 *Doxoscopix 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 Montpellier, 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 development 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 phenomenon, 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, superintendent 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 surprize, 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 im-
peachment

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 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 profelytes 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 befall 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 Ichneumoncs; 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 Rupprius's excellent *Flora Jenensis*, and the following for the appearance of Scheuchzer's inimitable *Agrostographia* and Dillenius's *Flora Giffensis*. Rupprius 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

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 revival of which one would have thought sufficient to difarm 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
author

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, the

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 Leipzig 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 that
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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 fervile 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 Seguiet'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 trifling

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 Peterburg 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 *wifer* 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 blaft the memory of Haffelquist. His calumnies have been refuted by Dr. Sparrman, who has juftly 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 fhip. He fpent fome time in China, of the natural hiftory of which he has told us much, and has made known many new plants, among which is the Osbeckia.

Loefling, a favourite difciple of Linnæus and an excellent botanift, undertook the examination of Spain in 1751, where he found many new and rare plants, and probably would have made many more difcoveries, had his ftay been longer in that rich, and hitherto almoft unexplored country; but he left it for one ftill more interefting, South America, where he would, no doubt, have made a rich harveft, had his life and health been continued; but he was foon cut off at the age of 27. His letters and botanical defcriptions have been published by his illuftrious mafter, who, in this inftance, as well as on every other occafion, has given proofs of that fenfibility which muft ever make him as dear to humanity as to fcience.

I forbear to enlarge upon other expeditions of lefs note, as thofe of Montin and Solander to Lapland, Bergius and Falk to Gothland, &c. although each contributed to the general ftock of natural knowledge very much. It is to be regretted we have not had more information from Rolander, who vifited Surinam and St. Eufatia in 1755. He fent home indeed feveral curious infects, mentioned in the *Systema Naturæ*; but I find, by a letter of Linnæus to Gerard, that he efteemed Rolander the firft entomologift after Reaumur. A pupil of Linnæus, named Martin, vifited Spitzbergen in 1758: he muft not be confounded with Martens, who went to the fame country in 1671, and whose rude figures are quoted by Linnæus. I muft 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 Auftriaca*? 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, Regenfus'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. Baister, 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 Subsciva*, 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
repulsing

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 Roefel 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

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 risk 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 reputation,

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 minutiae 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
humble

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.

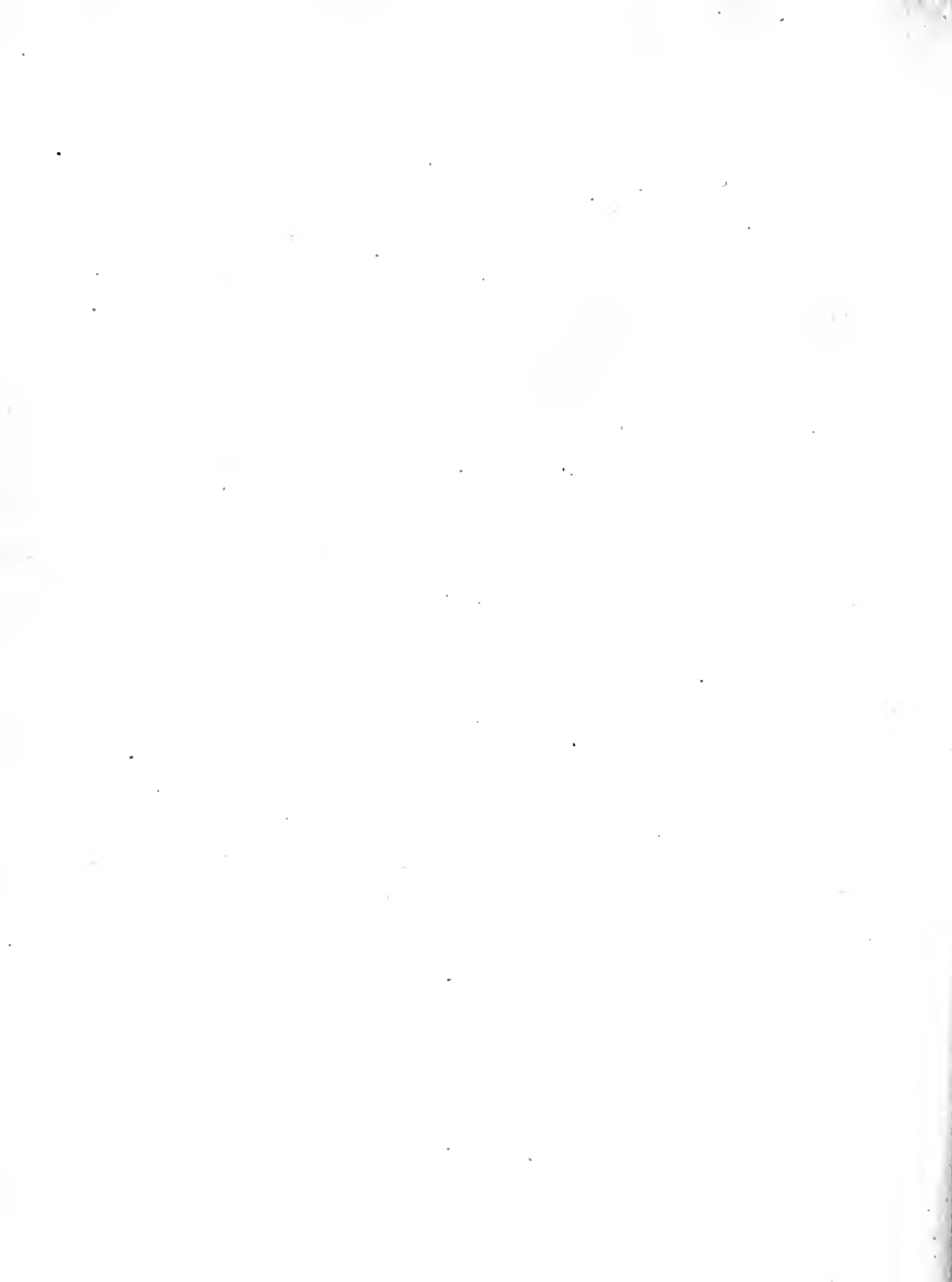
But nothing will be with more reason expected from the members of this society than a strict attention to the laws and principles of Linnæus, so far as they have been found to be good. No where have his works been more studied and applied to practice than in this country, nor can any other be so competent 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 possessed

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 détachés de leur masse et transportés sur des terrains calcaires, les végétaux, les animaux, les pierres roulées qu'on trouve dans son sein à une grande profondeur, sont des témoins irréfragables qui déposent sur le travail des eaux et sur les effets d'immenses courants.

Mais ces matériaux épars que l'activité des naturalistes rassemble de toute part et qui invitent le philosophe à remonter aux causes premières de leur déplacement, 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 paroît réduit 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.

Pendant les foins employés à recueillir ces matériaux difféminés 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 planète. 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 étoient 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 dû 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 naphthe et des autres matières minérales inflammables dénuées 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 étoient dus aux exhalaïsons de la terre, que l'élément terreux seul étoit le principe de leur formation, et qu'ils étoient à la terre et aux autres minéraux 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 Fourcroy 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 fréquemment 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 paroît postérieure 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 entraînées 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 inférieurs, ou garni les bords de la mer. Les testacées comme plus légers, ainsi que les pierres roulées et les sables ont formé les lits supérieurs. Ces derniers lits peuvent être contemporains ou postérieurs, et tenir par cela même à des époques différentes : mais, dans tout état de cause, si les testacées se sont conservés, l'immense grosseur des cétaquées, 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 rejeter la possibilité. Ils peuvent bien y avoir part dans certaines circonstances : peut-être même auroit-on quelque raison de regarder l'asphalte comme bitume mixte, si, pour se déterminer, on s'étoit 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 caractérisent les houilles, le malte, le bitume et les huiles de pétrole ? On ne peut voir ici que l'effet des décompositions spontanées et des nouvelles combinaisons
opérée

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 inconnues, 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 vaisseaux fermés; qu'elles s'échauffent par l'effet des décompositions lentes et des nouvelles combinaisons, et se réduisent 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, entraînés 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 manganèse 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 résultants d'un mélange naturel d'huile de pétrole avec une mine de fer analogue à celle du Derbyshire.

Dans d'autres circonstances ces mêmes huiles détachées des bois par leur décomposition spontanée, s'infiltrèrent insensiblement dans des couches de sable et d'argille, et donnent origine aux houilles sèches et aux schistes bitumineux. Enfin, dans d'autres circonstances encore et qui ne feroient qu'une suite des précédentes, ces huiles ramassées dans les scissures intérieures de la terre y ont pris la consistance 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 dû s'opposer à cette opération secondaire de la Nature ; la condition essentielle pour la bituminifation 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 cétaqués 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, feroit 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 feroient la suite ne pourroient influencer 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 entraînés 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 coïncidant avec l'hypothèse Francoise* : dans toutes ces mines j'ai aperçu des dépouilles de testacées, comme comes, 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 enfouies y sont carbonifiées 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 aperçus un peu au-dessus de Tanninge, 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 Genève 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 carbonifiées 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 Maastricht, ainsi que dans les immenses faluniers 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 recèle 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 possède n'ayant qu'un pied de longueur sans indiquer cette décroissance 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 désigne 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 présentent 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 schifteux 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 *ferré* qu'on ne voit pas dans nos empreintes, augmentoit nos incertitudes sur leur véritable espèce. 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 quartzéuse; et elle est tellement distribuée que la contexture du bois n'est nullement altérée 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 espéré 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 surpris'd 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. Inf.* 190. 93.

Gæd. Inf. vol. 1. tab. 23. fig. 38. Lijst. Gæd. 96. Rai. Inf. fig. 195. n. 40. Albin. Inf. 24. f. 36. g—k. Wilkes 20. t. 3—5.

De Geer. Inf. 1. t. 11. f. 8. Roef. Inf. 2. t. 46. Esper. tom. 3. tab. 66. fig. 6—10 Menthastr. 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 adpersæ punctis nigris plurimis in superiorum paginâ superiore; Abdomen luteum quintuplici macularum nigrarum ordinè, 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. Inf.* 190. 93.

Gæd. Inf. vol. 1. 38. Lijst. Gæd. 93. Rai. Inf. 196. n. 155.

Merian Eur. 1. t. 46. f. 65. Alb. Inf. 24. f. 35. a—d. Frisch. Inf. 3. t. 8. Ammiral. t. 6.

De Geer. Inf. 1. t. 11. f. 7. Roef. Inf. 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 Mustlin.*

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. Inf. 196. An. 97. 6. fœm. Reaum. Inf. 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 feu 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. Inf. 21. f. 30. e—h.

Expansio alarum 1 unc. 6 lin.

Descrip. Maxime 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 flavescens 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*.

L

Linneus

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



1



Phalena B. Erminacea.

2



Phalena B. Lubricipeda.

3



Phalena B. Mendica.

4



Phalena B. Papyratia.
Wockenzie

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 breviori compresso.

Sponte nascentem in *Ostro-Bothniæ* fylvis abunde legit C. Linné—prope *Bern* declivibus montium umbrosis legit A. Haller—in Monte *Saleve* legit J. Ray—in *Pedemontii* fylvis 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—hirsuto-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, hirsuto-pubescentia. 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 hirsuto-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 brevius, 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.

d Styli lobus terminalis.

b ——— inferius.

e Antheræ.

c Styli lobi laterales.

Isdem literis in omnibus tabulis notantur eadem 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 anguste canaliculatâ, inferiore petalis brevioribus compressis.

Sponte nascentem in *Virginiâ* legit H. Marshall.

Floret fine Maii.

Petala fordide viridia lineis macularum ferruginearum: supremum erectum; infimum paulo brevius, dependens; ovato-lanceolata: lateralia multo angustiora, 1-4ta parte longiora, patenti-deflexa, 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 anguste canaliculatâ—Labium inferius flavum maculis fuscis circa apicem, petalis brevioribus, calceiforme, compressum, ore suborbiculare, extus læve, intus basi barbatur. Stylus flavus—Lobi; laterales apice ipso levissimè incurvuli, anguste 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. *Morif. Hist. v. 3. p. 488. f. 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* fylvis legit I. Bartram.

Floret fine Maii, Junio.

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

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, linearilanceolata, basi intus barbata: integerrima, obtusa, hirsuto-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 barbata 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 adverfo prodeuntibus, &c. *Plukn. Mantiff. p. 101. t. 418. f. 1. pessima*.

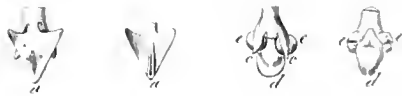
Corolla labio superiore rhomboideo acuminato lateribus deflexo subtus carina angustissima obtusa, inferiore petalis longiore antice fissio.

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

Floret fine Maii, Junio.

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

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-pubescentia, solidus, herbaceus, marcescens. Bractea solitaria sub germine, structura foliorum sed longe minor et ovato-lanceolata. Germen viride, breve incurvum, obsolete pyriforme 6-angulum, hirto-pubescentia. Petala pallide fusca: supremum erectum; inferum 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-pubescentia, subtus carina angustissima obtusa—Labium inferius purpureum vittis saturationibus, petalis longis; basi recte deflexum, intus barbatum; dein exprorectum, grosse calceiforme, ore antice fissum, utrinque hirto-pubescentia. Stylus flavus—Lobi; laterales apice ipso lævissime incurvuli, anguste cuneiformes, obtusi; medius late cuneiformis basi angustiore, obtusus—hirto-pubescentia. Antheræ flavæ, lobis multo latiores, orbiculares, 2-loculares. Pollen flavum. Stigma dilute flavum, basi longe attenuatum, triangulo umbilicatum, papillosum.



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.

I. LICHEN exanthematicus. t. 4. f. 1.

L. Leprofus cinereus, scutellis minutissimis carnis immerfis in
crustæ foveolis albis. Confer Lichenem 2077, 2078, *Hall. Hist.*

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

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

2. *L. gypfaceus.* 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 Seguerii.

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

M

Habitat

Habitat in rupibus Monspeliæ & Genuæ.

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

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

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

Habitat in fiſſuris rupium Galliæ auſtralis.

Cruſta alba, lobata; lobi rotundati, valde deflexi, ut farcti vel inflati apparent, ſupra minute teſſellato-rimofi. 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 Monſpeliæ.

