Edinburgh encyclopaedia, conducted by David Brewster ... with the assistance of gentlemen eminent in science and literature.

Edinburgh,Blackwood,1830.
http://www.biodiversitylibrary.org/bibliography/30911

9: http://www.biodiversitylibrary.org/item/58397

Article/Chapter Title: Entomology
Author(s): David Brewster
Page(s): Page 57, Page 58, Page 59, Page 60, Page 61, Page 62, Page 63, Page 64, Page 65, Page 66, Page 67, Page 68, Page 69, Page 70, Page 71, Page 72, Page 73, Page 74, Page 75, Page 76, Page 77, Page 78, Page 79, Page 80, Page 81, Page 82, Page 83, Page 84, Page 85, Page 86, Page 87, Page 88, Page 89, Page 90, Page 91, Page 92, Page 93, Page 94, Page 95, Page 96, Page 97, Page 98, Page 99, Page 100, Page 101, Page 102, Page 103, Page 104, Page 105, Page 106, Page 107, Page 108, Page 109, Page 110, Page 111, Page 112, Page 113, Page 114, Page 115, Page 116, Page 117, Page 118, Page 119, Page 120, Page 121, Page 122, Page 123, Page 124, Page 125, Page 126, Page 127, Page 128, Page 129, Page 130, Page 131, Page 132, Page 133, Page 134, Page 135, Page 136, Page 137, Page 138, Page 139, Page 140, Page 141, Page 142, Page 143, Page 144, Page 145, Page 146, Page 147, Page 148, Page 149, Page 150, Page 151, Page 152, Page 153, Page 154, Page 155, Page 156, Page 157, Page 158, Page 159, Page 160, Page 161, Page 162, Page 163, Page 164, Page 165, Page 166, Page 167, Page 168, Page 169, Page 170, Page 171, Page 172, Page 173, Page 174, Page 175, Page 176, Page 177, Page 178, Page 179, Page 180, Page 181, Page 182, Page 183, Page 184

This page intentionally left blank.

ENTOMOLOGY.

Entomology. Definition.

ENTOMOLOGY, from ἔντομα, *an insect*, and λόγος, *a discourse*; the science which treats of insects, a class of animals, which were formerly arranged, along with CRUSTACEA and ARACHNIDES, under the general denomination of insects (INSECTA,) which, as we have already shown under the article CRUSTACEOLOGY, are now universally allowed to be distinct. The word ἔντομα is derived from ἐν, *into*, and τέμνω, *to cut*; and *insectum* has a similar root, from *in*, into, and *seco*, to cut, because insects are divided into numerous segments, or from their being generally almost divided into two parts, which are merely attached to each other by a slender thread. The former term was made use of by Aristotle, who lived about 500 years before the Christian era, and seems to have been known much earlier than his time. It is defined by him to signify an animal which, by incisions, is severed into two or more parts. The latter word, *insectum*, is adopted by Pliny, and was in use among the Latins long before his time, and we find it applied in the same sense as the ἔντομα of Aristotle.

Importance of the science.

As the animals of this class constitute the most considerable portion of animated beings, it becomes one of the most interesting and important sciences which can engage the mind of the philosopher. The extreme difficulty of discriminating the characters and particular affinities of these beings, arising from their number and variety of form, in addition to their minuteness, more strongly claims his consideration. He who neglects the study of insects, or thinks it beneath his notice, cannot deserve our respect, as a general observer of nature, nor be considered a scientific naturalist. The views of such a man will be partial, and his inquiries circumscribed; he regards only an inconsiderable portion of animated nature; and he confines his remarks to such as, from their size and distinctness of character, present the least obstacle to investigation. In the study of entomology, the man of science will find abundant scope for the exercise of his zeal. The amazing number of species; their curious forms, so infinitely varied, and yet so nearly and gradually approximating through an endless series of transitions from one species to another; the diversity of structure observable in those parts which afford generic characters, added to the wonderful changes in form which they undergo, with their surprizing economy,—are circumstances which contribute to render them objects of most curious speculation to the philosopher. And although the study of every class of animals is most indisputably attended with peculiar advantages, yet we shall venture to affirm, that it is from a knowledge of the characters, metamorphoses, and various modes of life, these little animals are destined to pursue, that he will obtain a more intimate acquaintance with the great laws of nature, and veneration for the Great Creator of all, than can be derived from the contemplation of any other class in nature. Many other attractions accompany the study of this department of science. The beauty of insects in general, renders them engaging to many who have neither time nor inclination for studying their more complicated structure; and the gaiety of their colours, often combined with the most graceful forms, displays a beauty, splendour, and vivacity, greater than that bestowed by the hand of Nature on any of her other works. One defect in appearance must indeed be conceded; and this may be regarded, in point of beauty, a material defect; they are not always so considerable in magnitude as to become, even with these embellishments, so strikingly attractive. Were they equal in size to the smallest birds, their elegance would render them more inviting in the eyes of mankind in general; but, even amongst the minor species, when examined with a microscope, we find their beauty and elegance far superior to that of any other class in nature. "After a minute and attentive examination," says Swammerdam, "of the nature and structure of the smaller as well as the larger animals, I cannot but allow an equal, if not superior, degree of dignity to the former. If, whilst we dissect with care the larger animals, we are filled with wonder at the elegant disposition of parts, to what a height is our astonishment raised, when we discover these parts arranged in the least in the same regular manner!"

Entomology.

Uses of entomology.

Insects may be divided into two kinds; those which are immediately or remotely beneficial or injurious to mankind. Many insects certainly seem not to affect us in any manner; others, and by far the greater number, most assuredly fall under one or the other denomination, and surely on this account demand our most serious attention; but, lest our allusion to the utility of some insects should seem hypothetical to the superficial observer, whilst the noxious effects of others are too obvious to admit of doubt, we shall be more explicit in this observation. The depredations of insects upon vegetable bodies, are often detrimental; but it must be remembered, that in these ravages they often repay the injury they commit. The locust, the most destructive of all insects, whose numbers spread desolation through the vegetable world, are not (except on some occasions when their multiplication exceeds all bounds) unproductive of advantage. Although they deprive mankind of a certain portion of their vegetable food, yet, in return, their bodies afford nutriment of a wholesome and palatable kind, and in much greater abundance. The various species of locusts are the common food on which the inhabitants of many parts of the world subsist at particular seasons. The honey of bees, in many warm climates, constitutes another primary article of food. The caterpillars of several moths furnish materials for the silken raiment so universally worn by all ranks in the eastern parts of the world; and hence, in these countries, the silky produce of these industrious little animals is of as much use as the fleecy coat of the sheep is to us. As an object of traffic, silk is one of the utmost importance in China and Tartary; and, in those parts, paper is manufactured from the refuse of the same material. The extensive use of wax in all ages, is well known; but it is less generally understood that all wax is not produced by the bee alone; the wax-insect of China is a very distinct animal: (See CICADA, *Index*; and Donovan's *Insects of China*). Some insects are used with success in medicine; and many others (the cochineal, for instance,) are rendered useful in the arts: and greater numbers might perhaps also be employed for the same purposes. These few, out of a vast many more instances, are sufficient to prove the absurdity of an opinion very prevalent, "that insects are too insignificant to deserve the attention of

History. the philosopher." But allowing these benefits to be unknown, and that the study of entomology is not productive of any substantial advantages, how absurd would it still be to treat such an extensive portion of the creation with neglect? The objection, that they are in nowise conducive to our interests (even if founded in truth), would be no evidence of the frivolity of the science, unless we are to conclude, that the only inquiries which merit our rational attention are those which tend to the gratification of selfishness. If this be admitted as an objection, how many objects of philosophical investigation must be rejected as frivolous! From the earliest period in which the light of natural knowledge dawned, this class of animals has obtained considerable attention; and although the study has not at all times been cultivated with equal ardour, yet we shall hereafter be enabled to prove that it has not been utterly neglected, but has engaged the study of men endowed with talents as splendid, and judgment as refined, as the most exalted of those who affect to treat it with contempt.

HISTORY.

History. From the earliest period of which any authentic records remain, this science has obtained a very considerable portion of attention; but the total destruction of the great public libraries, has deprived us of the means of ascertaining to what state this branch of science had attained, till within about 2000 years of the present time. We shall now endeavour to lay before the reader an account of these works; and, as we deem the subject of importance, shall, as far as our limits will allow, mention every work, however slight, which has been productive of any material information; at the same time, we wish it to be understood, that we do not consider it necessary, or within our province, to enter at large upon a critical analysis of the multitude of writings before us, but only such as we have had an opportunity of consulting with attention, describing the leading intention of their authors respectively, which we shall enumerate as nearly as possible in chronological order.

Some books appear to have been written prior to the date of those which have descended to us, as we infer from various hints recorded in the earliest of those works now extant.

Moses. The oldest records on this subject are to be found in the sacred writings, where mention is made of locusts, flies, and caterpillars; and it is probable Moses had acquired a slight knowledge of this science from the Egyptian sages, as his works abound with passages relating to insects; and amongst the obsolete works of Solomon. Solomon, he is said to have treated of "creeping things."

Hippocrates. Hippocrates, who lived about 500 years before Christ (as we are told by Pliny), wrote on insects. The writings of the earlier Greek and Latin philosophers, quoted by Pliny, afford extracts of his labours.

Aristotle. Aristotle flourished in the succeeding age. He wrote, amongst many other works, a *History of Animals*, an elementary book, giving a general and comprehensive view of the animal creation; but he rarely descends to the description of species. It is a work of the greatest merit, which no one can impartially peruse without confessing the intimate knowledge its writer must have possessed of nature. The insect class is treated of in several parts of his work. In the seventh chapter of his first book, we find the term ἔντομα is that of a family, which constitutes one of his four orders of animals with colourless blood. These animals he terms *exsanguineous*; and, in his definitions, he points out, with great accuracy, in what they differ from the other three divisions of this class, viz. *Mollusca*, *Crustacea*, and *Testacea*. In the first chapter of the fourth book, we find the essential characters more clearly given, namely, the incisions on the back or belly, or both, by which their bodies appear to be divided into two or more parts. In another part of his book, more particularly devoted to insects, he describes them as having three parts, the head, trunk, and abdomen: the second part is denominated an intermediate portion, corresponding with the back and breast of other animals. He also adds, they have feet. In subsequent passages, he describes insects which fly, and those that walk. Amongst the former, he notices those with naked wings, and those covered with a sheath; and he observes, that some of these have the sheaths divided, and others immovably connected. The naked winged insects are of two kinds, some with four, and others with two wings. Some of those with four naked wings are furnished with stings at the extremities of their bodies, whilst those with two are destitute of this apparatus. He describes, with attention, the horns (*antennæ*) of the butterflies and locusts. When noticing the legs, he remarks the leaping feet of the locusts, which he compares to those of springing animals. The accuracy with which this learned philosopher has described the various parts of these animals, cannot but astonish the learned entomologist; he will be surprised at their consistency. Their accordance with the entomological definitions of the modern systematists, will excite further comparison; and the natural result will be, that, with the acquired knowledge of 2000 years, so far as he does proceed, we, until lately, have been unable to amend his observations. A cursory perusal of the whole work will show, that whatever might be the merits of this great man, his writings evince too much acquaintance with the science of nature to be the produce of any individual genius, shining with unborrowed light; for, when we reflect on the slow manner in which all human knowledge is developed, we are readily convinced that the science of nature must have made some considerable advancements before his time; and that he has derived considerable assistance from the works of more ancient naturalists.

History. Aristotle.

Ælian. Ælian, in his work on animals, Περὶ ζῴων, appropriates several chapters to insects, without entering into the system at large, confining himself to particular kinds; and those noticed are described with attention, as crickets, the generation of wasps, of cantharides, &c.

Democritus, &c. Amongst the Greek writers who immediately, or within a few centuries, followed Aristotle, treating on insects, were, Democritus, Neoptolemus, Philistus, Nicander, Herodius, with many others of less note. These writers were probably cotemporary with Pliny; and, during the same period, several Latin writers seem to have been induced to pursue this science, through the influence of the Greeks, who were insensibly led to it from attending to the culture of bees, which at that time was attended to with the most enthusiastic ardour. Aristamachus of Soli is said to have written on the subject, from the result of fifty years experience; and Philiscus to have employed his whole life in forests and deserts attending to their history.

Aristamachus. Philiscus.

Pliny. Pliny, in the eleventh book of his *Historia Naturalis*, treats of insects. His observations are chiefly copied from the work of Aristotle. In his day, the culture of silk-

History.

worms was an object of attention. He says that garments of silk were much admired in his days by the fair sex, as it shewed their form to advantage from the delicacy of its texture.

From the time of Pliny till the overthrow of the Roman empire, the study seems not to have been totally disregarded; but we are ignorant what steps were advanced during that period. Amongst the writers were Titus, Ætius, Alexander, Oribasius, Trallian and Paulus Ægineta, who lived between the fourth and seventh century. Between the ninth and twelfth century, some of the Arabian botanists distinguished themselves as entomologists. The principal were Rhazes, Avicenna, Avenzoar, and Averrhoes. From this period till the fifteenth century, a few obscure writers, scarcely worthy of notice, appeared, viz. Myrepsus, Platerus, &c.

Titus, &c.

Arabian entomologists.

Albertus Magnus wrote a general zoological work, entitled, *De Animalibus*, part of which treats of insects. He died 1280, but his work did not appear until the year 1519, being printed at Venice.

Albertus Magnus.

In 1549, Agricola published his work, *De Animalibus Subterraneis*, which contains a systematic arrangement of insects. He reduces all insects to three principal classes, viz. 1. Those that walk; 2. Those that fly; and, 3. Those furnished with swimming feet; and describes a number of species.

Agricola.

In 1552, Edward Wotton published a work, entitled, *De Differentiis Animalium*, in which he treats largely on insects. The book is in folio, and appeared three years before the author's death.

Wotton.

In 1555, Rondeletius of Montpellier gave his valuable work, "*Universa aquatilium Historia pars altera*," to the world, in which he treats of insects, which he accompanies with wood cuts.

Rondeletius.

In 1599, in folio, was published at Naples, "*Ferrante Imperato dell' Historia Naturale libri* 28."

In 1602, a very voluminous work was published, entitled, *De Animalibus Insectis*, by the "indefatigable compiler" Aldrovandus. Donovan is inclined to give him considerable credit. He has certainly acquitted himself in collecting together the undigested observations of the ancients; but from his entire ignorance of the subject, he has necessarily fallen into all the errors of his predecessors: we must, however, allow, that he has acted with candour, having rarely omitted to mention his authorities. He was professor of medicine at Bologna, and employed much of his time in the study of insects, and expended large sums of money in acquiring specimens, and employing artists to figure them. He is stated to have paid two hundred florins annually to an artist, who was occupied solely in the delineation of insects. He divides insects into two great orders, 1. *Terrestial*; 2. *Aquatic*, which he terms *Insecta farica*, and *Non farica*: these he divides into sub-orders, from the number and situation of their wings and feet. His figures are but rudely expressed, which is excusable. At this time a taste for more expensive embellishments began to prevail; but as the art of engraving on copper had scarcely emerged from its infancy, these works were exclusively produced by artists themselves.

Aldrovandus.

In 1612, the *Historia Animalium Sacra*, by Wolfang Frenzius, dividing insects into three classes, 1. *Aeria*, 2. *Aquatica*, 3. *Terrea*, and containing several new observations, appeared: and three years afterwards, in the year 1616, at Rome, a pamphlet of about one hundred pages, in Latin, entitled, *De Formica*, by Jeremiah Wilde.

Wolfang Frenzius.

History.

In 1622, a work but remotely relating to insects, in 4to, appeared in Edinburgh, bearing the following title, *Hieroglyphica Animalium Terrestrium, &c. quæ in Scripturis Sacris inveniuntur et plurium aliorum, cum eorum interpretationibus*; which, being the first work relating to insects published in Britain, is not unworthy of notice as a curiosity.

Jeremiah Wilde.

In 1630, a thin quarto, by Hoefnagle, was published under the title of *Diversæ Insectorum volatilium Icones ad vivum depictæ, per D. J. Hoefnagle, typisque mandatæ a Nicolao Johanni Vischer*, containing 326 figures, some of which are very indifferent. He has not adopted any particular mode of arrangement, but contented himself with delineating them in the states presented by chance, not always following them throughout their progressive changes.

Hoefnagle.

In 1634, Thomas Mouffet published his *Insectorum sive minimorum Animalium Theatrum*, which appears to be the second work on entomology published in our country. This work, as its title indicates, is written in the Latin language; it appeared in London in one volume folio, and contains numerous wooden cuts, rudely executed, accompanied by long, tedious, and often ridiculous and fanciful descriptions of the species. The first seven chapters (*capita*,) are occupied with heavy details concerning the common hive bee (Apis *Mellifica*.) The eighth is entitled, *De Vespis*. The ninth, *De Crabrone et Tenthredine*, which includes the humble bees (Bombi). The tenth, eleventh, and twelfth, *De Muscis*, which includes, with several dipterous (or two-winged insects) many hymenopterous, as well as neuropterous insects. The thirteenth, *De Culicibus*. The fourteenth, *De Papilionibus*, which occupies two hundred pages, the margins being embellished with 112 wooden figures, executed in the rudest style, yet in most instances tolerably intelligible to the skilful entomologist. The fifteenth *De Cicindela*, including the glow-worm (*Lampyris*,) and several others. The sixteenth, *De Locustis*. The seventeenth, *De Cicadis et Gryllis*. The eighteenth, *De Blattis*. The nineteenth, *De Buprestide et Cerambice*. The twentieth, *De Cantharide*. The twenty-first, *De Scarabæis*, which includes many of the larger beetles, (*Coleoptera*). The twenty-second, *De Scarabæis Minoribus*. The twenty-third, *De Proscarabæo et Scarabæo Aquatico*. The twenty-fourth, *De Gryllotalpa*. The twenty-fifth, *De Phryganea*. The twenty-sixth, *De Tipula*. The twenty-seventh, *De Forficula sive auricularia*. The twenty-eighth, *De Scorpio, Formica, et Pediculis alatis*. And, lastly, the twenty-ninth, *De Cimice Sylvestri*. After these, we arrive at the second book, which treats of apterous insects, (those wanting wings), amongst which he places all sorts of *Larvæ* (or caterpillars) of other species belonging to winged insects, and likewise many of the vermes, &c. We must apologise to the reader for taking up so much of his time with dry statements of the heads of this work; but as it was one of the first produced in this country, we trust he will not consider it as entirely uninteresting; and as a specimen of his style and notions relative to insects, we may quote the following, which speaks of a species of *Mantis*, (probably *M. religiosa* or *Oratoria*): "Pectus habet longum, tenue, cuculo tectum, caput simplex; oculos sanguineos, satis magnos, an-

Mouffet.