Radices albæ, ramoſæ, in fiſſuras rupium longiſſimè deſcendunt. Cruſta lobata, ſubfoliacea, craſſiuſcula, cæſii vel glauci coloris. Tubercula magnitudiue 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 Cenii 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 hirtutis 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 Sabaudicæ. In summitate montis *Montanvert* prope *Chamonix*.

Frondes valde implexæ, ramosissimæ, late diffusæ, magis vel minus angustæ, marginibus subrevolutis, supra albæ, nitidæ, quasi encausto ornata, 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. *Vuill. 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 Galliae borealis.

Foliaceus, late expansus, e cortice parum elevatus, rugosus margine undulatus; madidus saturate virens, subtus pullus; fuscus plumbeus. Scutellae numerosae, concavae, disco ferrugineo vel pullo; externe folio concolores, varieque corrugatae, verrucosae, & saepe farinosae, 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* Dickf. Fasc. sed differt quod subtus villosus, nec utrinque laevis est. Folia sicca obscure plumbea, villo albido. Scutellae numerosae, sparsae, atro ferrugineae, juniores marginatae, margine concolori, mox disco elevato, margineque oblitterato, in tubercula abeunt.

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

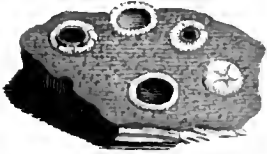
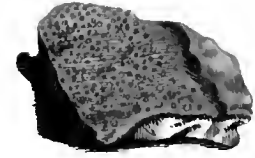
L. foliaceus erectus laciniatus albus, scutellis posticis cucullatis fuscis.

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

An *Dill. Musc.* t. 21. f. 56. B?

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

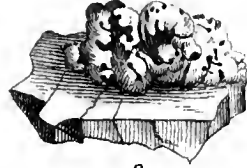
* *L. saturninus*. *Dickf. Crypt. fasc.* 2. 21. t. 6. f. 8.



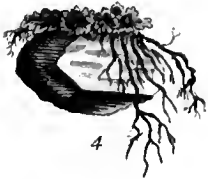
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6



7





Habitat in ericetis alpinis Sabaudia. 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. Lacinia fructifera ampliata, rugosa, posticè cucullata. Scutella intra cucullum, fusca.

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*, *Cantbaris livida*, with various species of *Musca*, 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

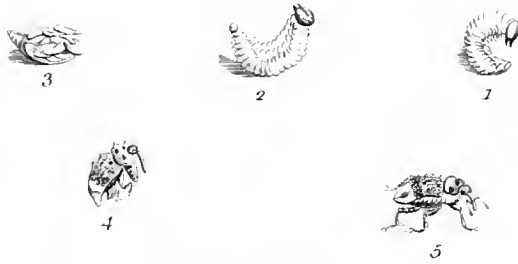
down the back to the tail, which was terminated by four small fetæ, turning a little upwards, the two lowermost by much the longest. The larvæ were generally found in considerable numbers together, and on being disturbed ran pretty briskly. From their size, and other concurring circumstances, I had no 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 fight 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.

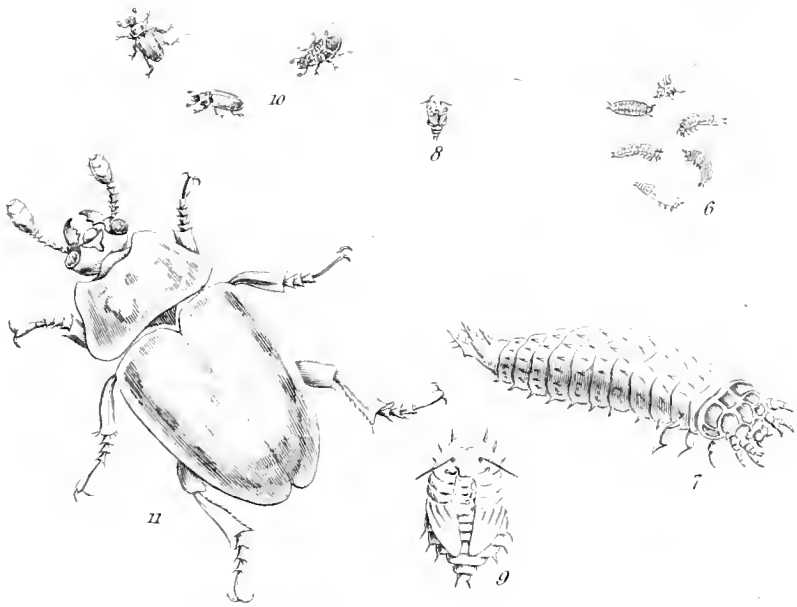
I should have taken other steps to have reared them, had I not been certain that my tree still contained great numbers of them: in hopes therefore of finding them in their pupa state, I waited till the 25th of July, when, on cutting out a piece more of the tree, my expectations were answered; I discovered 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



Curculio Lapathi.



Silpha grisea.

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 sawdust, 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.

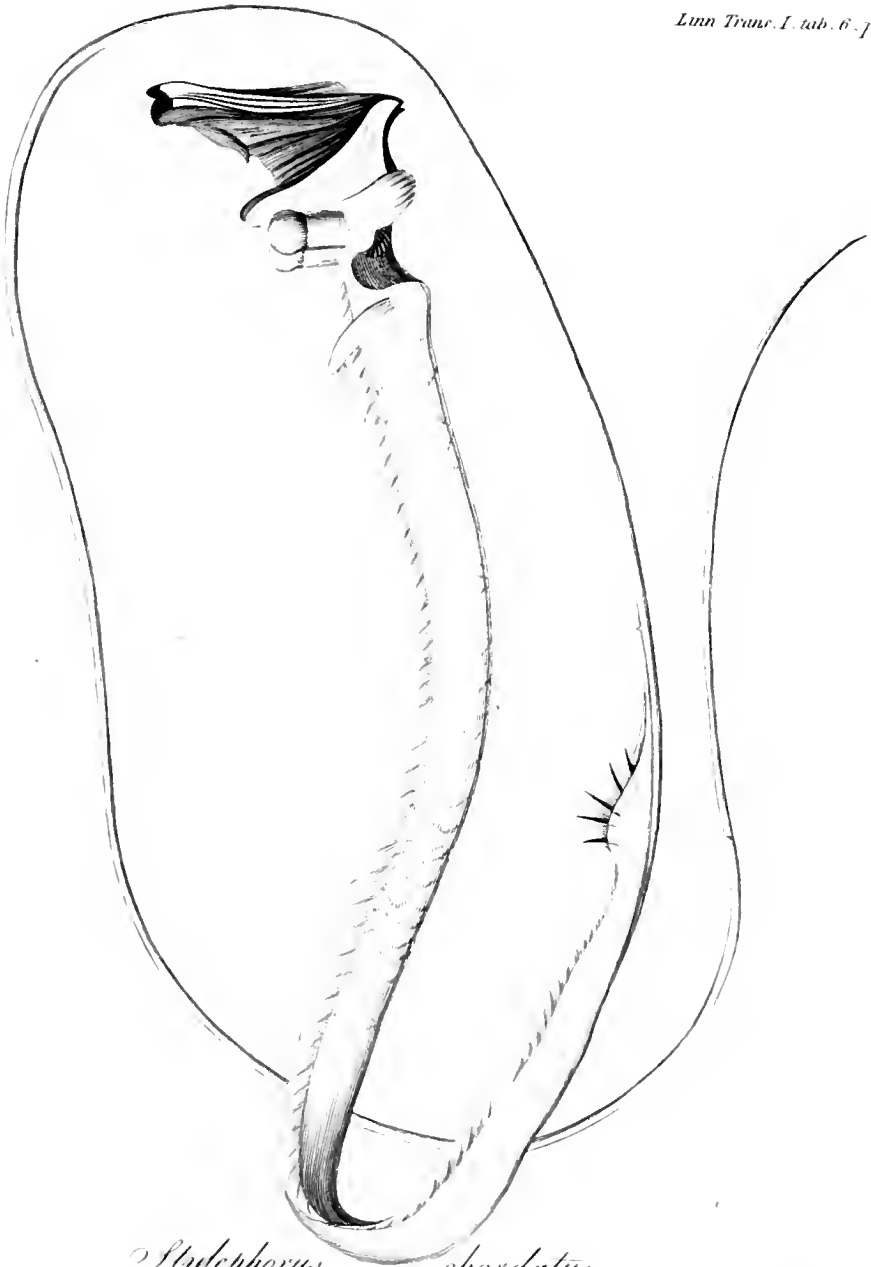
The head of this extraordinary animal bears some distant resemblance to that of the genus Syngnathus, and its true structure cannot so easily be described in words as conceived by the figure.

The

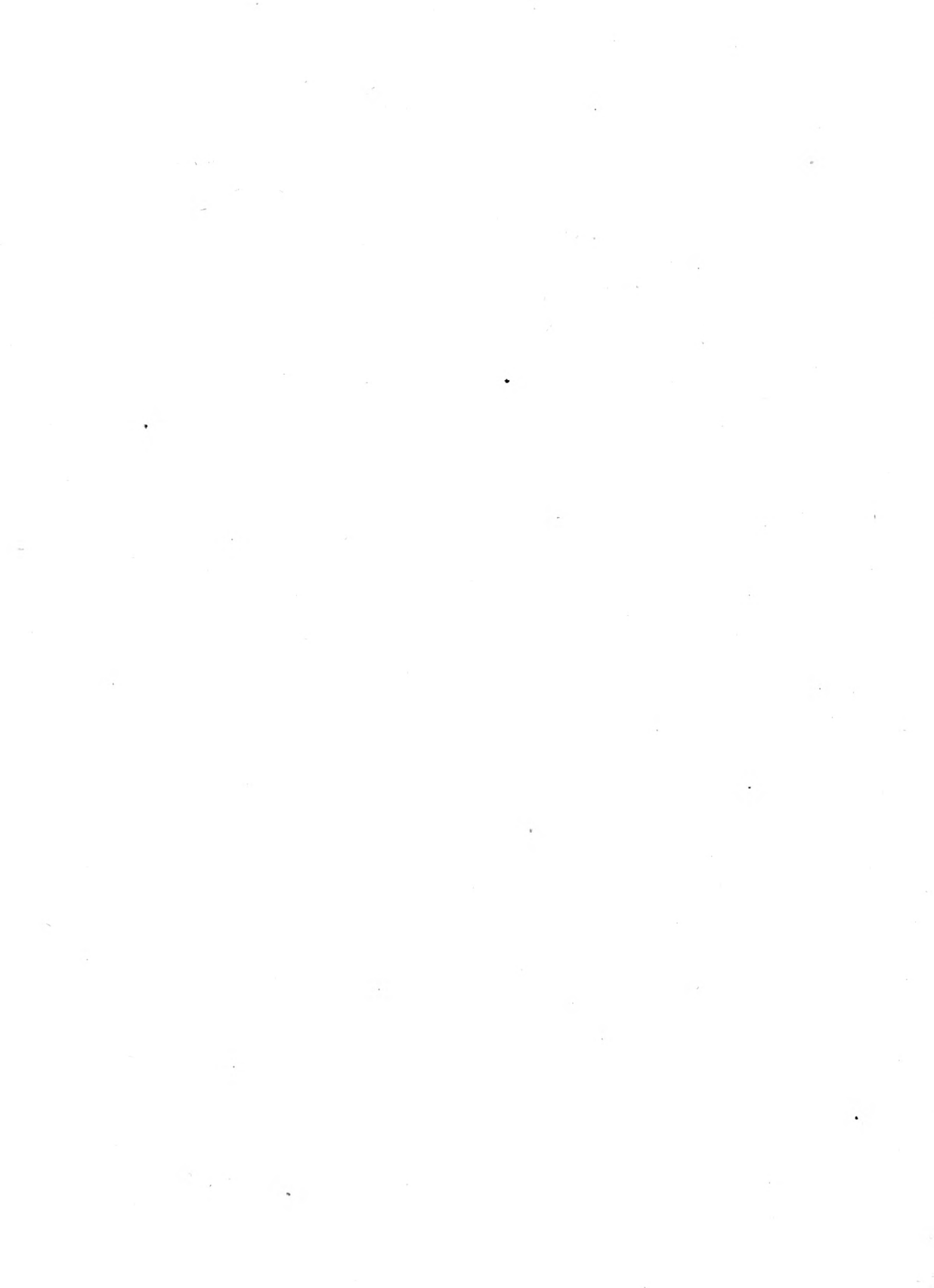
The rostrum, or narrow part which is terminated by the mouth, is connected to the back part of the head by a flexible leathery duplicature, which permits it either to be extended in such a manner that the mouth points directly upwards, or to fall back so as to be received into a sort of case, formed 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.



Stylophorus *chevdatus.*



VIII. *Description of the Hirudo viridis, a new English Leech, by George Sharw, 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.