History. tennas breves, pedes sex locustarum more, sed anteriores multo crassiores longioresque cæteris, quos quia junctos plerumque elevat (precantium ritu) a nostratibus *presque Dieu* dici solet: totum corpus macilentum est. Tam divina censetur bestiola, ut puero interroganti de via, altero pede extenso rectam monstrat, atque raro vel nunquam fallat. Cauda illi bifurca, setaceis duobus aculeis prædita; atque ut nanum elevatione vates refert, ita etiam et motus similitudine; neque enim ludit ut alii, neque saltat, neque gestit; sed lente obambulans modestiam retinet et maturam quadam ostendit gravitatem." The work is professedly an improvement on that of Dr Wotton, begun in 1550, continued by Conrad Gesner; and was afterwards enriched and published in its present form by Mouffet.

Hollar. In 1646, Hollar gained considerable reputation by his work, *Muscarum, Scarabæorum, Vermiumque variæ figuræ et formæ, omnes ad vivum coloribus depictæ et ex collectione arundeliana, &c.* which was published at Antwerp.

Johnson. In 1657, the *Historia Naturalis* of Johnson, in folio, was published; but as this work is a mere compilation, it is unworthy of further notice; for "he has not added a single remark to what was before known."

Topsal. In 1658, an English translation of Mouffet's work was published in London by Topsal, chaplain of St Botolph.

Goedart. Goedart, about this time, published a work in the Dutch language, with plates. This work, considering the time of its appearance, must be considered of considerable merit. It has been translated into Latin, French, German, and English, with copies of the plates. "For the space of twenty years," we are told, "Goedart devoted himself to the study of insects." He followed them through their progressive changes with great precision: this renders his book more extensively acceptable; and his figures, which were never surpassed by his predecessors, are sufficiently correct to be understood. The first edition of this work being sold off, the

Mey. first volume of a Latin translation, by Dr Mey, minister of Middleburg, was produced, under the title of *Metamorphoses et Historia Naturalis Insectorum*, in 1662. Lister allows but little credit to the translators of his works; "Goedart," he observes, "left his writings in Dutch; his translators were men wholly ignorant of natural history, and their comments are mere rhapsodies altogether."

Power. In 1664, a quarto relating to insects as objects of microscopical investigation, by Power, was published.

Hook. In 1665, Hook's *Micrographia* appeared; and, like the former work of Power, treats of minute insects.

In 1666, was published in quarto, *Adami Olearii Gottorffische kunst-kammer Sleswig.*

Merret. In 1667, *Pinax rerum naturalium Britannicarum, continens Vegetabilia, Animalia et Fossilia, in hac insula reperta inchoatus*, by Christopher Merret, M. D. was published in London. This is the first work treating exclusively of the insects of Britain: it contains a brief catalogue of such as were known to Dr Merret, each being accompanied by a concise descriptive sentence by way of name. In the first volume of the *Transactions of the Entomological Society of London*, an account of the insects given by this author, with their systematic names, is given by A. H. Handorth, Esq.

Charlton. In 1668, Charlton published a work in London, with a systematic arrangement of insects, after the manner of Aldrovandus, entitled, *Onomasticon Zoicon, &c.* 4to. History.

Swammerdam. In 1669, was printed in Dutch, with a Latin title, at Utrecht, *Historia Insectorum Generalis, &c.* by the illustrious Swammerdam. This work was printed in 4to. (and has since undergone several editions, which we shall mention in their proper order), illustrated with thirteen copper-plates. Many years elapsed before the excellence of this work, the admiration of later times, was in any manner acknowledged. It was condemned as inaccurate until the death of its learned and generous author, affording one of the many examples of that culpable spirit which living merit so rarely fails to experience, for labours bestowed for the benefit of an ungrateful world. No sooner was his death announced, than his merits were discovered, and his work was rendered into French by an anonymous translator: this and many other editions soon after followed. The system of this author is interesting; we shall therefore give a short sketch to our readers. He divides insects into four classes, the characters being taken from their metamorphoses and economy. The first undergo no change, and includes *spiders, onisci, &c.* (which are noticed under our article CRUSTACEOLOGY). The second class includes those which, after leaving the egg, appear under the form of the perfect insect, but have no wings; in which state it eats and grows, till, having passed the chrysalis state, it issues thence with wings, and is in a condition capable of propagating its kind. This class comprehends the orders of insects *Orthoptera, Dermaptera, Dictuoptera, Hemiptera,* and *Neuroptera,* of this work. In the third class, we find those insects which appear when hatched from the egg, under the form of a caterpillar (*Larva,*) which when full grown, changes into a chrysalis, where it remains until the parts are fit to be developed. The insects included in this class are the orders, 1. *Coleoptera,* and 2. *Aptera,* (Lamarck); *Suctoria,* (Latreille); whose larvæ divest themselves of their skin before transformation. The fourth class comprehends those who having attained the pupa (or chrysalis) state, do not divest themselves of their skin. The insects alluded to are the orders *Diptera* and *Hymenoptera* of modern entomologists.

Wolf. In the same year Wolf's *Dissertatio de Insectis, &c.* appeared at Leipsic. The author was professor of medicine at Jena.

Redi. In 1671, Redi published his *Experimenta circa generationem Insectorum*, in which he combats the long-maintained doctrine of equivocal generation with success; proving by experiments and close reasoning, the fallacy of such opinions. At the end of this book he has given figures of the lice of birds.

Perrault. In 1671, Claude Perrault, one of the most learned exotic entomologists of his age, author of several very ingenious papers in the *Memoirs of the French Academy*, published a folio work at Paris, entitled, *Memoires pour servir à l'Histoire naturelle des Animaux.*

Ferrard. In 1672, Ferrard published a work at Naples, of which we have no account, nor have we met with it.

Franzelio. In 1673, Franzelio submitted his *Insecta Novisolii cum nive delapsa* to the world.

Mollerus. In the same year, at Frankfort, was published by Mollerus, *Meditatio de Insectis quibusdam Hungaricis prodigiosis anno proxime præterito, ex aere una cum nive in agros delapsis*, ornamented with wooden cuts.

History.

In 1675, a tract on the natural history of the *Ephemera horaria*, by Swammerdam, appeared, entitled, *Ephemeri Vita of afbeeldingh van 's menschen leven, ventoont in de Historie van het uligent ende een-daghlevent Hasl of Oever-aas.*

Belerio. And in the same year, an elementary tract by George Belerio, printed at Upsal, *περὶ τῶν ἐντόμων.*

Bochart. About the same time, also, by Samuel Bochart, a work entitled, *Hierozoicon, sive bipartitum opus de animalibus Sanctæ Scripturæ.*

In 1676, some additions to Claude Perrault's work were published.

Gräffinn. In 1679, Madame Maria Sybilla Merian, *vel* Gräffinn, produced the first part of her work, "*Der Raupen wunderbare verwandelung und sonderbare blumen-nahrung,*" which relates principally to European lepidopterous insects. The authoress was a native of Frankfort on the Maine, wife of John Andrew Gräffinn. In early life, she imbibed a taste for the study of insects, from being occupied at times in painting these objects as ornaments to her flower-pieces. The task of painting insects she performed with tolerable accuracy; yet there is "a peculiar exuberance of style incompatible with any faithful resemblance of nature." Many of her original drawings are preserved in the British Museum as specimens of her style.

Wagneri. In 1680 was published, Johannis Jacobi Wagneri, *Historia Naturalis Helvetiæ curiosa.* Figuræ.

Grew. In 1681, Grew published his *Museum Regalis Societatis;* being a catalogue and description of the natural and artificial rarities belonging to the Royal Society of London, preserved in Gresham college. London. Folio.

In the same year, an English translation of Swammerdam's *Ephemeri Vita* was produced in London, and a French translation in Paris.

In 1682, a book entitled *Johannes Godartius of Insects, done into English, and methodised, with the addition of notes; the figures etched in copper by Mr P. Fib,* was published at York. It is supposed to have been translated by Lister; the initials M. L. are at the close of the address "to the reader." The impression, as we learn from the preface, consisted of one hundred and fifty copies, which were intended merely for the curious; and the notes are copious.

Lister.

Hoppis. In 1682, Hoppis published a dissertation on the *Gryllus migratorius.*

Merian. In 1683, the second part of Merian's *Der Raupen,* &c. appeared.

In 1685, the first Latin edition of Swammerdam's work was printed in Lyons, under the title, *Historia Generalis Insectorum, Latinam fecit* H. C. Hennius.

In this year also, Lister's Latin edition of Goedart, entitled, *J. Goedartius de Insectis in methodum redactus, cum notularum additione, opere,* M. Lister, in octavo, appeared in the Latin language. The author distributes the materials into a new form of arrangement, the merits of which are too obvious not to be considered as an improvement on the original production. He divides them into ten sections, as follow.

1. Those with erect wings, and angulated pupæ. *Butterflies.*
2. Those with their wings placed horizontally, and which proceed from caterpillars, called *geometræ* by Goedart, from their gait. *Moths.*
3. Those with deflexed wings. *Moths.*
4. *Libellulæ,* or dragon flies.
5. *Bees.*
6. *Beetles.*
7. *Grashoppers.*
8. *Dipterous,* or two-winged flies.
9. *Millepedes.* (Now *Crustacea.*)
10. *Spiders.* (Now *Arachnides.*) See the article CRUSTACEOLOGY.

History.

Although we readily allow Lister the credit due for this arrangement, yet we cannot avoid expressing our regret for his remarks on the original author, to whom he allows neither credit as a naturalist nor as a writer. He highly praises his skill as a painter; but says, "Goedart, after forty years attention, seems to have made but little advancement in his skill in the nature of insects; he rather seems to have diverted himself, than to have given himself any trouble to understand them; and yet after all, you will find him everywhere just and correct, but in many places short and hardly intelligible." These opinions are delivered in a style of affected superiority over his author, highly unbecoming and not strictly true; and he gained no reputation on the continent for these illiberal remarks, which were much condemned.

Also, by the same author, *Appendix ad historiam animalium Angliæ.* London. Octavo.

Leeuwenhoek. In 1687, Leeuwenhoek published his *Anatomia seu interiora rerum, cum animatarum tum inanimatarum, ope et beneficio exquisitissimorum microscoporum detecta.*

Geyereus. In the same year, Geyereus wrote a treatise on the medicinal properties of Spanish flies, (*cantharides,*) under the title, *Tractatus physico-medicus de cantharidibus.*

Griendel. Also by J. F. Griendel, at Neuremberg, in quarto, *Micrographia Nova,* in which some notice is taken of insects.

In 1688 was published an Italian edition of Redi's *Experimenta circa Generationem Insectorum,* entitled, *Esperienze intorno alla Generazione degl'Insetti.*

Blankaart. In this year also, Stephen Blankaart of Amsterdam, published a work, *Schon Berg der Rupsen, Wormer, Maden en vliegende Dierkens daar uit voort-kommende.* The author was a physician, who devoted much time to collecting insects. The plates are admirably executed; but the work in other respects bears but an indifferent character. Frisch and Lyonet consider it but a superficial production. It treats of the larvæ of various insects, and a few perfect insects are also noticed. Another edition was published at Leipsic in 1690.

Cyprien. John Cyprien also published at Frankfort, *Historia Animalium,* in the same year, in which insects are noticed.

Muralto. About this period, two papers on insects appeared, one by John de Muralto, the other by C. Mentzelius. Mentzelius.

Bilberg. In 1690, Bilberg published at Upsal a dissertation entitled, *Locustæ.*

König. And in the same year, König's *Regnum Animale.*

In this year also, Stephanus Blancard published in octavo, at Leipsic, *Schon-burg der Ruspen, Wormen, Maden.*

Jungius. In 1691, *Historia Vermium,* by Jungius, was printed at Hamburgh.

Sedileau. In 1692, in the Memoirs of the French Academy, we find a curious paper, by Sedileau, entitled, *Observations*

History.

sur l'origine d'un espece de Papillon, (which treats of *Saturnia pavonia major.*)

Hennius. In 1693, an augmented edition of Swammerdam's *Historia Generalis Insectorum Latinam fecit* H. C. Hennius, was printed at Utrecht.

In this year, the prodigious ravages occasioned by immense swarms of locusts, which, in the month of August, over-ran Germany, and extended partially through the rest of Europe, even to the northern borders, could not fail to engage the observations of many writers, among whom we find the following naturalists, *De Locustis immenso agmine aërem nostrum implentibus, et quid portendere putentur,* by Hebenstreit; also *Dissertatio de Locustis, anno præterito immensa copia in Germania visis, cum diatriba, qua sententia autoris de* שלוים *defenditur,* by Ludolphus. The former of these works is comprised in sixty-five pages, with one plate, from which we learn the species treated of to be *Gryllus migratorius.* The work of Ludolphus is in folio, and consists of eighty-eight pages, embellished with figures. The following authors also published tracts on this subject, namely Crellius, Kirkmajor, Woollenhaupt, and Treunera, but we are ignorant of the titles of these little dissertations.

Hebenstreit.

Ludolphus.

Albino. In 1694, Albino published a small tract on the Spanish flies, (*Cantharides.*)

In 1695, the *Arcana Naturæ Detectæ,* by Leeuwenhoek, appeared.

Petiveri. And in the same year, a small octavo, Jacobi Petiveri *Museum.*

In 1699, Hombergh published a paper in the Memoirs of the French Academy, on *Agrion virgo.*

Goedart. In 1700, was published, in three volumes duodecimo, *Histoire Naturelle des Insectes selon leurs différentes metamorphoses, observées* par Jean Goedart. Amsterdam.

Petiver. In 1702, James Petiver produced the first decade of his *Gazophylacium naturæ et artis,"* which was carried on progressively till about ten years afterwards. It consists of ten decades, which treat of insects, as well as larger animals, fossils, and plants.

Ray. In 1705, our celebrated countryman Ray published his work entitled, *Methodus Insectorum, seu in methodum aliqualem digesta.*

Rumphius. In this year also, the entomological part of the work of Rumphius appeared.

In 1707, appeared in London, *A Voyage to the Islands of Madeira, Barbadoes, Jamaica, with the Natural History,* &c. by Hans Sloane. Folio.

In 1710, Russel published his *Theatrum universale omnium animalium,* which treats of insects.

Derham. And the illustrious Ray's *Historia Insectorum,* under the care of Dr Derham, after the author's death, appeared. In this work, he divides insects into two principal classes, such as undergo transformation, and those that do not; and these he subdivides into several orders. He includes amongst these some vermes, which have again been removed by Linnæus, as we shall have occasion to mention hereafter.

Wedelio. In 1717, Wedelio published a tract on the utility of *Cantharides* in the materia medica, in Jena.

Petiver. And in the same year, J. Petiver, an entomological writer, published a work, *Papilionum Brittaniæ Icones, nomina,* &c. in folio, London, which in its time was certainly a valuable publication to the student of entomology, and even now, as a work of reference, is in high repute.

History.

Frisch. In 1720, Frisch published his *Beschreibung von Insecten in Deutschland*: the whole work consists of thirteen parts, each being illustrated by three plates.

Albin. In this year, Eleazare Albin published in London, *A Natural History of English Insects,* with one hundred copperplates, in one volume quarto.

Bladley. In 1721, Bradley published in London, *A Philosophical Account of the Works of Nature,* which contains some entomological matter, and also a few engravings of insects, in octavo.

In 1722, *Opera Omnia,* containing all the works of Leeuwenhoek.

Sloane. In 1725, Sir Hans Sloane published in London, the second volume of his *Natural History of Jamaica,* the second book of which treats of the insects of that island, accompanied by several uncoloured plates.

Merian. In 1726, Merian published at the Hague, in large folio, *De generatione et Metamorphosibus Insectorum Surinamensium*; the materials of which were collected by herself, or under her directions, in Surinam, where she spent two years, for the sole purpose of forming a collection, and in taking drawings for this work; which is not, however, entirely devoted to entomology, for besides insects, we find depicted plants, and various reptiles, as toads, lizards, serpents, &c.

Valisnieri. In 1730, Valisnieri, in his *Esperienze et Observazioni intorno agli inseiti,* distributes all insects into four classes, from their habitats. The first comprehends those which live on plants; the second, such as live in water; the third, those that live on earth, or amongst stones; and the fourth, those which subsist on other animals.

In 1731, was published in one volume quarto in London, *Insectorum Angliæ Naturalis Historia illustrata Iconibus in centum tabulis æneis eleganter ad vivum expressis,* &c. by Eleazare Albin, and was esteemed an elegant work; but, we must confess, it is more remarkable for gaudiness than fidelity.

Catesby. In 1731 at London, *Histoire Naturelle de la Caroline, la Floride,* &c. par Marc Catesby, folio.

Reaumur. In 1734, the first volume of Reaumur's *Memoires pour servir à l'Histoire des Insectes,* was published in Paris. The five succeeding volumes appeared between that time and 1742.

Alberti Sebæ. In 1734, Alberti Sebæ, *Locupletissimi rerum naturalium Thesauri accurata descriptio, et iconibus artificiosissimis expressio Latinè et Gallicè,* tom. iv. folio. The first volume appeared in the above year, the other three before 1765.

Linnæus. In 1735, the illustrious Swedish naturalist Linnæus, published the first edition of his *Systema Naturæ, sive Regna tria Naturæ Systematice proposita per classes, ordines, genera et species,* in which work he distributes insects into four orders, according to the number and form of their wings, under the names, 1. *Coleoptera;* 2. *Angioptera;* 3. *Hemiptera;* 4. *Aptera.* In the first, are contained those whose wings are covered; the second, those with naked or uncovered wings, as butterflies, dragon flies, ephemeræ, &c.; the third, locusts, bugs, &c.; the fourth, those without wings, as lobsters, spiders, lice, &c. Besides these, several animals, which, in later editions of the work, Linnæus considered as *vermes,* were included. These were the earth-worm *(Lumbricus,)* the leech *(Hirudo,)* all land and sea shells, and star-fish *(Asterias,)* sea-egg *(Echinus,)* &c.; and in this arrangement, he by no means deviated from the received opinions of his time. In the subsequent editions of his

History. work, these orders are divided, and the *vermes* are separated; and, after the manner of Aristotle, are considered as forming another class. His final arrangements we shall notice, when speaking of his last (12th) edition. See the year 1767. And in the same year at Upsal, *Acta Literaria Scientiarum Sueciæ.*

Boerhaave. In 1736, all the works of Swammerdam were put to press, entitled, *Biblia Naturæ, sive Historia Insectorum Belgiæ, cum versione Latina, H. D. Gaubii, et vita auctoris,* per H. Boerhaave. The first volume appeared in 1737, and the second in the year following.