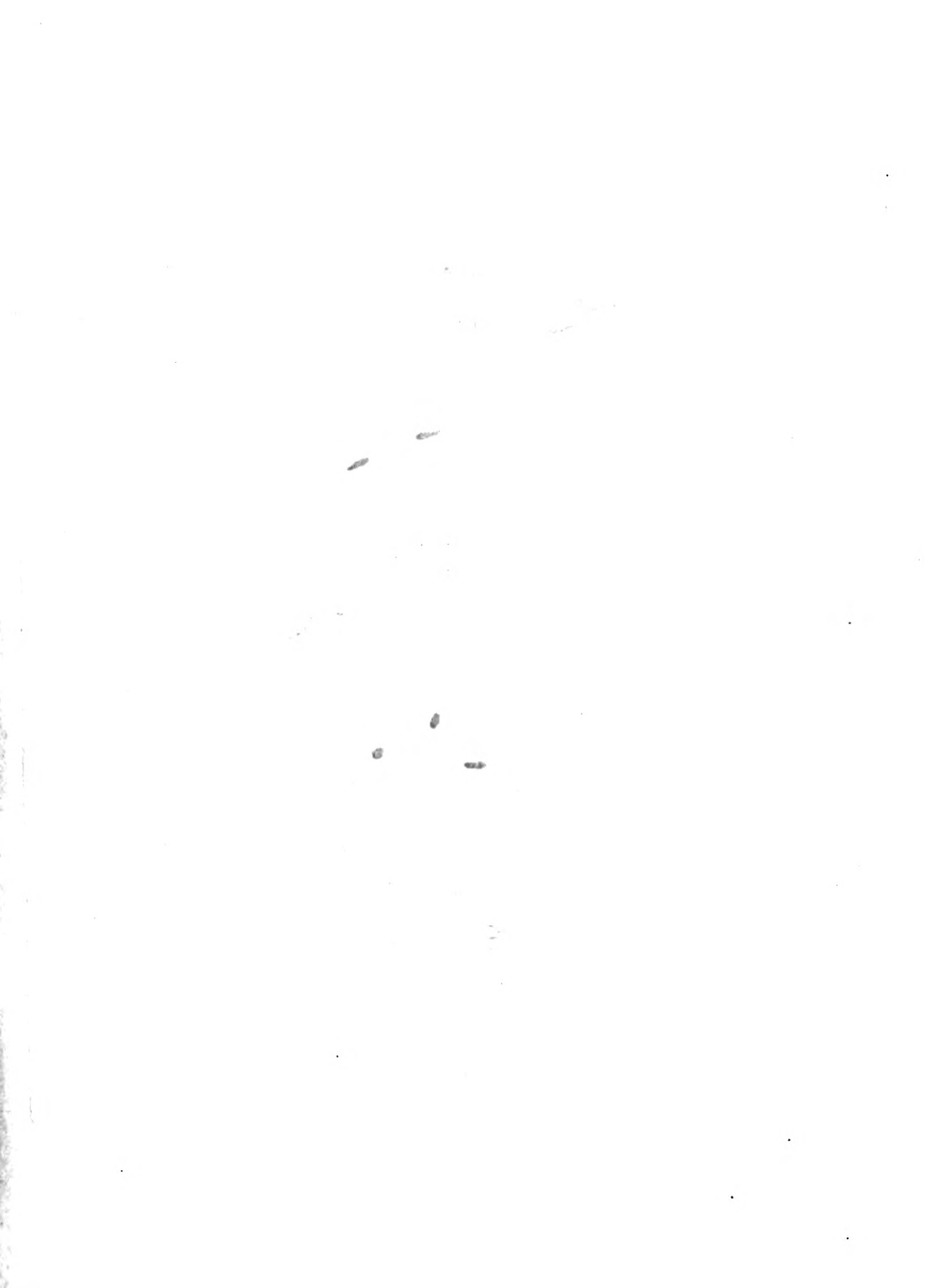
black. Its motions are in every respect analogous to those of the *Hirudo complanata*, *stagnalis*, and *oëtoculata*, which are all three sufficiently common in this country; but the small species now describing seems to possess a greater degree of contractile power than the three former, since it often 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.

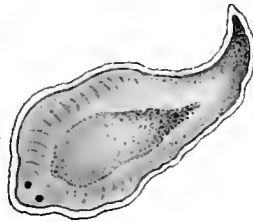
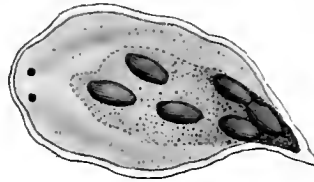
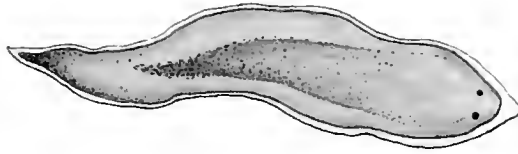
This little animal, after being kept for a few days in a glass of its native water, seldom fails to appear filled with 5 or 6 ova, of a very considerable size in proportion to the parent animal, and which are of a much stronger and tougher nature than one would easily imagine; since, when taken out of 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. oëtoculata* 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 acutiufcula.

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 *oëtoculata*, 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 Jucaixæ. *Nieremb.* 294.

Arbor cujus cortex ginger 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, Pomét*, &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. *Pomét, 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 2I 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 2I, 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*, *Erythroxyton*, &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 *Capficum*, were formerly common ingredients in the food and drink of the Caraihs, 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.

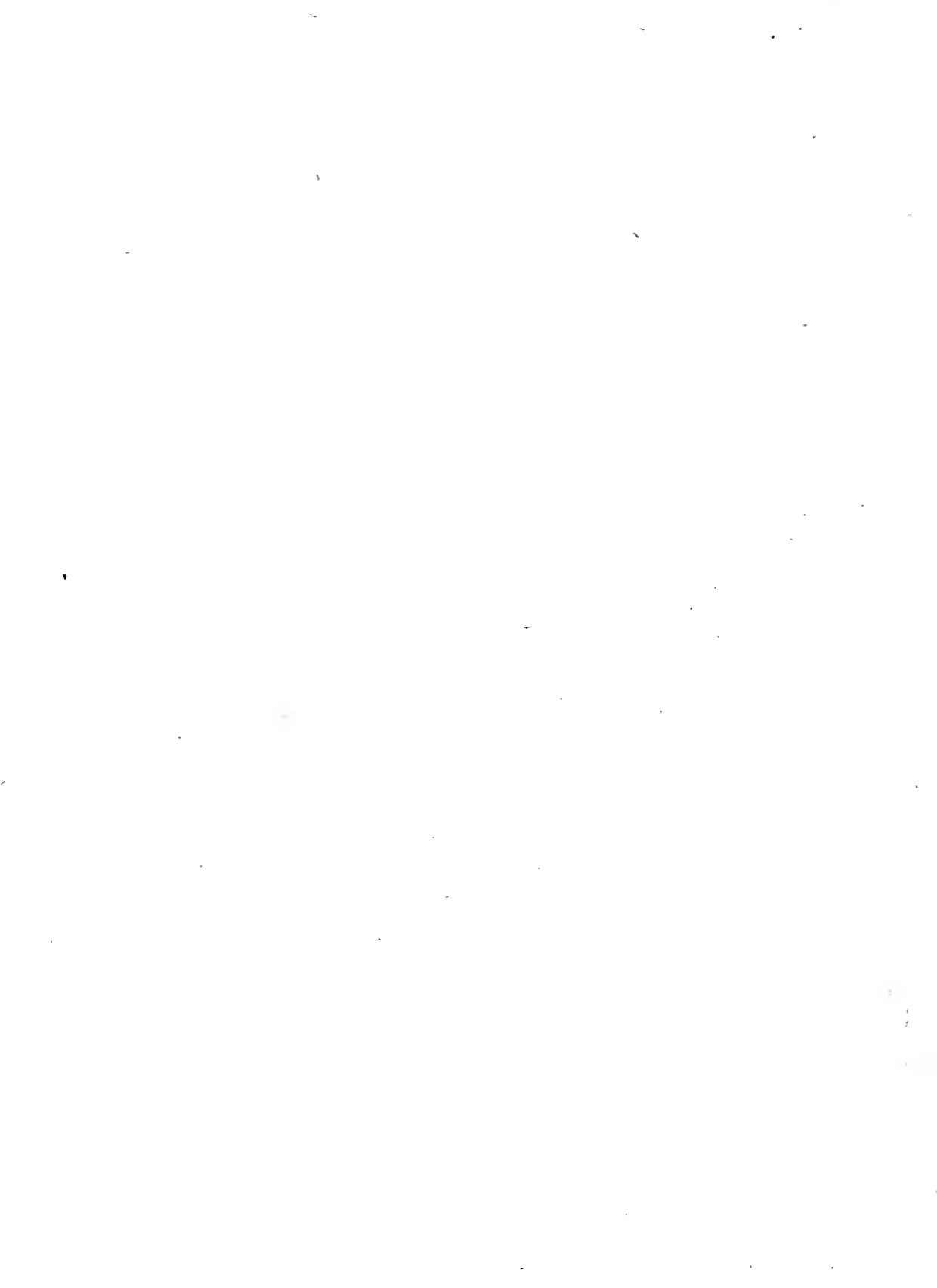
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The annexed plate (*t.* 8) represents a branch of the tree in flower, and the berries of their natural size.

- 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.



Cinnella 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 transf-

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 exuviae 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.

M I C R O S C O P I C D E S C R I P T I O N .

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.

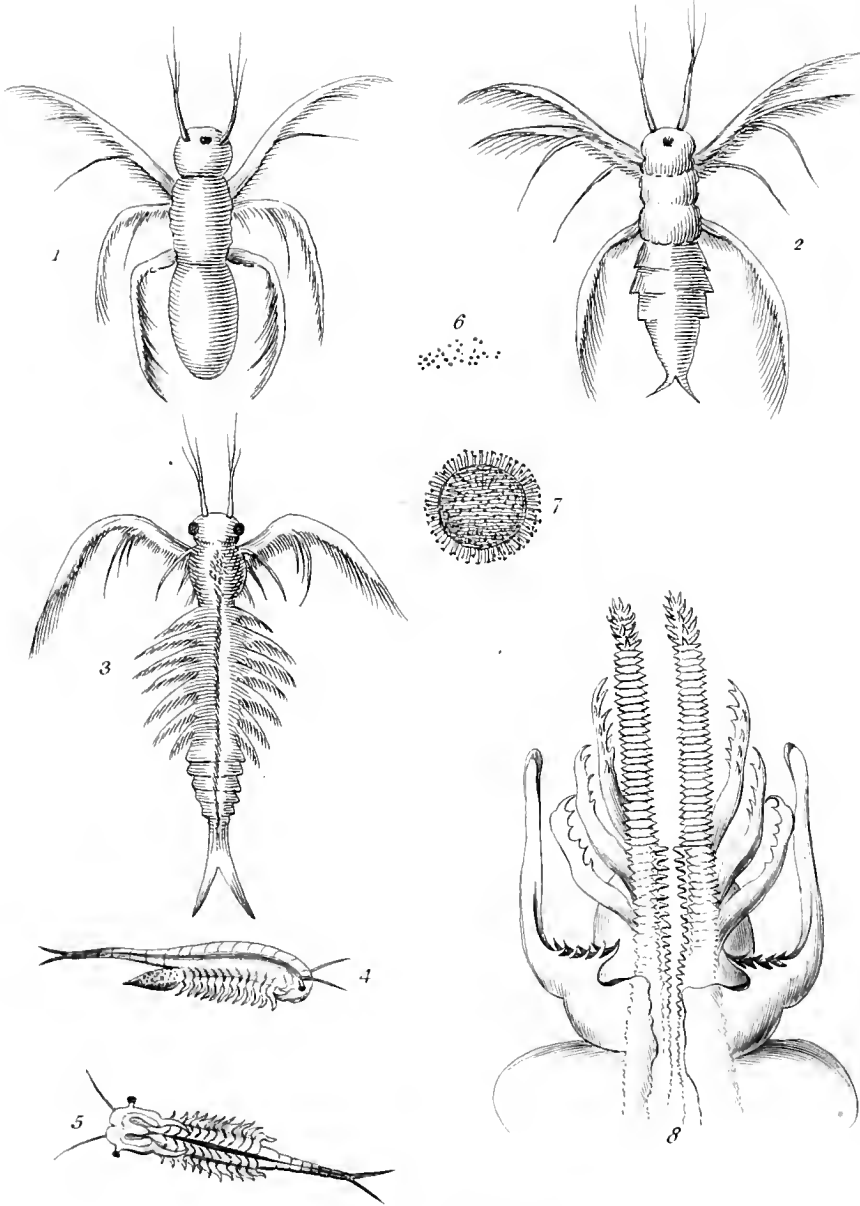
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My observations on this insect were made long before I had seen Schæffer's work. I then sketched several parts by the microscope, which I afterwards found had been already done by Schæffer. The annexed plate therefore contains only a few particulars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



Cancer stagnalis.

XI. *On the Festuca spadicæ, 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. Elyf.* 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 ulserius.”

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 Montpellier botanists have gone many a pilgrimage to the Hortus Dei, without finding any thing which answered to the description; inasmuch that professor Gouan, in his *Illustrationes Botanicae*, 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 Elysi*, which is preserved in the Sherdian 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* and 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.* I. 145.

GRAMEN sparteum, paniculâ flavescente. *Rudb. Elyf.* V. 1, 40, f. 14.

Habitat in pratis et pascuis alpinis. 2

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. *Anthere* purpurascentes, inclusæ." Gerard.

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

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

OBS. Panicula variat magis vel minus ramosa.

Linnaeus 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.

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 Botanicae*, page 4, and Linnæus's *Système Naturel*, 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. Micheli Hort. Pisan. 75.

G. montanum paniculâ spadiceâ crassiore. Tournef. Inf. 524.

Nardus spuria Narbonensis. C. Baub. Pin. 13.

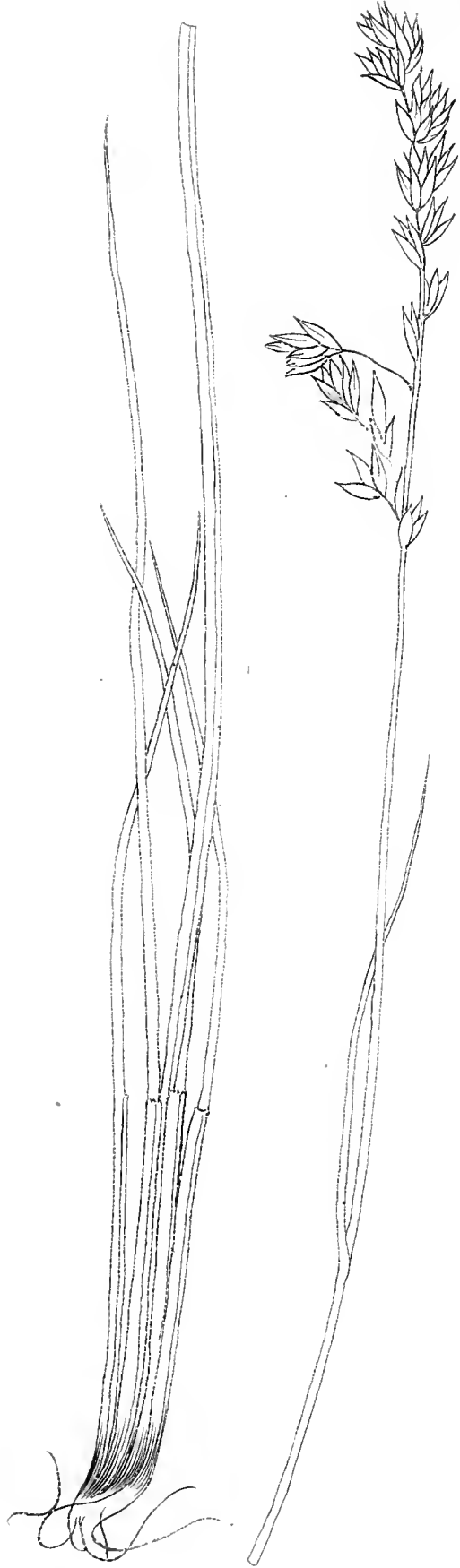
Nardus Gangitis spuria Norbonæ. Lob. Adversar. 43.

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. IO. is an exact copy of Rudbeck's figure above quoted, traced from his *Campi Elysi* in the Sherardian Library.

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 guesses, 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.



Not seen after

Redback'd Butcher Bird - *Lark*

Seen

N. B. When I say that I ha

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— <i>Hirundo rustica</i> .																
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— <i>Hirundo arbica</i> .																
First seen	—	Ap. 20	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— <i>Hirundo Apus</i> .																
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	Aug. 26	Oct. 10	Sep. 21	—	Aug. 11	—	Sep. 2	—	Sep. 8	Sep. 1	Aug. 28	Nov. 6
Sand Martin— <i>Hirundo riparia</i> .																
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	Aug. 28	Sep. 1
Wry Neck— <i>Jynx Torquilla</i> .																
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	Aug. 26	—	Sep. 14	—	Aug. 29	—
Cuckoo— <i>Cuculus canorus</i> .																
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	—	Aug. 26	Aug. 25	Sep. 2	Sep. 5	Oct. 11	—	—	Sep. 23	—	—	—	—
Goat Sucker— <i>Caprimulgus Europæus</i> .																
Seen	—	—	—	—	—	—	—	—	—	—	—	—	—	May 29	—	—
Turtle Dove— <i>Columba Turtur</i> .																
Seen	—	—	—	—	—	—	—	—	—	—	—	—	—	June 11	June 4	—
Woodcock— <i>Scolopax Rusticola</i> .																
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	Apr. 18	Mar. 23	Mar. 19	Apr. 17	Apr. 13	Apr. 6	Mar. 17	Apr. 5	Mar. 21	Apr. 8	Mar. 21	Mar. 27	Apr. 6
Red Wing— <i>Turdus Ilacus</i> .																
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	Apr. 18	Mar. 1	Apr. 2	Apr. 17	Apr. 13	Apr. 6	Mar. 17	Apr. 5	Mar. 15	Apr. 8	Apr. 14	Mar. 27	Apr. 6
Royiston Crow— <i>Corvus Cornix</i> .																
First seen	Nov. 17	Nov. 7	—	Oct. 21	Oct. 18	—	Dec. 1	—	—	—	—	—	—	Oct. 30	—	Dec. 23
Not seen after	Ap. 14	—	Ap. 14	Apr. 18	Feb. 21	Mar. 25	—	Ap. 13	Apr. 6	—	—	—	—	Apr. 1	—	Apr. 14
Snipe— <i>Scolopax Gallinago</i> .																
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	Apr. 18	Apr. 2	Apr. 7	Mar. 19	Apr. 14	Apr. 6	—	Apr. 5	Mar. 13	Apr. 8	Mar. 21	—	Apr. 6
Fieldfare— <i>Turdus pilaris</i> .																
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	Apr. 18	Apr. 8	Apr. 10	Apr. 17	Apr. 13	Apr. 6	Mar. 14	Apr. 5	—	Apr. 8	Apr. 14	—	Apr. 6
Jack Snipe— <i>Scolopax Gallinula</i> .																
First seen	—	—	Nov. 20	Dec. 28	Dec. 26	—	—	Dec. 19	—	—	Jan. 29	—	—	Dec. 28	—	Dec. 29
Not seen after	—	—	—	Apr. 18	Mar. 16	Apr. 7	—	Apr. 13	Apr. 6	Feb. 8	Apr. 5	Mar. 13	Apr. 19	Apr. 14	—	Apr. 6
Siskin, or Aberdavine— <i>Fringilla Spinus</i> .																
First seen	Apr. 5	Apr. 20	—	—	—	—	—	Apr. 22	—	—	—	—	—	Apr. 10	Apr. 15	—
Not seen after	—	—	—	—	—	—	—	—	—	—	—	—	—	Apr. 30	—	—
Redstart— <i>Motacilla Phænicurus</i> .																
First seen	Apr. 6	Apr. 15	Apr. 27	Apr. 17	Apr. 5	Apr. 14	Apr. 21	Apr. 22	Apr. 17	Apr. 23	Apr. 20	Apr. 30	Apr. 30	Apr. 17	Apr. 25	Apr. 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— <i>Motacilla Trochilus</i> .																
First seen	Apr. 6	Apr. 29	May 16	Mar. 30	Apr. 18	Apr. 16	Apr. 20	Apr. 22	Apr. 3	Apr. 14	Apr. 7	Apr. 19	Apr. 16	Apr. 3	Apr. 18	Apr. 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— <i>Motacilla Luscina</i> .																
First seen	Apr. 12	Apr. 16	May 8	Apr. 23	Apr. 18	Apr. 21	Apr. 20	Apr. 26	Apr. 20	Apr. 17	Apr. 8	Apr. 17	Apr. 5	Apr. 14	May 3	Apr. 28
Not seen after	—	—	—	—	Nov. 1	—	—	—	—	—	—	Sep. 23	Sep. 14	—	—	Oct. 2
White Throat— <i>Motacilla Sybæa</i> .																
First seen	Apr. 23	Apr. 17	May 5	Apr. 26	Apr. 26	Apr. 20	May 3	Apr. 21	Apr. 19	Apr. 19	May 2	Apr. 21	Apr. 30	Apr. 14	Apr. 25	Apr. 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— <i>Motacilla Oenanthe</i> .																
First seen	May 5	Apr. 15	May 6	Apr. 5	May 23	Apr. 16	May 8	June 29	Apr. 21	—	May 18	Apr. 3	Apr. 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— <i>Muscipepa grjola</i> .																
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. 13	—	Sep. 21	Sep. 13	Sep. 23	Sep. 14	Sep. 22	Aug. 31
Laud Rail— <i>Rallus Crex</i> .																
First seen	Sep. 1	Sep. 23	Aug. 27	—	Sep. 9	Sep. 1	Sep. 12	—	Sep. 2	Sep. 4	Sep. 14	Sep. 1	Aug. 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— <i>Motacilla rubetra</i> .																
First seen	—	Apr. 30	May 10	Apr. 17	May 5	Apr. 20	—	Aug. 7	Aug. 20	May 10	Aug. 4	—	—	Aug. 20	Aug. 28	Aug. 26
Not seen after	—	Sep. 21	Sep. 21	Oct. 6	Sep. 5	Sep. 16	—	—	—	—	Sep. 17	Sep. 23	—	—	—	—
Black Cap— <i>Motacilla Ardeipilla</i> .																
First seen	—	Apr. 30	—	Apr. 22	—	Apr. 23	May 7	—	May 20	Apr. 23	May 29	—	Apr. 30	Apr. 14	Apr. 26	May 15
Not seen after	—	—	—	Oct. 6	—	—	—	—	—	Sep. 19	—	Sep. 23	Sep. 1	Sep. 4	—	Oct. 2
Redback'd Butcher Bird— <i>Lanius Colurus</i> .																
Seen	—	—	—	—	—	—	—	—	—	—	May 12	May 6	July 10	May 11	May 6	June 7

N. B. When I say that I hav. 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-

ferred 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 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 Grifola—*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 fiffipes?* 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 Suffex, 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*) *rostrō lævi, pedibus virescentibus, 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.

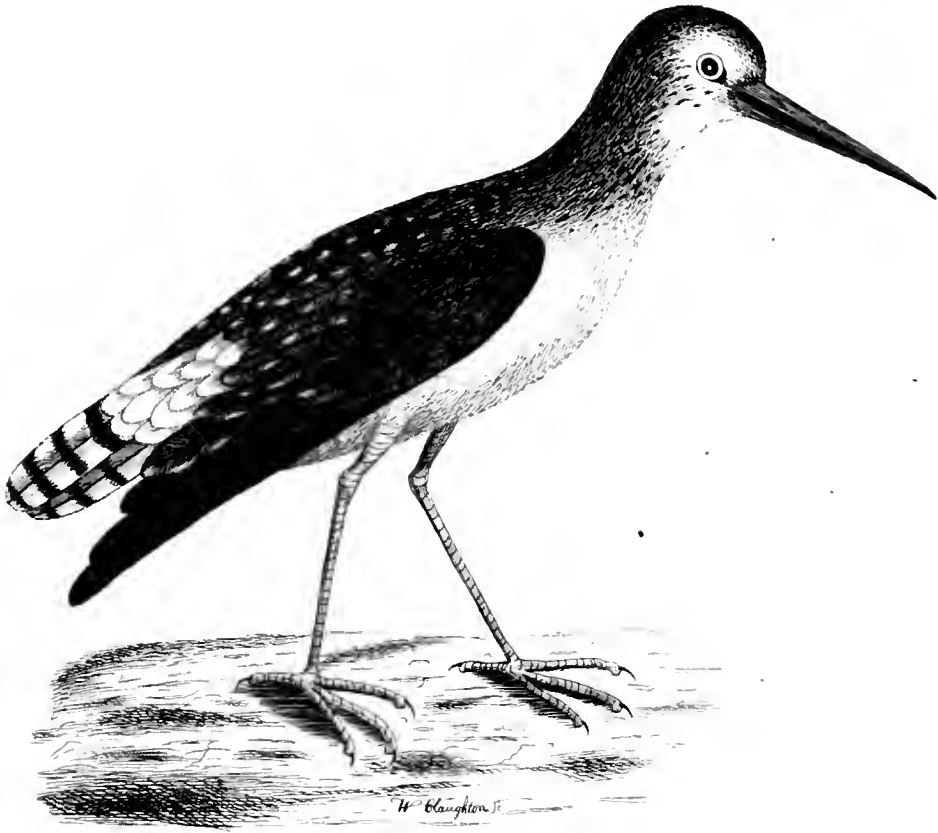
Tringa. Brisson's Ornithologia, vol. ii. p. 259.

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.



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 surpris'd and pleas'd 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 filiquosus*.

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

DESCRIP-

D E S C R I P T I O N.

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 silique, 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.

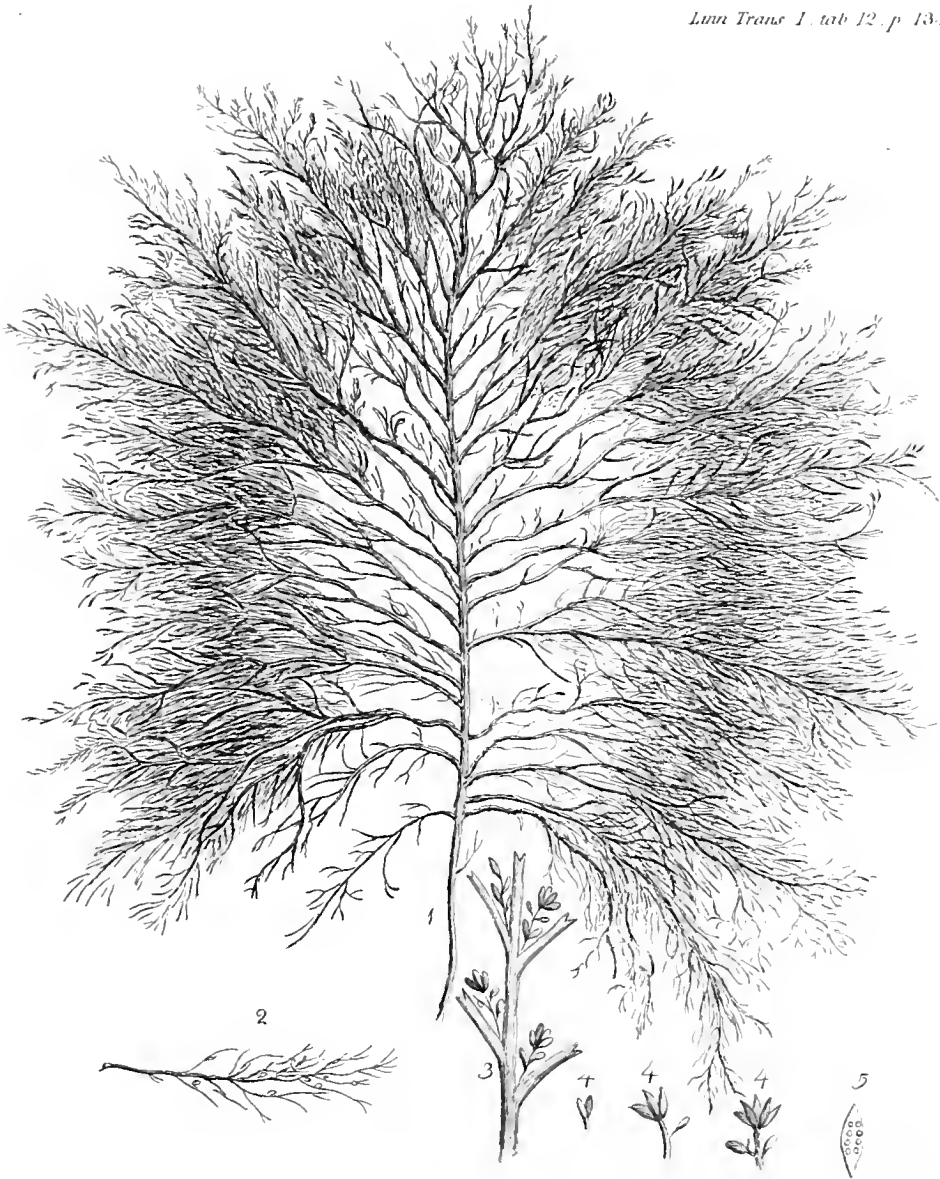
Fig. 1. A single stem complete. This is the representation of a dried specimen, of a young and perfectly vigorous plant, but not in a state of fructification. When older, many of the smaller branches and leaves are broken off, giving the plant a more naked appearance—natural size.