Lesser. In 1738, Lesser published a work, entitled, *F. C. Lessers Insecto-Theologia, oder Vernunft-und Schriftmässiger Versuch wie ein mensch durch aufmercksame Betrachtung derer sonst wenig geachteten Insecten,* &c. Frankfort and Leipzig, in octavo. This work has never come under our inspection. We have, however, noticed a French translation, which appeared in 1742, at some length.

In 1739, Linné produced two entomological tracts, entitled, *Om Renarus Brömskulor i Lapland*; the other dated Stockholm, *Tal om Märkwardighter uti Insecterne.*

Also at Stockholm in octavo, *Acta Holmenses, Svenska Vetenskaps Acadmiens Handlingar.*

And *Kongl. Svenska Vetenskaps Academiens Halingar.* Stockholm, in octavo.

L'Admiral. In 1740, the folio work of L'Admiral, entitled, *Naawkeurige Waarneemingen van Gestaltverwisselende gekorwene Diertjes,* was published at Amsterdam. It contains a series of highly finished etchings, which are distinctly copied by Harris in his *Aurelian.* This work is confined to the insects of Europe, and contains figures of about fifty of the larger species, principally of lepidoptera, which are represented in various attitudes, with large branches of the plants on which they feed, generally accompanied with their larva and pupa. It began in numbers, and was intended to contain one hundred plates, and four hundred pages of letter-press, but the work was discontinued. Most copies of the work contain twenty-five plates, and five pages of print; but Mr Donovan's copy, which is the most complete that we have seen, contains thirty-two plates, and twenty pages.

Schæffer. In 1741, Schæffer published a valuable work, under the title, *Icones Insectorum circa Ratisbonam Indigenorum,* in three volumes quarto, with a vast number of coloured plates. The classification of this author differs extremely from that of Linnæus, and approaches that proposed by Geoffroy, yet is so far distinct, that being a system of considerable repute, it may not be amiss to present an outline of it in this place. He divides insects into seven orders, which he terms classes:

1. *Insecta Coleoptero-macroptera,* those with their elytra crustaceous throughout their whole length, and extending beyond the abdomen when closed.
2. *Insecta Coleoptero-microptera,* those with crustaceous elytra shorter than the abdomen.
3. *Insecta Coleoptero-hymenoptera,* such as have their elytra half crustaceous, or becoming membranaceous towards their extremities.
4. *Insecta Hymeno-lepidoptera,* insects having transparent or membranaceous wings, imbricated with scales.
5. *Insecta Hymeno-gymnoptera,* those with naked membranaceous wings.
6. *Insecta Diptera,* or insects with two wings.
7. *Insecta Aptera,* or those without wings.

In 1742, a French work, being a translation of Lesser's *Insecto-Theologia,* with remarks by Lyonnet, entitled, *Theologie des Insectes, ou Demonstration des Perfections de Dieu dans tout ce qui concerne les Insectes. Traduit de L'Allemand de* Mr Lesser, *avec des remarques de* Mr Lyonnet a la Haye, octavo, appeared. The original work we have never seen; it appeared in 1738. The views of the author are to promote the glory of God; nor did he in any degree attempt to establish any new facts relative to entomology, but directed his attention to the collection of such anecdotes relative to the natural history of insects, as could be rendered a convenient medium for the theological remarks with which his pages abound. To the entomologist, the work is of no use; for his knowledge was but limited, and his remarks often erroneous. As a theological production, however, it may have an useful tendency, as it is calculated to expose the glaring errors of others, who, with a fanatic spirit, had entered on the same subject. One of the best chapters relates to the abuse of insects in theology. He says, the Jews are accused of stating many wonderful things relative to insects, which can only be considered as fables. Amongst many instances, after repeating the text, Kings i. 6, 7, concerning the erection of the temple, ("And the house, when it was in building, was built of stone, made ready before it was brought thither: so that there was neither hammer nor ax, *nor* any tool of iron heard in the house, whilst it was building,") he states, that the Jews explain this passage in the following manner: The workmen (they say) employed a worm to shape the stones; which insect, named *Schamir,* cut and broke them to pieces in places where applied. They add, that it was "figured like unto a grain of barley," and was kept in a leaden box, "because had it reached rocks, it would have cleft them, so as to unfit them for use." This fable, with many others equally absurd, invented by the rabbis, is particularly mentioned. Amongst the legends of Catholic superstition, too, he selects several anecdotes equally fraught with folly, which, if really believed in the time of Lesser, will excuse him (he being a divine) for applying his time to the exposure of such gross absurdities. Two of these anecdotes we shall take the liberty of inserting. Baldus relates, that a number of bees accidentally passing over holy ground, paid it homage, and carried a portion respectfully to their hive; and it is stated that St Francis, when walking in his garden, saw a grasshopper, which immediately pitched on his hand, and, at his command, sung psalms and praises to God.

Detharding. Detharding also, this year, published a *Disquisitio physica Vermium in Norvegia qui nova visi,* in quarto. It is a small treatise, relating to the larvæ of *Phalænæ,* or moths.

Edwards. In 1743, George Edwards published the first volume of his *Natural History of uncommon Birds, and of some other rare and undescribed animals.* London, quarto. Three other volumes appeared before 1752, in which several insects are given.

Degeer. In 1744, at Stockholm, was published by Degeer, an interesting little work in octavo, on the utility of studying insects, entitled *Tal om nyttan, som Insectere ochderas sharshadande, tilskynda oss,* pointing out the advantages of cultivating the natural history of those animals, and, as far as we know, is the oldest work on this subject.

In 1745, *Ejusdem Olandska och Gothländska Resa förrättad är,* 1741. Stockholm och Upsala, 1745, one small volume octavo, by Linné.

Rosel. In 1746, *Der monatlich-herausgegebenen Insecten-Be-*

History.

lustigung, by Rösel of Nuremberg, a man of genius, by profession a miniature painter. The work is in quarto. Two other volumes appeared in 1749 and 1755. To these a fourth volume was added by a relation (Kleemannir) after his death in 1761; and, since that period, Kleemanahus published three other parts.

Kleemannir.

Kleemanahus.

Menander. In 1747, a tract, explaining the advantages arising from the study of insects, entitled, *Dissertatio de Usu Cognitionis Insectorum*, was published by C. F. Menander.

Gould. In the same year, William Gould published in London *An Account of English Ants.*

Bazin. Also in Paris by Bazin, *Abrégé de l'Histoire des Insectes, pour servir de suite à l'Histoire Naturelle des Abeilles.*

Gadd. In this year also was published in quarto, Adrian Gadd *Observationes Physico-Œconomicæ, in septentrionali prætura territorii superioris Satagundiæ collectæ. Dissertatio Præside C. F. Menander*, Aboæ; an interesting tract, explaining the advantages arising from the study of natural history.

Lyonnet. In this year, *Theologie des Insectes* de Lesser, *avec des remarques* de Lyonnet, à la Haye, in two volumes octavo, appeared, being a translation, with comments by Lyonnet, of Lesser's *Insecto-Theologia*, published in 1738.

Augustin. Also Buzin Gilles Augustin *Abrégé de l'Histoire des Insectes pour servir de suite à l'Histoire Naturelle des Abeilles.* Paris, in two volumes duodecimo.

Dutfield. In 1748, was published in London, by J. Dutfield, six numbers of a natural history of English moths and butterflies.

Hoppe. And, in this year, T. C. Hoppe published two small entomological tracts, as *Antwort-Schreiben auf Hern Schreibers zweifel;* and *Eichen-Weiden-und Dorrosen.* The first at Gera; the second at Leipsic.

In 1749, Linné published *Ejusdem Skänska Resa.*

And at Norembergh, J. M. Seligmann *Aves, adjectis ex* G. Edwardi *Iconibus.* Folio.