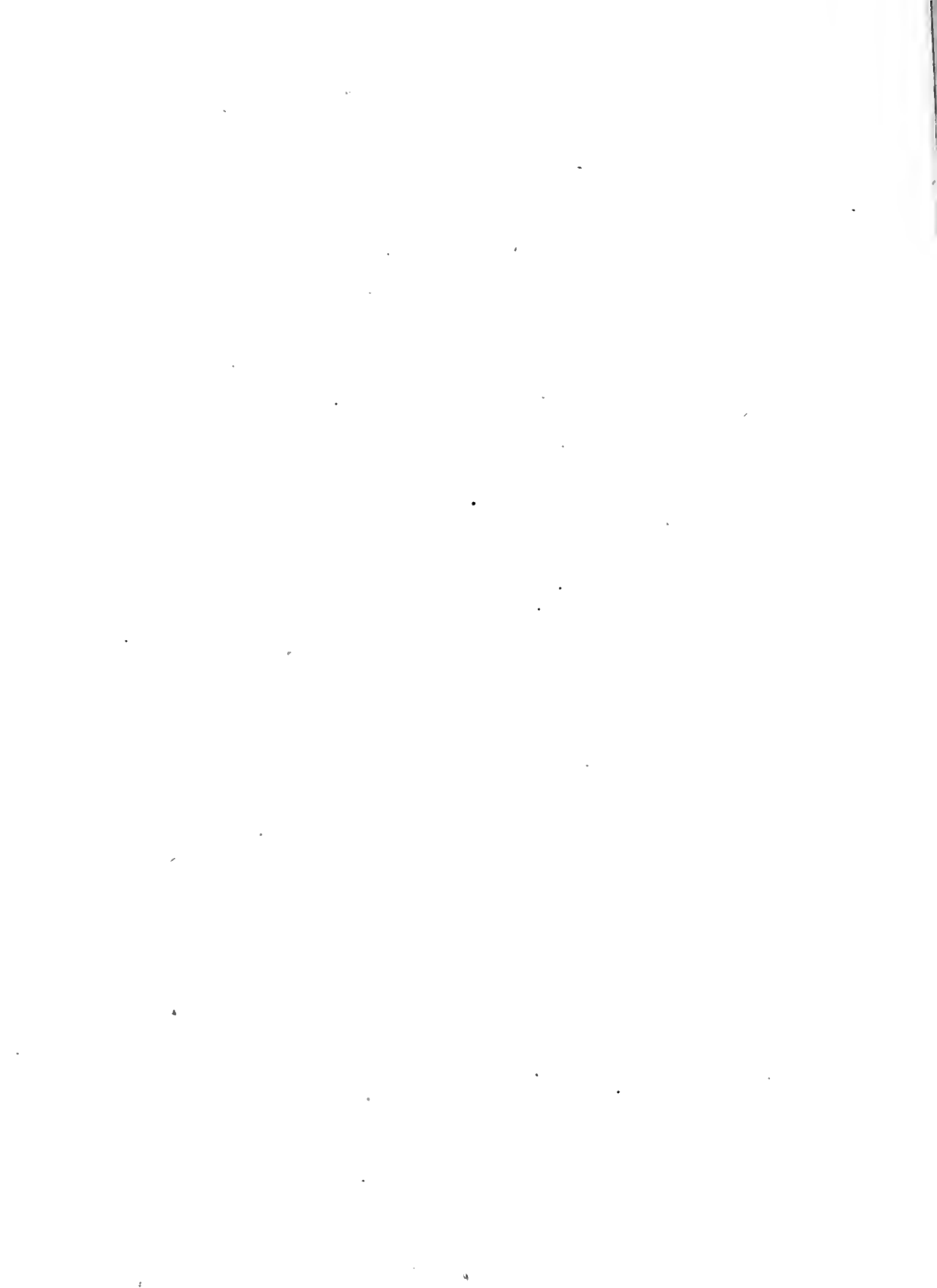
2. A small branch of another dried specimen, with the fructification—natural size.

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

Read June 2, 1789.

Veniet tempus quo ista, quæ nunc latent, in lucem dies extrahat.

LINN. in *Introitu ad Syst. Nat.*

MÉPRISÉE dans les tems anciens, l'Entomologie doit, on peut dire, sa naissance dans le siècle 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'affurer 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 système, 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'aujourd'hui 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 Sphinx 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, qui nous ont détaillé jusqu'au moindre des intestins d'un insecte; il est étonnant, dis-je, que leur soit échappée dans les Sphinx 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 Sphinx, 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 brouffailles, il était très-facile, qu'en heurtant contre quelque obstacle leurs ailes se dérangent 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 *Resort* 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 Resort 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.

ire (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 ferait 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 système: direz-vous, Messieurs, qu'il est facile d'en batisir! C'est une maladie universelle que la vanité produit, que l'amour propre fomenté, et qui repand plus de brouillards que de clarté sur les connaissances humaines. Les systèmes dans les sciences sont comme les feux follets qui égarent et déroutent 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 *Convoluti* 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.

système, au lieu de fonder son système 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 système que je vous offre; ce n'est qu'une idée, une simple conjecture. Rien dans le monde n'est fait à l'hazard; *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 | } anneau. |
| | { | F. Ressort l. 2½ sans | |
| 6. Atropos. | { | M. Ressort l. 3½ 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 aperçu. | |

* 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.

P H A L Æ N A.

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. Reffort de l. 1½ avec anneau.
 { F. Reffort sans anneau.
30. villica. { M. Reffort de l. 1½ avec anneau.
 { F. Petit paquet presque imperceptible.
31. dispar. { M. Reffort avec anneau.
 { F. Paquet de 15 filets sans anneau.
32. Chrysothæa. { M. Reffort avec anneau.
 { F. Paquet sans anneau.
33. Salicis. { M. Reffort 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. Reffort avec anneau.
 { F.
36. cæruleocephala. { M. Reffort avec anneau.
 { F. Paquet de 3 filets sans anneau.
37. Cossus.
38. palpina.

Bombyces spirilingues, dorso lævi, alis deflexis.

39. Aulica. { M. Reffort avec anneau.
 { F. Paquet de 5 filets sans anneau.
40. Ruffula. 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 précisément les mêmes que dans la précédente; j'en ai observé deux, que j'ai; je ne leur ai point trouvé de ressort: ne ferait-ce pas peut-être la femelle de celle-là?

41. grammica.

41. grammica. { M. Reffort avec anneau.
 { F. Paquet en filets fans anneau.

Bombyces spirilingues, dorso cristato, alis deflexis.

42. Libatrix. { M. Reffort avec anneau.
 { F. Paquet fans anneau.
 43. Æsculi. { M. Reffort de l. 2 $\frac{1}{4}$ fans anneau.
 { F. Paquet très-court de plusieurs filets.

Noctuae spirilingues, dorso læves, absque crista.

44. Dominula. { M. Reffort avec anneau.
 { F. Paquet de plusieurs filets.
 45. Hera. { M. Reffort avec anneau.
 { F. Paquet de 3 filets.
 46. Batis. Paquet en filets. Je n'en ai qu'une feule, et probable-
 ment c'est la femelle.
 47. glyphica. { M. Reffort avec anneau.
 { F. Paquet de 3 filets.
 48. Jacobææ. { M. Reffort avec anneau rouge très-élegant.
 { F. Paquet de plusieurs filets.
 49. Sponfa. { M. Reffort de l. 2 $\frac{1}{4}$ avec anneau.
 { F. Je ne l'ai pas examinée.
 50. Nupta. { M. Reffort avec anneau.
 { F. Paquet de 3 filets.
 51. Pronuba. { M. Reffort très-gros à proportion avec anneau.
 { F. Paquet de 3 filets.
 52. Fraxini. { M. Reffort avec anneau.
 { F. Je ne l'ai pas.
 53. Chryfitis. { M. Je n'en ai point.
 { F. Paquet de plusieurs filets.
 54. meticulosa. { M. Reffort avec anneau.
 { F. Paquet de filets.
 55. gothica. Reffort avec anneau. Je n'en ai vu qu'une feule; il
 y a apparence que c'est le mâle.

Geometræ pectinatae, 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. pufaria.
- 61. papilionaria.

Geometræ feticornes, alis rotundatis.

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

Tineæ.

- 65. pufiella. 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, dépassent 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

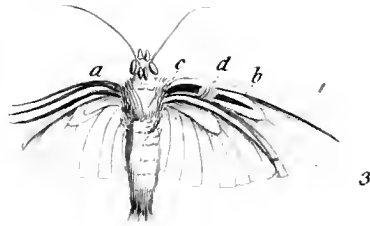
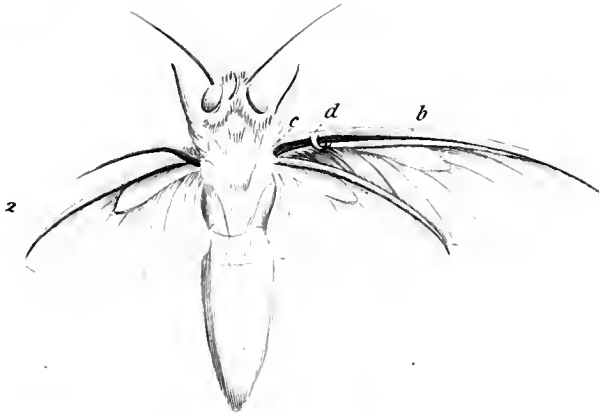
ailes felon Scopoli*? Cette partie du moins est bien plus sensible que celles de la bouche, sur lesquelles est fondé le système de Fabricius.

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 plupart des auteurs ont pris cette différence comme la distinction de sexe; d'autres ont douté si c'en était une d'espèce: cette dernière 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 plupart 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 femelle 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 détachée *x*, fait voir que ce paquet sort de la base de l'aile.



Macronyx fex



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

N O T E.

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*

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of

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. *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.

S I R,

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*, *hread*, *tip*, *pointal*, *ſeed-bud*, *ſtaſt*, *ſummit*, they require explanation, in their appropriate ſenſe, as much as *calyx*, *corolla*, *ſtamen*, *filament*, *anthera*, *piſtillum* or *piſtil*, *germen* or *germ*, *ſtyle* and *ſigma*, 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 *dissipiment*, 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 *ferrate*, 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 cylindrical, 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*, *bispidus*, *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, parçè detorta.—

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*, *calycleled*, *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 inertie*, *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*.—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 Ruling, 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 *inaequaliter cordatum*, cujus alter lobus major. (Malè *obliquum* dictum, cum terminus hic directionem folii, non figuram, respiciat.)

Folium *femicordatum*, cujus alter lobus obliterated.

Capfulæ *alæ parallelæ*, dum alæ margo exterior lateri capfulæ parallelus est.

Rotundatæ, cum medio latiores.

Obtusangulæ, supernè latiores, angulo rotundato.

Acutangulæ, supernè latiores, angulo acuto.

BEGONIA. *Tourn. Infl.* 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 inferta, 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.

I. *BEGONIA nitida*, fruticosa erecta, foliis glaberrimis inæqualiter cordatis obsolete 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. 1

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

* Icon. vol. ii.

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.

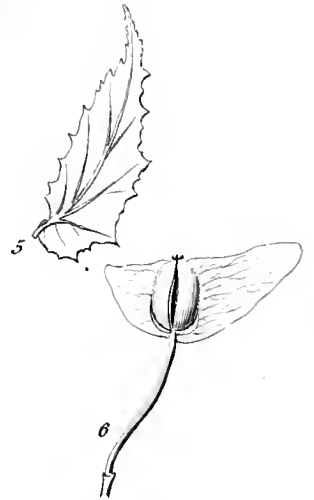
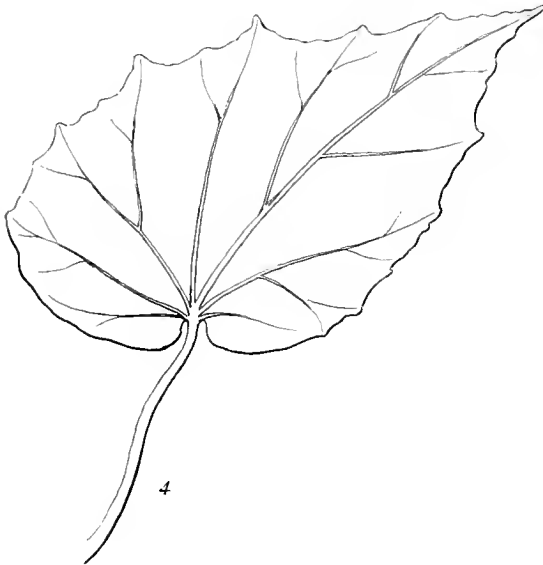
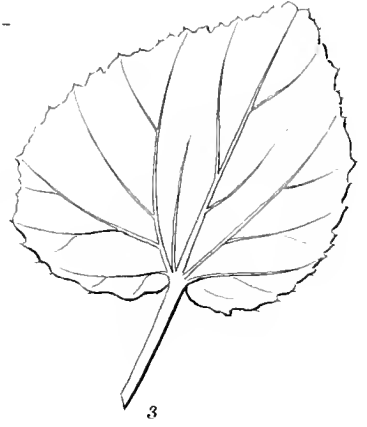
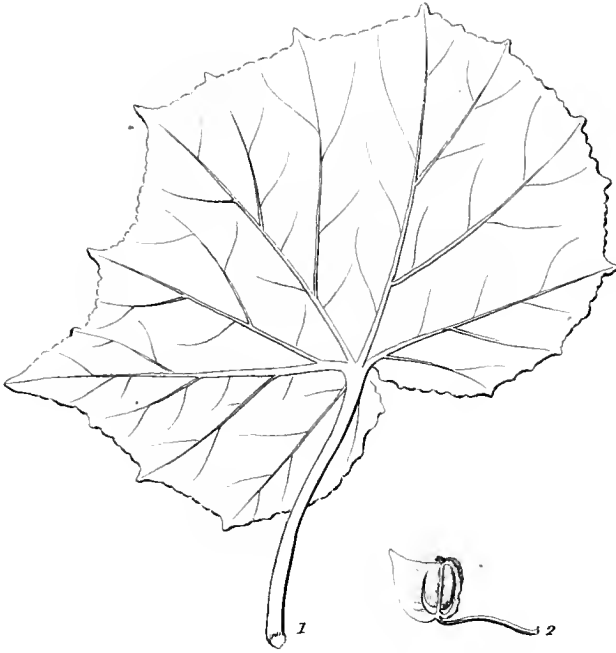
2. *BEGONIA isoptera*, caulescens, foliis glabris semicordatis obsolete dentatis, capsulæ alis subæqualibus parallelis*.

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. *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* carnosî, 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-lancéolata; 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, acutiufcula, alba.

“*Germen* inferum, ovatum, triangulare: angulis membranaceis: membrana anguli exterioris majore. *Styli* tres; bipartiti, villosiusculi. *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 ferratis, capsulæ ala maxima falcata; reliquis obliteratis.

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

Habitat in Madagascar: in infula Maroffe intra sinum Antongil, supra lapides fecus rivulos. *Jo. Gul. Bruguere*.

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 infula Salfette, 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 obsolete 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, obtusifuscula.

“*Filamenta* numerosissima (100), receptaculo in conulum elevato inferta, brevia. *Antherae* ovatae, erectae, luteae.

“*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 ferratis, 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 Kämpfer'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 Kämpfer 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, Job. Ryan, Henr. de Pontbieu, Alex. Anderson.*

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

10. *BEGONIA acutifolia*, caulescens, foliis fœmicordatis 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 hispida fœmicordatis acuminatis inæqualiter dentatis, capsulæ ala maxima obtusangula; reliquis acutangulis. TAB. 14. Fig. 5, 6.

Habitat in Jamaica montibus cæruleis. *Jul. von Robr, Gul. Wright.*
Floris masculi Petala quatuor, quorum duo opposita minora. *Floris feminei* Petala quinque, quorum duo minora. Ad basin germinis *bractææ* duæ, argutè ferratæ, germine dimidio breviores.

Specimens are in the Herbarium of Sir Joseph Banks *.

12. *BEGONIA humilis*, caulescens erecta, foliis hispida fœmicordatis duplicato-ferratis, capsulæ alis rotundatis parum inæqualibus.

Hort. Kew. iii. p. 353. TAB. 15.

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

Descriptio.

Tota planta carnosâ, pellucida. Caulis, petioli et pedunculi pallidè rubentes. *Caulis* teres, geniculis tumidis, primo anno spithamæus, altero anno bipedalis. *Folia* fœmicordata, acuminata, duplicato-ferrata: ferraturis 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* femiovatæ, concavæ, ciliatæ, hyalinæ. *Pedunculi* axillares, sæpius dichotomi. *Bractæa* 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. *Anthere* oblongæ, luteæ. *Floris feminei Petala* quinque, alba, persistentia, obovato-oblonga: duo paulò angustiora. *Germen* trigonum, angulis acutis, alis rotundatis parum inæqualibus, pallidè carnis. *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.



Begonia humilis.



When this plant first flowered in Mr. Lee's garden at Hammer-smith, 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 hispida femicordatis duplicato-ferratis, 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 hispida inæqualiter ovatis duplicato-ferratis, 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 obfoletè 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. i.

Empetrum acetosum. *Rumph. Amb.* v. p. 457, tab. 169, fig. 2.

Habitat in faxosis infularum 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 Linnaeus'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.





Begonia tenera.

Muskenzie fci'

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. *Job. Gerb. 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. *Petoli* 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. *Stipulae* radicales, ovatae, acuminatae, concavae, dorso carinatae, carnosae, albicantes, marcescentes, femunciales. *Flores* umbellati, masculis numerosis, feminis paucis. *Umbellae* interdum compositae. *Braeae* ad basin pedicellorum lanceolatae, parvae, caducae. *Pedicelli* teretes, laeves, 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. *Antherae* erectae, clavatae, filamentis longiores, petalis interioribus breviores, luteae. *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 praefertim ad apices obducta. *Capsula* turbinata, triquetra, alata, trilocularis. *Receptaculum* feminum membranaceo-trialatum. *Semina* utrinque ad alas adnata, numerosa, globosa, minima."

Dr. Koenig 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 inaequaliter cordatis, pedunculis dichotomis, capsulae ala una maxima; altera angusta; tertia obsoleta.

Begonia capensis. *Linn. Suppl.* 420. *Jacqu. Collect.* i. p. 130, n. 9.
Begonia species capensis. *Linn. Mant.* 502. descr. Kœnig.

Habitat in insulæ Joannæ umbrosis, ad latera montium. *Job. Gerb. 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 obsolete 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* feu *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 ferrated. 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. Infl.* 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. Infl.* 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. *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 the Genus of Symplocos, comprehending Hopea, Alstonia, and Giponima. 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 completi sub nomine Symplocos planum mihi est. Utinam de classe necnon de speciebus non minus certe pronuntiare possim!

Characteres tam essentialem quam naturalem primum exponam.

S Y M P L O C O S.

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 inferta: petalis f. laciniis 5—10, ovatis, integerrimis, reflexis, basi in tubum longitudine calycis coalitis, simul deciduis.

STAM.

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

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

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

SEM. Nux ejusdem formæ, striata, tri-quinquelocularis: 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. ʒ

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

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

Habitat in Guiana. *Aublet. Patris.* ʒ

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

ARECHEA.

ARECHEA. S. pedunculis subquinquefloris, foliis ferratis nudiusculis.

Arechea vulgo.

Habitat in sylvis Peruæ. *Dombey.* ½

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. *Linu. Mant.* 105.

Arbor lauri folio, floribus in foliorum alis. *Catefb.*

Car. i. 54.

Habitat in Carolinâ. *Frafer.* ½

ALSTONIA. S. floribus subdecapetalis sessilibus subternis.

Alstonia theæformis. *Linu. Suppl.* 264.

Habitat in Americâ meridionali. *Mutis.* ½

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 diceret germen in *Symploco*, et tale habere *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.* ½

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.

Hicce 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 cœtaneo præclare merito de re botanicâ dicavit, nuncupavitque *Pallasiam caspicam* in suo Plantarum Supplemento. Ivit itaque inter botanicos et hortu-

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

Calligonum in herbario Linnæano desideratur; sed Polygonoides quam vidi in herbario Tournefortiano, etsi Pallasæ 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 existare, 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.

C A L L I G O N U M.

Charaeter essentialis.

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

Charaeter 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, patentés, 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; fetis ramosis rigidis mollibus: nucleo ejusdem formæ.

Species.

POLYGONOIDES. C. fructibus cancellatis, fetis ramosis rigidis.

C. polygonoides. *Linm. Spec.* 748.

Polygonoides orientale Ephedræ facie. *Tourn.*

Cor. 47, *It.* ii. p. 356, t. 356.

Habitat in Armeniâ. *Tournefort.* 5

COMOSUM. C. fructibus cancellatis, fetis ramosis mollibus.
Habitat in Ægypto, *Lippi*: Barbariâ, *Louiche Desfontaines*. ^h

Varietas forte præcedentis. Plantæ in omnibus similitimæ, sed in plantâ Lippianâ fructus comosior fetis mollioribus, dum fetæ 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*. *Lim. Suppl.* 252.

Habitat in Moscoviâ ad Caspium mare. *Pallas*. ^h

Frutex femiorgyalis, 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 f. fere glauci.

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

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

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

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 *Pallasia* genus inter syngenesistas vide apud *L'Her. Stirp.* ii. 39. t. 19. et *Bot. 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*. Willdenow 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. Thelypt.* 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. puncta 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 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 filk 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 *Geometrae* 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 filk 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 (filans) 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

B b

hanging

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 surprize, 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. *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 adhaerens.

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
gibbofo.

Habitat in Oceano Pacifico, saepius in ventriculo Scombri Pelamidis.

B b 2

This

This little animal is about two inches long, having a soft cylindrical body annulated with fine wrinkles; and towards the extremity it becomes spherically gibbous, 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 perluculentibus.

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. *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 *kamt-schatica*; 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 laciniaë 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 folitariis 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 Commerçon 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 *Mantiffa* 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.

Bractææ 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.

C c

Capsule

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 hirfuto, 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 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 terrestres, magno flore. *Tourn. Cor. et Herb. Buxb. C. I.*, 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.

I. PYRALIS tuberculana.

P. ALIS anticis grifeis fusco punctatis margine crassiori antice trituberculato.

H. *Parisiis.* Larva in Hedyfaro 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. *Tborax* argenteo-grifeoque varius, antice cristatus; *Crista* argentea, fusco-bifasciata; fascia anteriori minori. *Alæ* deflexæ; *Superiores* supra albæ, fusco grifeoque punctatæ et maculatæ; *Tubercula* tria feriem 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. TH-



1. *Echenis limata.*



2. *Fasciola clavata.*



3. *Hirudo branchiata.*



Phalana Pyralis Tuberculana.



Phalana Tinea Sparmannella.



2. *TINEA* Sparrmannella.

T. Alis violaceo-nitentibus maculis numerosis aurcis; majori ad marginem tenuiorem.

H. *Parifis.* Capitur ætate in paludibus.

Caput nigrum, hirsutissimum; *Antennæ* fuscæ, filiformes. *Alæ anticae* violaceo-nitentes aureo-maculatæ. Maculæ numerosæ, angulatæ vel irregularis super discum adspersæ, tamen ad fascias formandas præsertim in circiter ad marginem crassiolem, et una major in medio ad marginem. Subtus, sicut *alæ posticæ*, aurato-

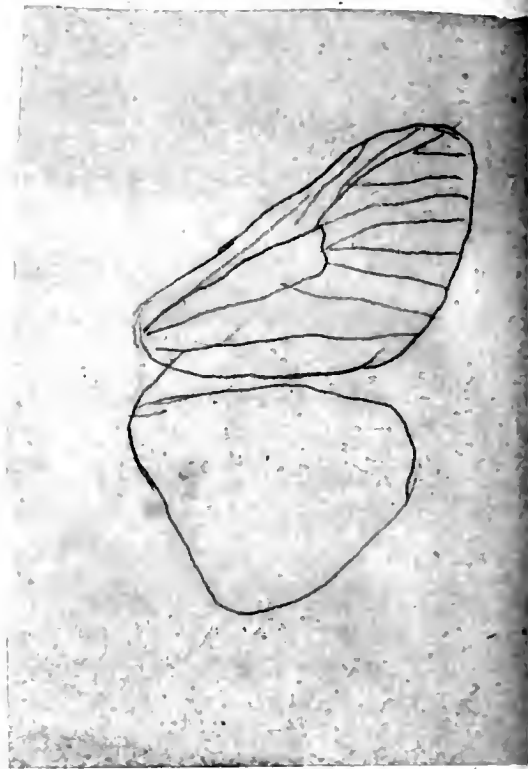
Locus in sylvestrium partem *Tineam* Mouffetellam.

In memoriam pergratissimi celeberrimi *Andræ Sparrmann*, Suecici, in botanica et zoologica versatissimi.

Insectum pro mole inter splendidissima.

TAB. 17. FIG. XI. Magnit. nat.

7. *M. Sparrmanni*.



2. TINEA Sparrmannella.

T. Alis violaceo-nitentibus maculis numerosis aureis, majori ad marginem tenuiorem.

H. *Parisiis*. Capitur ætate in paludibus.

Caput nigrum, hirsutissimum; *Antennæ* fuscæ, filiformes. *Alæ anticae* violaceo-nitentes aureo-maculatæ. Maculæ numerosæ, angulatæ vel irregulares, supra discum adspersæ, tamen ad fascias formandas tendentes; duodecim circiter ad marginem crassiolem, et una major in medio ad tenuiorem. Subtus, sicut *alæ posticae*, aurato-violaceæ. *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. Inf. magnit. nat.

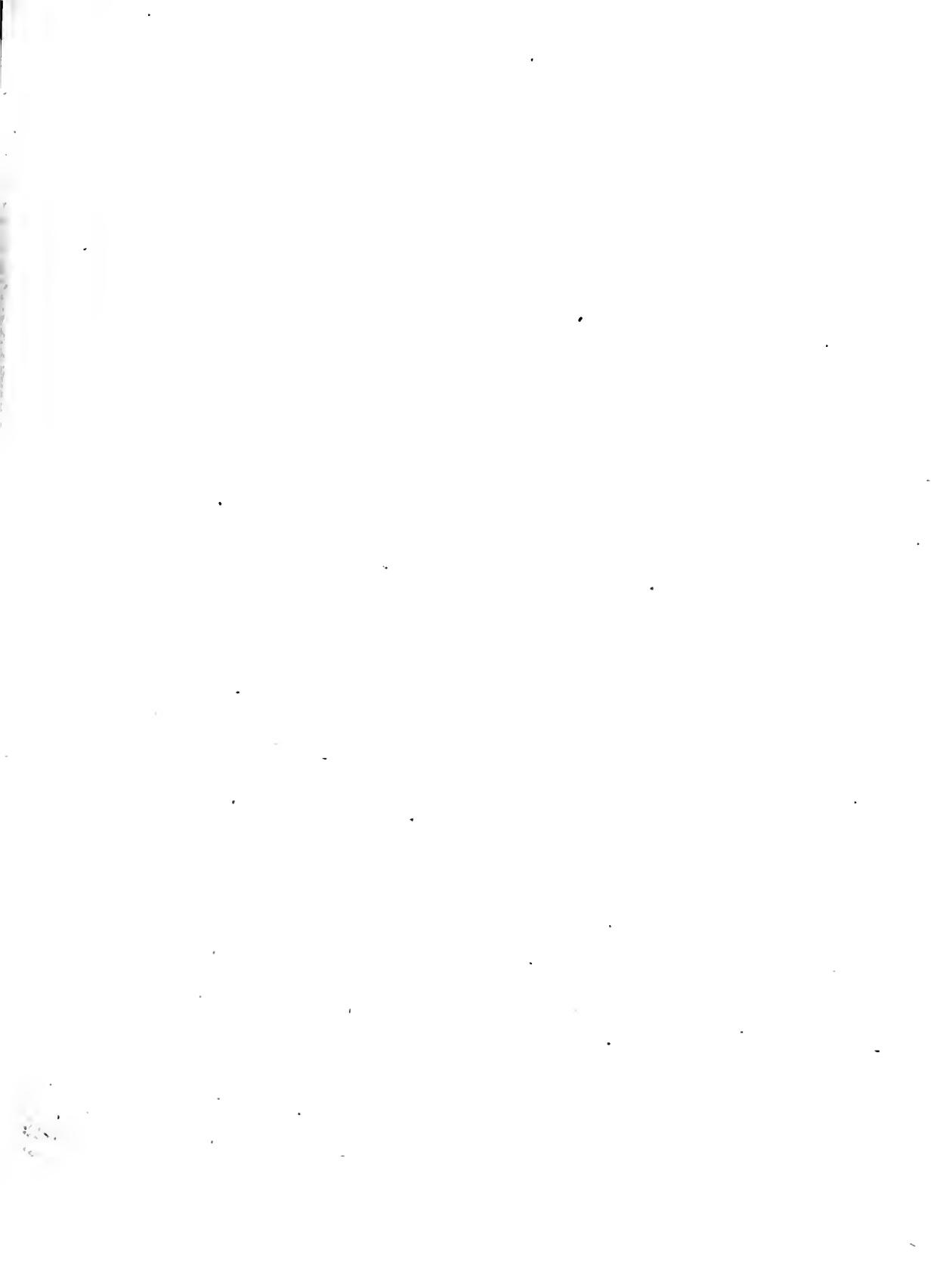
7. Id, auctum.