Wilks. In the same year, or perhaps earlier, the splendid work of Benjamin Wilks, under the title of *The English Moths and Butterflies, together with the Plants on which they feed, and are usually found.* The plates, which appeared first, bear no date. In the third volume of Rösel's work, *Insecten Belustigung*, we find comments on this work, not to the credit of English entomologists in general, when the science ought, from the labours of former writers, to have stood on very high ground in this country, and the public judgment to have been so far matured as to discover imposition. Rösel, in the plainest terms, accuses our author of piracy; and, when we reflect on the celebrity this work has heretofore enjoyed as an original production, it certainly attaches some little reproach to our naturalists, that facts, so publicly asserted on the continent, should have remained unknown to us. As the remarks are curious and interesting, we shall copy this part translated by a friend. "In the supplement, or third part of my amusements of insects, I have mentioned a certain work which Mr Wilks in London continues monthly, and promised that I should take some opportunity of giving a more circumstantial account. Since then the plates amount to ninety, all of which I have examined with great attention. They are as yet destitute of any description, which is, however, promised at some future period. In the notice to these plates, he professes to have drawn them from life; but, by those acquainted with other works, it will readily be discovered that several are taken from Albin's work, from Merian's book, and many from my own. How far he has succeeded, I leave to the judgment of others. An ape mimics every thing, but does not always succeed. I may appear to many too severe; but let them consider that he counterfeits the works of others, and gives them for his own. I venture to assert, that in the future description of his work, he will be careful not to mention the authors whose works he has so unjustly robbed; for he already strives to conceal on his plates what he has copied from others, by reversing the figures, or by giving them a different position." Vol. iii. p. 192. 1749. The substance of these remarks we are sorry to be under the necessity of allowing to be true; for the eye of the artist will perceive, on comparing the two publications, that Wilks has taken an unlimited range through the first volume of Rösel. We have repeated the remarks of Rösel at length, because we wish to impress on the public mind the value and importance of any general work, in preference to productions of this nature. Wilks was also publisher of *Twelve new designs of Butterflies*, in which the insects are disposed in stars, festoons, circles, or other whimsical groups, forming what are usually denominated "butterfly pictures." The nature of the first work above mentioned, is rather incorrectly stated in the title-page; for the plants on which the insects are grouped, are not those which furnish their natural food; they consist of gaudy flowers, auriculas, roses, monstrous varieties of cultured plants, fruits, &c. the introduction of which, in preference to their natural food, has incurred considerable censure.

History.

In 1752, Dr Hill, in his *History of Animals*, published in London in the year 1752, divides insects into three classes: the first *Apteria*, includes all insects without wings; the second *Pteraria*, is devoted to the winged insects; the third *Gymnanthridia*, comprehends those with soft and naked bodies. Hill.

De Geer also in this year, published the first volume of his invaluable work, *Memoires pour servir à l'Histoire des Insectes*, at Stockholm, which was received with every demonstration of praise to which its merits are entitled. From the testimony of the author's merit afforded by this volume, the continuation was expected with impatience; but nine years elapsed before the second volume appeared, and it was altogether twenty-six years from its commencement to its termination. It was completed in 1778, in which year the labours of its author closed with his life. He was author of several papers in various Transactions, which we shall notice in their proper place. De Geer.

In this year also, Linné published two dissertations at Upsal, *Miracula Insectorum*, and *Noxa Insectorum.* The latter of these is very valuable, from the object in the contemplation of the author; and the first is not destitute of merit.

Scopoli, in the year 1753, published his *Entomologia Carniolica*, in which he distributes all the insects of which he treats, into orders, genera, species, and varieties, nearly after the manner of Linné. As a systematic work, this publication is of little importance; in other respects it is valuable. Scopoli.

In this year also, *Novæ Insectorum Species, Diss. Præsid.* Johanne Lecher. Resp. Isaacus Uddman. Aboæ, quarto.

In the year 1754, Kalm, a learned botanist, published a paper on a species of *Cicada*, in the Swedish language; but we are unacquainted with its title. Kalm.

In 1756, in folio, Brown's *Civil and Natural History of Jamaica.* Brown.

In 1757, *F. Hasselquists Iter Palæstinum, eller Resa*

History. *till Heliga Landet aren* 1749—1752, *Utgisver af* Car. Linné, appeared at Stockholm.

In 1758, in quarto, an interesting work in its day, entitled, *Ejusdem Dissertatio. Centuria Insectorum rariorum, &c.* Upsaliæ.

Fleoyd. In this year, an English translation of one of the works of Swammerdam was published in London by Thomas Fleoyd.

Schreberi. And in 1759, J. C. D. Schreberi *Novæ Species Insectorum*, appeared at Halle.

In 1759, Caroli Linnæi *Animalium Specierum, &c. in formam enchiridii, Lugd. Bat.* Octavo.

In 1760, Caroli a Linné *Amœnitates Academicæ*, tom. v. Holmiæ, octavo.

In 1761, Linné published his *Fundamenta Entomologiæ*, being an introduction to the study of the science.

Poda. In this year likewise, an interesting little work, entitled, *Insecta Musei Græcensis*, was given to the world by Nicolaus Poda, giving an account of the insects of Greece, arranged after the Linnean manner.

Sulzer. J. H. Sulzer, in the same year, produced an introductory work to the study of insects, in quarto, illustrated by several plates, under the title, *Die Kennzeichen der Insekten nach Anleitung der Ritters*, Karl Linnæus, *durch 24 kupfertafeln erläutert, und mit derselben natürlichen geschichte begleitet.* Printed at Zurich.

And a new edition of Linné's *Fauna Suecica editio altera auctior*, Stockholmiæ, considerably enlarged and improved, appeared.

In the same year with the above, an octavo, *Det Trondjemske og Norske Videnskabers Selskabs Skivter.*

Thrane. Also *Bruniche* Martinus Thrane. *Prodromus Insectologiæ Siællandicæ.* Hafniæ, octavo.

In 1762, *Histoire abrégé des Insectes aux Environs de Paris*, octavo.

Sepp. In the same year, Sepp began his work, *Beschouaring per wondern gods in de minstgeachte schepzelen of nederlandsche Insecten*, which is entirely dedicated to the more rare butterflies and moths of Holland. The text is in the Dutch language; and the plates, which are very numerous, are admired for their peculiar neatness, being engraven in the dot or stipple stile with considerable delicacy and elegance.

In this year, a most valuable systematic work by Geoffroy, was published in Paris, and demands the attention of the modern entomologist. It is entitled, *Histoire abrégée des Insectes*, and divides insects into six classes: 1. *Coleopteres;* 2. *Hemipteres;* 3. *Tetrapteres à ailes nues;* 4. *Tetrapteres à ailes farineuses;* 5. *Dipteres;* and 6. *Apteres.* The first is the same with the Linnean order *Coleoptera;* the second is regulated by the form of the proboscis; the third agrees with the *Lepidoptera;* the fourth comprehends the *Neuroptera* and *Hymenoptera;* the fifth and sixth are the same with the Linnean orders *Diptera* and *Aptera.* The characters of these orders are taken from the number of joints in the feet; and the generic characters are taken from various parts of the body. Many of the genera are perfectly natural, and are still in use.

Brunniche. Brünniche, in this or the following year, published two entomological tracts, *Prodromus Insectologiæ Siællandicæ*, and *Entomologia sistens Insectorum tabulas systematicas cum introductione et iconibus.* The latter is an elementary work in the Latin and Dutch languages.

Gronovius. In 1763, L. T. Gronovius published in folio, *Grorovii Zoophylacii.* Three fasciculi only appeared.

Scopoli. Also Johannis Antonii Scopoli *Entomologia Carniolica, &c.* Vindebonæ, in octavo.

In this year, *Den Danske Atlas ued* Eric Pontoppidan, Kiobenhavn, appeared in quarto. Other parts appeared in the years 1764 and 1767, forming altogether three volumes in quarto. History. Pontoppidan.

In 1764, Dr M. Geoffroy published in two volumes quarto, *Histoire abrégée des Insectes, dans laquelle ces Animaux sont rangés suivant un ordre methodique.* Paris. Geoffroy.

Linné in this year, again appeared before the public, and produced his excellent *Ejusdem Museum Lodovicæ Ulricæ Reginæ.* Holmiæ, in octavo.

Also Otho Fr. Müller *Fauna Insectorum Fridrichsdalina sive methodica descriptio Insectorum agri Fridrichsdalensis, &c.* Hafniæ et Leipsiæ, octavo. Muller.

Also J. C. Schæffer's *Abhandlungen von Insecten.* 3 *Bande.* Regensburg, quarto.

Also the second part of *Zoophylacium Gronovianum*, by Laudentius Theodorus Gronovius, containing descriptions of about six hundred insects, with synonyms after the Linnean system, accompanied by four illustrative plates, was printed at Leyden in folio. Gronovius.

In 1765, Seba's *Thesaurus Naturæ* was published at Amsterdam, in which a vast number of the extra European insects are figured in a very coarse style. Seba.

In this year J. G. Gleditsch published at Halle, in 8vo. the first volume of *Vermischte Physicalisch Botanish Occonomische Abhandlungen;* two other volumes appeared in the two succeeding years. Gleditsch.

Also at Copenhagen and Hamburgh, Eric Pontoppidan's *Kurygefasste Nachrichten, die Naturhistoire in Dännaemark betreffend.*

Also *Det Kiöbenhavnske Selskabs Skrioter*, at Kiobenh.

In 1766, Schæffer published at Regensburg *Elementa Entomologiæ*, containing 132 plates, illustrating the principles of his system, and an additional section with two plates, describing the manner of catching insects, and the manner of feeding them, with microscopes, &c. for examining them. He was author of another work on this subject, in the German language, entitled, *Zweifel und Schwürigkeiten, welches in der Insectenlehere annoch vorwalten*, published at Regensburg in 4to, but we are ignorant of the date. Schæffer.

In this year, also, a second edition of Frisch's work appeared.

In 1767, Pallas published at Berlin, in 4to, the first fasciculus of his *Spicilegia Zoologica quibus nova informis et obscuræ animalium species Iconibus, descriptionibus atque commentariis illustrantur*, a very valuable work. Several other numbers or fasciculi were published before the year 1780, when the last made its appearance. Pallas.