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, DILLENIAE 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 inferantur 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 integrifolia.

plantam vivam vel ficcatam, 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
Antherae numerosissimæ, germinis basi insertæ, lineares, aurantiacæ, linea nigra exarata, 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 *Ceilon*, Indiæ Orientalis.

Ceilonensibus: Gudåpara et Runumidale.

Arbor ramis alternis, rugosis, fuscis, glabris.

Folia alterna, petiolata, obovata, obtusa, a medio ad apicem ferrulata ferraturis obsoletis vixque manifestis, utrinque glabra, coriacea, supra viridia, subtus pallidiora, nervosa nervis alternis parallelis sursum curvis, utrinque inter nervos tenuissime reticulata, patentia, subsipithamæa, palmam lata.

Petoli semiteretes, canaliculati, villosi, pollicares.

Flores

Flores in ultimis ramulis terminales, subfolitarii, pedunculati.

Ufus: 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 invenit crescentem.

Dillenia Indica, Linn. Syft. 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 ferratis, pedunculis unifloris.

Crescit, ex auctoritate Rumphii, in *Amboina*, *Celebe*, *Macassar*.

Songium Rumph. Herbar. Amboin. tom. ii. p. 140, tab. 45.

Folia alterna, petiolata, elliptica, acuminata, argute ferrata, nervosa: nervis oppositis, parallelis.

Flores terminales, solitarii, pedunculati.

4. *D. retusa*: (TAB. 19.) foliis obovatis truncatis ferratis, pedunculis unifloris.

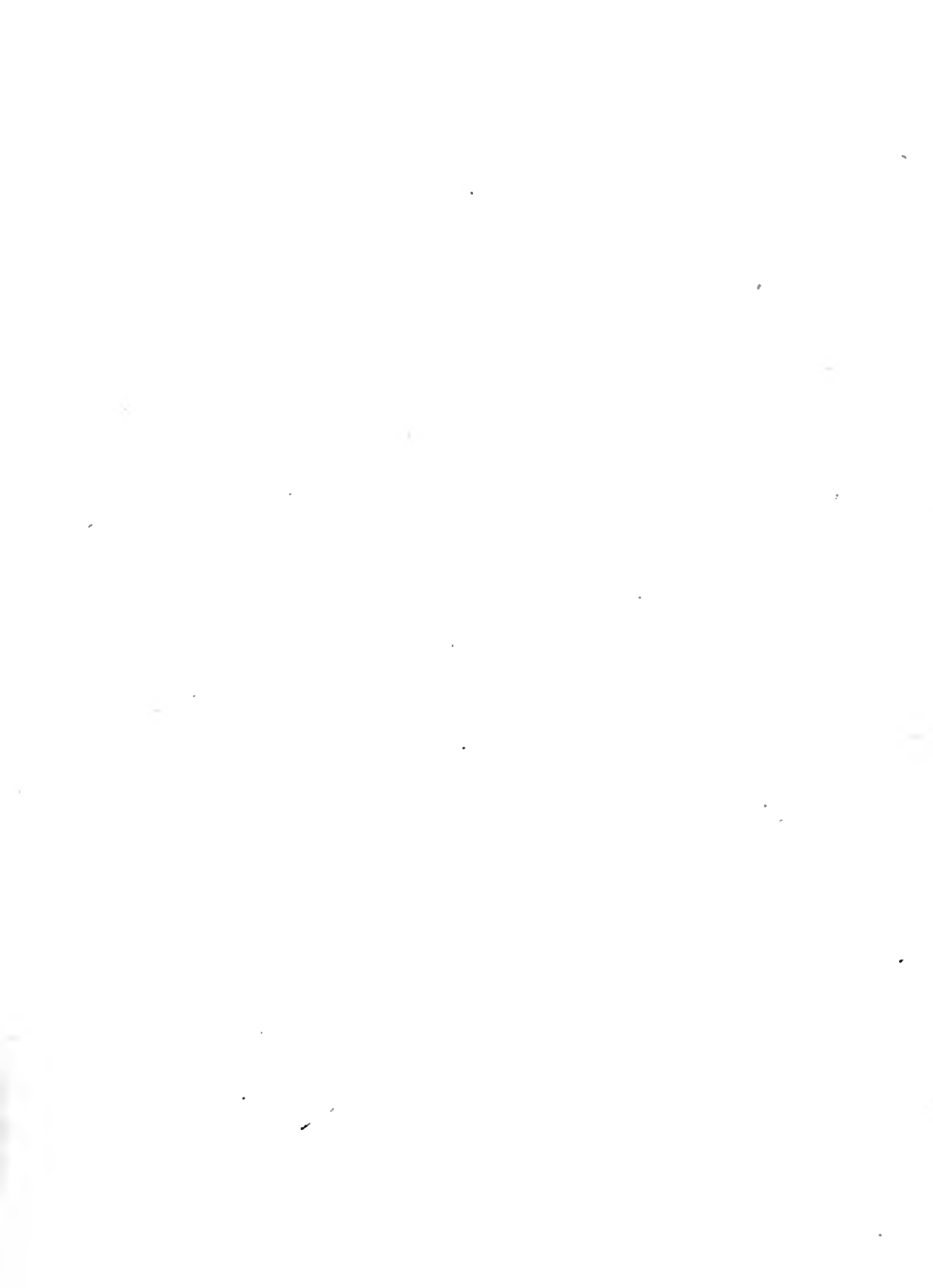
Crescit in Ceilonæ sylvis.

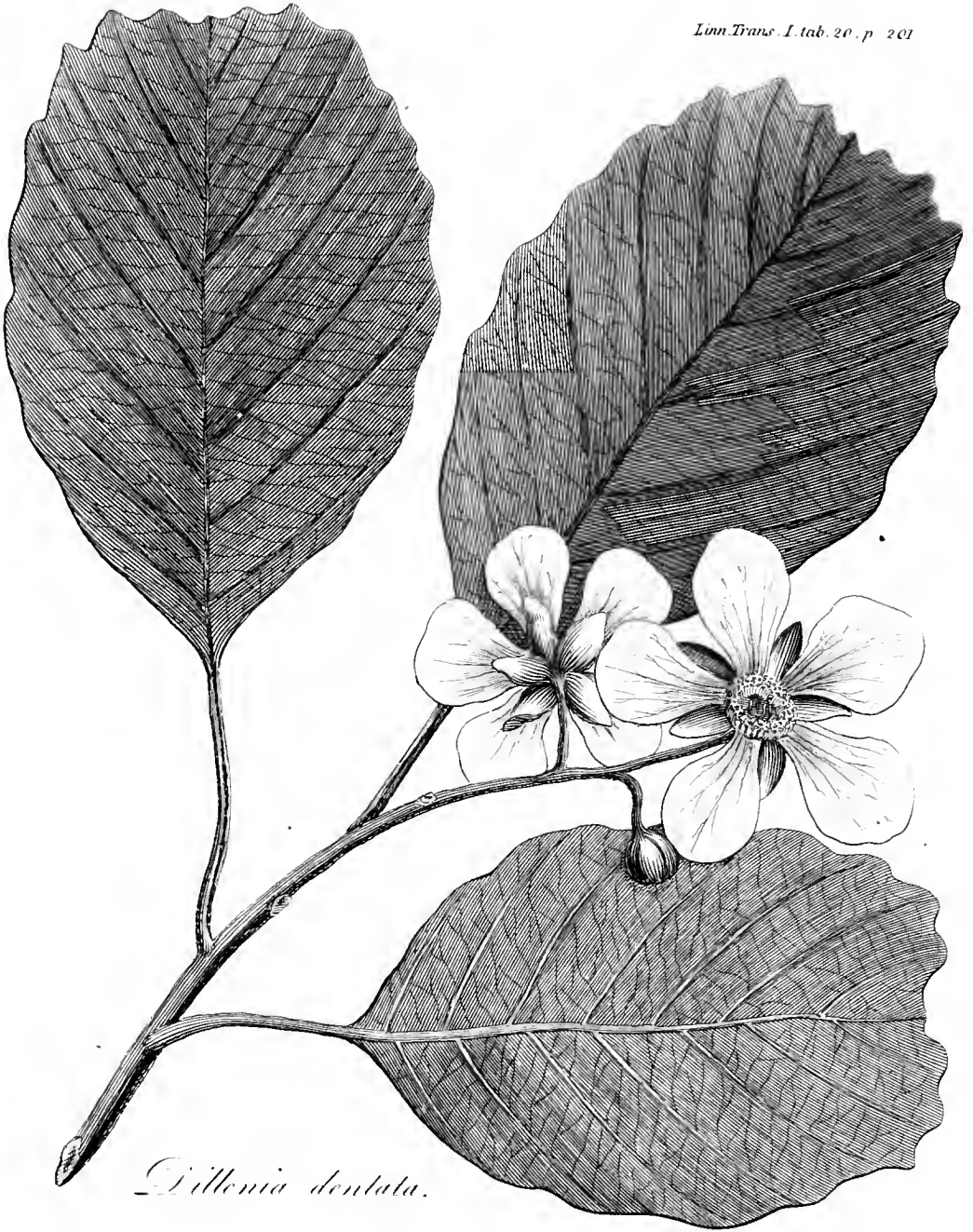
Arbor ramis alternis, rugosis, fuscis, glabris.

Folia alterna, approximata, petiolata, obovata; inferne attenuata, integra;



Dillenia retusa.





Dillenia dentata.

integra; supernè remotè ferrata ferraturis obsoletis; apice truncata, subretusa; coriacea, utrinque glabra, nervosa: nervis parallelis, alternis, sursum curvatis; inter nervos tenuissimè reticulata, patentia, palmam ferè lata, et duplo longiora.

Petoli femiteretes, canaliculati, basi hirfuti, vix pollicares.

Flos terminalis, solitarius, pedunculatus.

5. *D. ferrata*: foliis elliptico-ovatis acutis ferratis, pedunculis trifloris.

Crescit, secundum Rumphium, in *Celebe*, *Macassar*, *Java*.

Sanguis, Rumph. Herbar. Amboin. tom. ii. p. 142, tab. 46.

Folia alterna, petiolata, elliptica, acuta, argutè ferrata, 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 *Ceilon*.

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.

Petoli angulati, glabri, folio paulo breviores.

Flores in ramis terminales, racemosi, subterni.

Pedicelli alterni, glabri, femipollicares.

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*, Gefn. 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 *Cytifus*, only differs from it by having longer leaves as well as spikes. Now the *Cytifus* 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, Rupprius, 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*, as well as both the first editions of his *Synopsis*, he has described a *Trifolium* which is the real *medium*, without referring to any

any preceding author. But in the third edition we find quoted such as have intended the *Trifol. alpestre*. Ruppianus has done the same, remarking at the same time that his *Trifolium ferè simile est illi quod fertur 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 *Morif. 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 Ruppianus; 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 latoribus 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 superne raro maculata*, *calyx glaber*, & *florum spica obsoletior*, 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-ferrata*, 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 *Trifolium*

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.

I. *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,

Gérard 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 ferrulatis. Gmel. Sib. iv.

p. 22, n. 20.

Thalium and Ruppium 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 ferrated 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 ferrulated: 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 surpris'd 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 ascendentes*, 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 Ruppian, 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 Ruppian, 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 *linearilanceolata*, and *calycis dentes brevissimi, infimo tubo corollæ dimidio brevior*, 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 infidentibus, 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 inaccurate

rate observation of Haller's, out of his edition of Rupprius'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 Auftriaca*, 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 quoadum 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. Baub. Pin. p. 328. Ray, Hist. i. p. 944, n. 7. **

Trifolium purpureum majus, folio et spica brevior. Baub. Hist. ii. p. 375, fig. inf.

*Trifolium majus tertium purpureum, Clusio. Baub. 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. panonicum*, 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 Roefslin'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.

Matthioli, 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 Matthioli 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 Matthioli, 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 *Dalechampi*, and the French translation of it; and, lastly, in the *Dioscorides* in Spanish, by De Laguna. It must be remarked that Matthioli, 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 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 above-mentioned 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-impresions 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 *Speçt. 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 authorized 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. IIIO, n. I.

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 Morifon, 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 *Theaurus*, 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

ticifes 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 feu 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 feu 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 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 *ochroleucum*, 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. *Trifolium montanum*.

Trifolium pratense ii. *Dur. Herb.* p. 1014. (*ed. Germ. Uffenbach.* 1619. *Franc. ad Moen.* 4^o.)

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 Roefslin'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 Fuchsi 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 Seguiet 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 dilute 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 annuum 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 pennatum, et refer hoc 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 *capitulum*

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.

- I. TRIFOLIUM *alpestre*, spicis densis, corollis subæqualibus, stipulis setaceis divergentibus, foliolis lanceolatis, caulibus strictis simplicissimis.

Trifolium.

- Trifolium alpestre*. *Lim. 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 ru-*
brum. *Baub. Hist. tom. ii. p. 375.* *
- Trifolium montanum purpureum majus, C. B.* *Ray. Hist.*
tom. i. p. 944, n. 6. * *Tournef. Instit. p. 404. Boerb. 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.* *Baub. 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, setacæ, uni-nerve, villosæ, cauli approximatae, a se
 invicem divergentes, vaginantes: vaginis angustatis, semiam-
 plexicaulibus, margine utrinque rectis, initio villosis ciliatisque,
 dein glabris et vix nisi in sinibus inter stipulas petiolumque
 ciliatis.

Petioles 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 æquant, *inſimus* 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 *ſannonico*, 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 breviffimis, inferioribus binis paullulò longioribus, inſimo filiformi, longitudine totius corollæ, et proximis dentibus ſaltem triplo longiori.