And in the same year, the twelfth edition of the *Systema Naturæ* of Linné was produced. As this was the last work of that illustrious naturalist, we shall lay before our readers his entomological arrangement. He divided insects into seven orders, deducing his characters from their wings, as follow:

Order I. COLEOPTERA, (from κολεὸς, *a sheath*, and πτερὸν, *a wing*), including those insects having crustaceous shells or elytra, which shut together and form a longitudinal suture down the back of the insect. In many the whole body (abdomen) is covered by these elytra, in others partially. The coleopterous insects comprehend those commonly termed *beetles.*

Order II. HEMIPTERA, (from ἥμισυ, *half*, and πτερὸν, *a wing.*) These animals have their upper wings half crustaceous, and half membranaceous, or of a matter intermediate between leather and membrane. *Examples*, the bug, the locust, &c.

Order III. LEPIDOPTERA, (from λεπὶς, *a scale*, and

History. πτερὸν, *a wing.*) Insects having four wings imbricated with scales. *Examples*, butterflies and moths.

Order IV. NEUROPTERA, (from νεῦρον, *a nerve*, and πτερὸν, *a wing.*) Insects having four transparent naked wings, reticulated with veins or nerves. *Examples*, libellulæ, or dragon-flies, &c.

Order V. HYMENOPTERA, (from ὑμὴν, *a membrane*, and πτερὸν, *a wing.*) Insects with four naked and membranaceous wings. *Examples*, bee, wasp, &c.

Order VI. DIPTERA, (from δὶς, *two*, and πτερὸν, *a wing.*) Insects with two wings, as gnats, flies, gadflies, &c.

Order VII. APTERA, (from ἀ, *without*, and πτερὸν, *a wing.*) Includes all insects without wings, as spiders,* crabs, lice, &c.

The great perspicuity of Linnæus's System of Entomology, arose from its author having made choice of the most obvious characters which insects afford for the leading distinctions of his orders. In the construction of his genera, he has taken his characters from the parts of the head alone, paying particular attention to the form, situation, and structure, of the antennæ or horns; these parts being conspicuous in most insects, and so infinitely varied in their appearance, as to constitute, with few exceptions, a permanent distinction. That there are other characters which, in the opinion of later entomologists, are better adapted to the purpose of classification, the reader must be aware; but these, although really preferable, are perhaps too minute to become always useful to the student; yet to the man of science, who is really willing to learn and study entomology as a science, there can be no doubt as to the superiority of the modern systems, although we are ready to allow that the characters from the mouth are not so well calculated to further the views of the superficial observer, as those proposed by Linné; the simplicity of his arrangement, the celebrity of his name, and the princely patronage under which he wrote, conspired, with other favourable circumstances, to render the science more universally cultivated, admired, and respected, about his time, than it appears to have been at any former period. Much credit is undoubtedly due to this great man for his entomological labours; but as we have stated before, when speaking of Aristotle, he is not alone entitled to our commendation for the arrangement he has proposed; we must acknowledge the merits of his predecessors, who wrote under less favourable circumstances, but nevertheless excelled in this department of science; men to whom Linné stands in a very high degree indebted, and without the aid of which it is impossible to imagine the system which now commands our respect. In the works of Aristotle and Pliny, in those of Aldrovandus, Swammerdam, Ray, Willoughby, Lister, and various others, (whose works we have noticed), we perceive, with some variations, the grand outline on which he has formed his system. It was from these valuable sources that he gained the materials, from which he selected, with profound judgment, and the greatest success, the valuable matter, carefully and industriously separating the dross. The characters of his orders and genera also are to be found in several earlier publications, as are descriptions of several of the species. But he has concentrated these scattered rays of science with so much skill and industry, that we must admit that to him alone the science is indebted for that firm foundation on which it now rests. His style throughout is concise and expressive, but in many instances it is so laconic, that it is impossible even to guess at the animals described. History.

In 1768, was published in Paris, Bomare *Dictionaire raisonné universel d'Histoire Naturelle*, 4to. Bomare.

In 1769, in three volumes 4to. *Ejusdem Icones Insectorum circa Ratisbonum Indigenorum, &c.* Regensburg, by Schæffer. Schæffer.

And in the same year, at Leipsic, was published in octavo, J. A. Scopoli *Anni Historico Naturales.* Scopoli.

Also Dr John Berkenhout, M. D. published the first edition of his *Outlines of the Natural History of Great Britain.* That portion containing insects is very limited, treating of no more than six hundred species, which are arranged after the Linnæan system. Notwithstanding the small number of species enumerated, this little work has tended materially to advance the study of entomology in Great Britain. Since the publication of the above, three or four other editions have appeared. Berkenhout.

In 1770, J. R. Forster published, at Warrington, in octavo, *A Catalogue of British Insects*, a mere list of Latin names, amounting to about 1000 species, the greatest number hitherto enumerated. This was intended as a Prodromus to a general work on the insects of Britain, as we learn from the preface, in which the author offers duplicates in exchange for any not in his collection. Forster.

In this year also, D. Drury published a very beautiful work in one volume, containing comprehensive descriptions in English and French, with an index of Linnean names, illustrated by coloured copperplates, entitled, *Illustrations of Natural History, wherein are exhibited Figures of exotic Insects, &c.* The plates form a miscellaneous assemblage of the more beautiful extra European insects, which the extensive collection of its author afforded. Three years after the publication of the first volume, a second appeared; and the third, which concludes the work as far as it proceeded, appeared in 1782. Besides those figured and described in the three volumes published, the extensive cabinet of Mr Drury contained many choice specimens, reserved as materials for a fourth volume, amongst which were a vast number of curious species, collected in the interior of Africa, and other parts of the world, rarely visited by Europeans, the introduction of which would have rendered this volume, (which was never published,) of much greater interest to entomologists in general, than either of the preceding. We may observe, that Mr Drury's cabinet was one of the most extensive ever made, and is said to have contained, in species and varieties, no less than 11,000 insects, (in his time the largest collection,) which he obtained by transmitting printed directions and instructions, in various languages, for gathering and preserving insects, offering sixpence an insect for all insects, "from the size of a honey-bee upwards." His museum of entomology was disposed of, in London, by public auction, and produced about six hundred pounds. One insect, viz. *Scarabæus Goliathus*, (*Goliathus magnus*,) was purchased by Mr Donovan, for twelve guineas and a half, who obtained also all the British insects, (which were very numerous,) collected by Mr Drury, and now enrich his splendid museum. Drury.

And in this year also, G. A. Harrer's *Beschreiburg derjenigen Insecten welche Herr* D. J. Christoph. Schæffer *in* cclxxx *ausgemahlten kupfertafeln herausgegeben hat.* Regensburg, octavo. Harrer.

In 1771, John Reinhold Forster published *Novæ* Forster.

* The crabs and spiders are now considered as constituting two distinct classes. See our article CRUSTACEOLOGY.

History. *species Insectorum centuria*, 1; the avowed purpose of which, as the reader is informed in the preface, was to give descriptions of one hundred insects, not mentioned in the latest work of the illustrious Linné. The insects included are partly indigenous; some are from China, and others from South America. The greater number of these are coleopterous insects, and are arranged after the manner of Linné, except the genera *anthribus* and *cistela*, which are taken from Geoffroy. We may observe many of the insects seem to have been unknown to Linné, and some few were previously made known to the world, by the works of Schæffer and Drury. This the author was aware of; but as they had escaped the observation of Linné, whose work he was solicitous to improve, it was considered right to introduce them. He was one of those eminent naturalists who accompanied the celebrated Captain Cook in his voyage round the world, and his labours as an entomologist in those times entitled him to respect.

The *Mantissa Plantarum altera generum editionis* vi. *et Specierum editionis* ii. Holmiæ, of Linné, in which several insects, not noticed in other parts of his works, are described, octavo, appeared in this year.

Curtis. In 1772, Curtis published in London a translation of the *Fundamenta Entomologiæ* of Linné, which considerably advanced the study in this country.

Lettsome. And in the same year, Dr John Coakley Lettsome, published in octavo, *The Naturalists and Travellers Companion*, giving directions how to collect and preserve all sorts of natural productions. It has since undergone several editions, and may be considered as a very useful book to students of entomology.

Brunnichii. Also M. Th. Brunnichii *Zoölogiæ Fundamenta prelectionibus academicis accommodata*, Hafniæ et Lipsiæ, octavo.

Kahn. In 1773, Kahn published a tract relative to the mode of preserving and catching insects, entitled *Kurze anleitung Insecten zu sammlen.*

Yeats. Thomas Pattinson Yeats published *Institutions of Entomology*; an useful work, being a translation of the Linnean orders and genera, collated with three other systems, namely, those of Geoffroy, Scopoli, and Schæffer, together with many ingenious observations, by its translator. It is particularly defective, however, in the comparison drawn between the systems of Linné and Scopoli, from an event which could not be anticipated. When Scopoli published his *Entomologia Carniolica*, he coincided very nearly with Linné, in his arrangement; but in a work of his, (soon to be noticed,) he abandoned that method, and adopted another. For an account of the system alluded to, see the year 1777.