Montanum caulibus angulato-ſtriatis, multifloris; foliolis iifdem 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; foliis 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. Hudf. Angl. ed. 1, p. 284. Jenk. Brit. Pl. p. 178.*

Trifolium flexuosum. *Jacqu. Austr. iv. p. 45, * tab. 386. Allion. Pcdem. 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. * Leersf. Herborn. p. 160, n. 575. * Lightf. Scot. p. 406. * Robf. Brit. Fl. p. 137, n. 8. Poll. Palat. tom. ii. p. 335, n. 702. * Mull. Fl. Dan. Fasc. xii. p. 3, tab. 662. Hudf. Angl. ed. 2, p. 326. Retz. Prodr. p. 141, n. 819. Liebl. Fuld. p. 303, sq. * Relb. 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 infidentibus, vaginarum caudis latioribus. *Hall. Stirp. p. 585, n. 12. * Boehm. Lipf. p. 135, n. 318. * Nonn. Erford. p. 155, n. 5. * Gattenb. 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 saturatoribus. Ray. Syn. ed. 2, p. 194, n. 6, * et ed. 3, p. 328, n. 7. * Tournef. Inst. p. 404. Boerb. Lugd. ed. 2, P. 2, p. 31, n. 8. * Willd. 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 argillofis, in Anglia, Scotia, Suecia, Dania, Austria, Carnioliâ, Pedemontio, Hollandia, Helvetia, et variis Germaniæ partibus.

Radix obliquè descendens, infra tellurem repens, fusco-cinereascens.

Caules suffruticulosi, infernè obliqui subtrigoni (siccati exactè trigoni), supernè erectiusculi teretes, geniculato-flexuosi, ramosi: ramis e tumore axillari calloso adfurgentibus, saturatè virides, interdum hic illic rubentes.

Stipulae 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.

Petioles 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 inferiorum 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 ferius florente, sessilis vel pedunculata, una vel utraqûe; 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 facile patet. Sed præterea ab eo etiam distinguitur *partibus* plurimis majoribus et colore obscuriori præditis; *radice* magis lignosa et terræ tenacius in hærente; *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; *foliis* multo latioribus et plerisque oblongis, subtus glaucescentibus nervoque minori instructis, versus oras oblietius 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. Diët.* 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. *Gattenb. Heidelb.* p. 177.* *Liebl. Fuld.* p. 302.* *Cappel. Helmsf.* p. 126, sq.* *Rehb. Cant.* p. 280, n. 538.* *Wither. Bot. Arr.* ed. *Stok.* p. 794, sq.*

Egenolpb. Imag. p. 139 (ed. ut vid. tert. sine impr. anno) et ejusd. *Effig.* p. 144 (ed. 1562). *Lonic. Hist.* tom. i. p. 104 $\frac{1}{4}$ (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. Phytbol. 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, foliis integerrimis.* *Linn. Hort. Cliff. p. 375, n. 16. * Virid. Cliff. p. 76. Fl. Succ. ed. 1, p. 222, n. 615. Roy. Lugd. p. 380, n. 20. Dalib. Paris. p. 222.*
- Trifolium spicis villosis, foliis infidentibus, 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. Egenolpb. Imag. p. 10* (ed. 1536). *Dorst. Botan. p. 288, D. (ed. Lat. 1540). Rivin. Tetr. tab. 11, fig. fin.*
- Trifolium pratense purpureum.* *Fuchf. 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. Ups. p. 40* (ed. 1666), p. 111 (ed. 1685). *Ray. Hist. i. p. 943, n. 2. * Magnol. Charact. p. 293. * Wilf. 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*. *Baub. Hist.* ii. p. 374.
- Trifolium pratense flore purpureo*. *Frank. Specul.*
- Trifolium flore purpureo*. *Till. Abcëns.*
- Trifolium pratense purpureum minus, folio maculoso*.
Lind. Wiksb. p. 38 (ed. 1716).
- Trifolium pratense, flore monopetalo*. *Tournef. Instit.*
p. 404. *Boerb. 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*. *Weimm. Phyt. Iconogr.* vol. iv.
N^o. 980. ♂.
- Triphylloides pratensis, flore purpureo*. *Ponted. Anthol.*
p. 241. *Segu. Veron.* vol. i. p. 274.
- Epithymum*. *Dorff. Botan.* p. 114.
- Var. β . *fativa*. *Hall. Stirp.* p. 586, et *Hist.* i. p. 163.
- Trifolium pratense*. *Vahl. Fl. Dan.* Fasc. xvii. p. 6,
tab. 989.
- Trifolium pratense γ* . *Hudf. Angl.* ed. 1, p. 284, et ed. 2,
p. 325. *Wither. Bot. Arr.* ed. Stok. p. 795. *
- Le Trefle. *Speçt. de la Nat.* tom. iii. *Icon. A.* ad p. 26
(ed. 1735).
- Trifolium purpureum majus fativum, pratensi simile*.
Ray. Syn. ii. p. 194, n. 5, * et ed. 3, p. 328, n. 6. *
Wilf. 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. *Baub. 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, sicciora atque umbrosa respuit.

Radix ferè perpendiculariter descendens, infra tellurem vix repens, granulata, cinerea.

Caules ascendentes, 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.

Petioles inæquales, plerumque longissimi et stipulis multoties longiores, patentes.

Foliola inæqualia, ovata vel ovalia, obtusa, foliorum infimorum multò minora, ferè orbiculata, retusa, omnia supra depresso-fubtus elevato-venosa, supra etiam macula centrali subfagittata 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, siccatae vero paullulum elevatis; *spica* minori, multò rarius pedunculata geminaque, et vertice non depresso; *perianthio* nunquam profus 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 proportionè 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* adèd 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, teretiufcula, 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 membranacæ, integerrimæ, ochroleucæ, nervoso-venosæ
(*vasis*)

- (*vasis* nempe 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.
- Petoli* supra canaliculati, ceterum striatuli, villosi vel magis minusve pilosi.
- Foliola* subsessilia, nervoso-venosa ut *vaginæ*, supra glabra subtus subvillosa, imprimis 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 ascendenti 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, ascendens, 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, femine maturo cinerascens vel flavicans.

Semen subreniforme, compressiusculum, glabrum, nitidum, subflavescens.

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.

I. COSTUS speciosus.

COSTUS foliis subtus fericeo-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 trifold 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 Afoph.

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. *Braëteæ* 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 *braëteæ*, like those on the stalk; but furnished also with two larger and more obtuse *braëteæ*, 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. S E M P E R V I V U M 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 alinaefolium* 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. 4

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. ½

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. M I M O S A *fuaveolens*.

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.* ½

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. EXTRACTS *from the* MINUTE BOOK *of the* Linnæan Society.

November 4, 1788. **M**R. 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 *lunule* 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 *Lufus Naturæ* in a dove-house Pidgeon, now in my collection.

“ All I know of the history of this extraordinary production 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 produce 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.

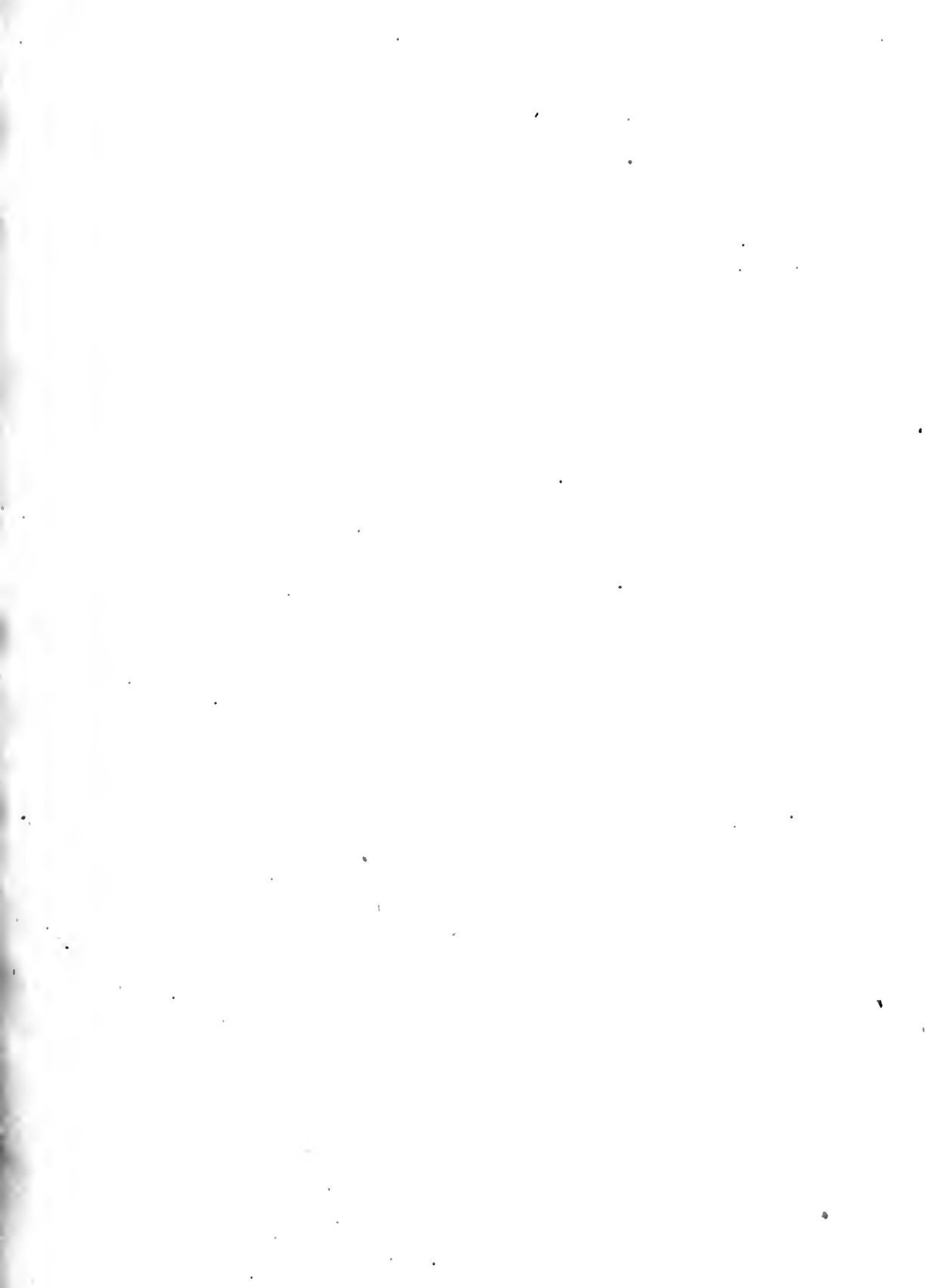
(Signed) “ JOHN LATHAM.”

DARTFORD,
November 4, 1788.

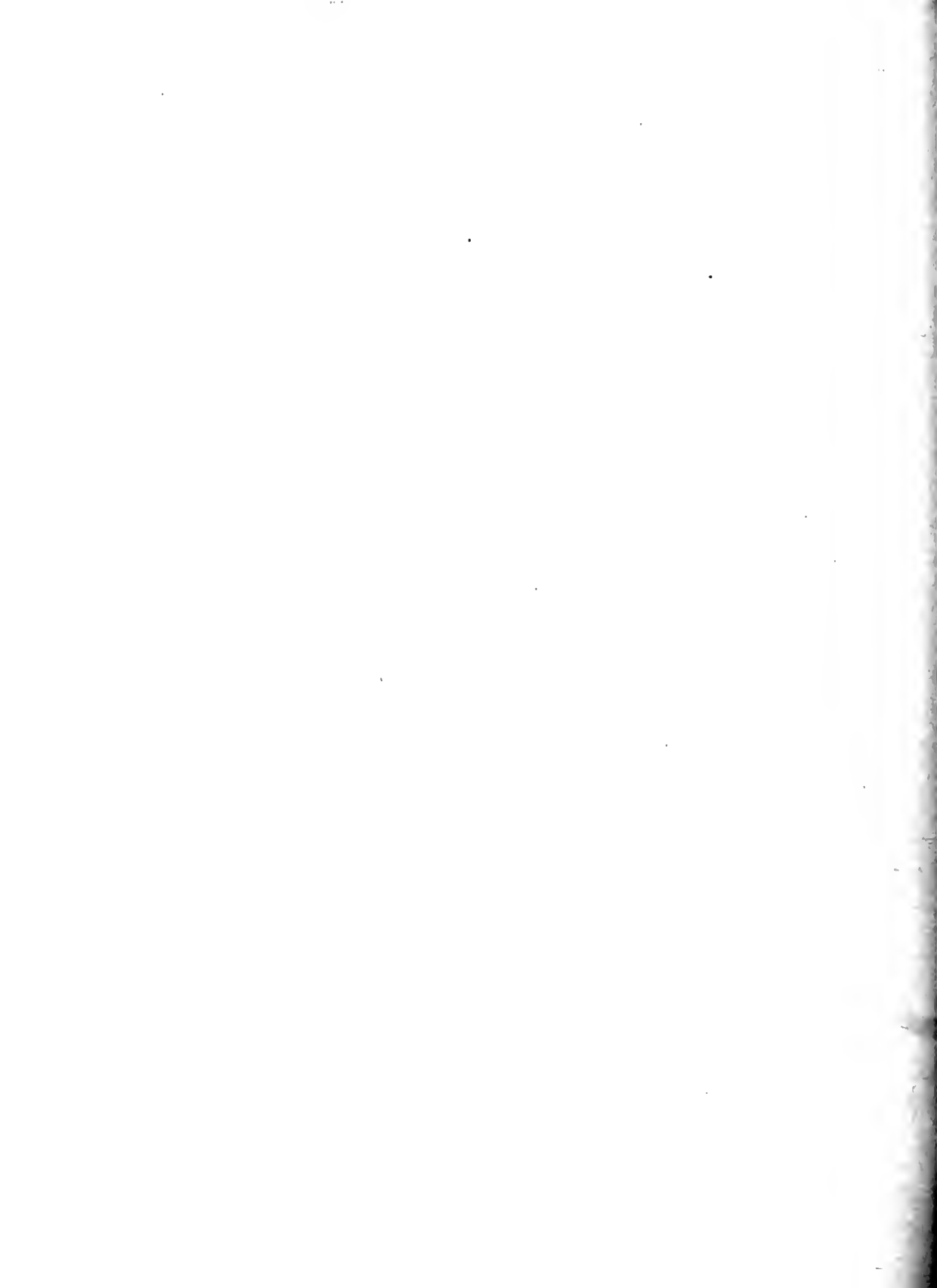
March 2, 1790. The President exhibited some descriptions in Italian, accompanied with rude drawings, of several rare plants found near Bologna in 1652, appearing to be an original manuscript of Zannoni, the property of Mr. Thomas F. Forster, jun. of Threadneedle Street.

F I N I S.













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