Pallas. In this year, the account of a tour made by the celebrated Russian naturalist Pallas, appeared, entitled, *P. S. Pallas Reise durch Verschiedene Provinzen des Russichen Reichs. St Petersburgh*, which has been rendered into Latin and English.

Hill. In this year, also, Dr John Hill published a *Decade of curious Insects, some of them not described before, shown in their natural size, and as they appeared before the Lucernal Microscope, in which the Apparatus was artificially illuminated; with their History*, &c.: illustrated with ten quarto plates, in which the figures are sometimes immensely magnified, and far from correct. The scientific accounts are given in English, accompanied with various interesting observations as to their natural history and economy.

Wilks. In the *Transactions of the Entomological Society of London*, vol. i. part 1. the work of Benjamin Wilks is stated to have been published in this year, but is noticed by us as having been published in the year 1749, or earlier: but, from the comments made on that work by Rösel, it must have been published, as we have stated, in or before 1749. History.

L'Admiral. In 1774 was published at Amsterdam, in folio, by Jacob L'Admiral, *Veranderingen van Veele Insecten.*

Also, at Halle, in 8vo. *Der Naturforscher*, but the author's name not known to us.

Tagebuch. And, in this year, Iwan Lepechius Tagebuch *der Reise durch verschiedene Provinzen der Russischen Reichs*; Altenburg. One volume appeared first, and two others before 1783.

Faeslins. In 1775, an interesting little work, describing the insects of Switzerland, under the title *Verzeichniss der ihm Bekanten Schweitzerischen Insecten*, was printed at Zurich, in quarto, by Joh. Gaspar Faeslins.

Fabricius. In this year, J. C. Fabricius, a pupil of Linné, published a new system of entomology, under the title *Systema Entomologiæ*, in which the principles of a new mode of classification is for the first time developed. He has taken the essential characters of the classes (*orders*, Linné would have termed them) from the parts of the mouth (*Instrumenta cibaria*), which has given this the title of *Cibarian System.* He, in this work, divides insects into eight classes, viz. Eleutherata, Ulonata, Synistata, Agonata, Unogata, Glossata, Rhyngota, and Antliata. In this part of his system he has been followed by very few; but his mode of distinguishing the genera is still retained, and opens the way to the knowledge of natural genera, which, by his method, are generally to be distinguished without examination of any other parts. As he has since that time written several other works, and added considerably to this system, we shall defer noticing it further for the present. We may, however, observe, that he gained such reputation from this work, that he was induced to prosecute his entomological studies with increased ardour, and during his lifetime always held the highest rank as an entomologist.

Forskal. Also, *Descriptiones Animalium, Avium, Amphibiorum, Piscium, Insectorum, Vermium; quæ in Itinere Orientali observavit*, Petrus Forskal, Prof. Harn. *Post mortem Auctoris, edidit* Carsten Niebuhr; Havniæ, quarto.

Harris. Moses Harris also published a little pamphlet, entitled, *The English Lepidoptera, or Aurelian's Pocket Companion*, &c. London; an alphabetical catalogue of the larger lepidoptera collected by its author in England. This little tract, although apparently insignificant, has materially contributed to the practical study of entomology. The Linnean names, as far as they were known to him, with the time and place of the appearance of the insects, in both states, are concisely given in columns. A frontispiece is added, explaining the terms used in the description of animals of this order.

Brown. In 1776, Peter Brown figured a number of insects in his *New Illustrations of Zoology.*

Sulzer. In this year, Sulzer published, in quarto, *Abgekürzte Geschichte der Insecten*, Winterthur.

Fabricius. The *Genera Insectorum* of Fabricius appeared in this year.

Sulzer. In this year, also, J. H. Sulzer's *Abgekürtze Geschichte der Insecten*, 2 Theile, quarto.

Schrank. Also, *Beytrage zur Naturgeschichte von Franz, von* Paula Schrank, Leipzig, in octavo.

Müller. In this year, O. F. Müller *Zoologiæ Danicæ Prodromus*, &c. Hafniæ, appeared in octavo, and must ever be considered a most valuable and useful work.

History. Schröter.

In this year was published at Halle, in octavo, the first part of a work, entitled, Joh. Schröter *Abhandlungen über verschiedene Gegenstande der Naturgeschichte*; a succeeding part appeared in 1777.

A valuable book in quarto, entitled, *Systematisches Verseichniz der Schmetterlinge der Wienergegand*, &c. Wien, appeared in this year.

Scopoli.

In 1777, Scopoli published the systematic work before alluded to, under the title, *Introductio ad Historiam Naturalem*. In this work (which does not relate exclusively to the science of entomology), he divides insects into five tribes, under the singular appellations of *Swammerdami-lucifuga, Geoffroy-gymnoptera, Röeselii-lepidoptera, Reaumurii-proboscidea,* and *Frischii-coleoptera.* In this manner he identifies each tribe with the name of that author who has, in his opinion, been most successful in the explanation of that to which his name is attached. The order *Lucifuga* includes two genera, 1. *Crustacea,* 2. *Pedicularia. Gymnoptera* comprehends his *Halterata, Aculeata,* and *Caudata. Lepidoptera,* the genera *Sphinx, Phalæna,* and *Papilio. Proboscidea,* he divides into *terrestrial* and *aquatic.* And the *Coleoptera* he divides likewise into those inhabiting water, and those the land.

Göeze.

In this fertile year, J. A. E. Göeze began to publish an extensive systematic work called *Entomologische beyträge zu des Ritters Linné zwölften Ausgabe des Natur Systems,* &c. which was continued progressively in parts till 1783, in octavo.

Esper.

Esper also produced in Germany the first part of his valuable work on lepidopterous insects, entitled, *Die Schmetterling in Abbildung nach der Natur mit Beschreibungen,* accompanied by many plates, of which a second part was published in 1779. Between that time and 1786, two other parts appeared likewise, and which, altogether, form a very extensive publication.

Pallas.

In 1778, at Berlin, was published in quarto, by Peter Simon Pallas, *Naturgeschichte Merkwürdigen Thiere, in welcher Vornehmlich neue und unbekannte Thierarten durch kupferstriche, Beschreibungen und Erklärungen erläutert werden.*

Czempinsky.

And Paul Czempinsky published, in octavo, *Totius Regni Animalis Genera.*

Bergstraesser.

Also, in quarto, *Nomenclatur und Beschreibung der Insecten in der Graffschaft Hanau-Münzenberg, von* Joh. And. Ben. Bergstraesser.

Fuesly.

Also, *Magazin für die Liebhaber der Entomologie Herausgegeben, von* Jos. Casp. Fuesly, Zurich und Winterthur.

Fischer.

And, in this year, at Leipsic, in octavo, was published, *Versuch einer Naturgeschichte vom Livland, entworfen von* J. L. Fischer.

Harris.

Moses Harris also published his *Aurelian, or Natural History of English Insects, namely, Moths and Butterflies,* London, in quarto.

Fabricius.

Lastly, J. C. Fabricii *Philosophia Entomologica,* &c. a work to be studied by every scientific entomologist.

Cramer.

In 1779, Pieter Cramer published, *De vit Landsche kapellen, Voorkomende in de drie Waereld deelen Asia, Africa, en America,* or extra European insects, which, with the continuation published in the year 1782, consists of four volumes quarto, with many plates, confined entirely to lepidopterous insects.

And, in the same year, another very expensive work, in the French language, named *Papillons d'Europe, peints d'après Nature,* which, as its title shews, is devoted entirely to the lepidopterous insects.

Leske.

In 1779, was published, in octavo, *Anfangs-gründe der Naturgeschichte, von* Nath. Gotft. Leske. Leipzig.

History.

In 1780, in Berlin, was published, in octavo, *Schriften der Berlinischen Gesellschaft Naturforschenden Freunde.*

Otho Fabricius.

Also, Otho Fabricii *Faunn Grænlandica,* &c. Hafniæ et Lipsiæ; a valuable little work, in one volume octavo.

Barbut.

In 1781, was published, in London, by James Barbut, an elementary work, *The Genera Insectorum of Linnæus, exemplified by various Specimens of English Insects.* As an illustration of the Linnean system, this work may be not uninteresting to the English reader, but its views are too limited to admit of even mere general utility. Its author does not seem to have been aware of the vast improvements the science had undergone on the Continent, in the interval between the publication of the *Genera Insectorum of Linné,* and the time in which he wrote; and has therefore drawn no comparisons between them, which, without innovation, must have placed the science in a more lucid point of view. It is to the silence of English writers in this respect, arising either from want of information, from sentiments of illiberality, from jealousy, or negligence, that we must ascribe the very low state of entomological knowledge in Britain, even to the present period.

Schrank.

In the same year, Franciscus Paula Schrank distinguished himself by his enumeration of the insects of Austria, called *Enumeratio Insectorum Austriæ Indigenorum,* which has since been rendered into German by Fuesly.

Laicharting.

Johann Nepomuk von Laicharting, in this year, published, at Zurich, the first part of his catalogue of the insects of the Tyrol, *Verzeichniss und Beschrvibung der Tyroler Insecten*; a second part appeared in 1784. He adopts a system distinct from that of Linné. Insects by him are divided into ten classes or orders, characterised from various parts of the body. These orders are named, *Scarabæöides, Gryllöides, Cimicöides, Papilionöides, Libelluloïdes, Vespöides, Museöides, Cancröides, Aranöides,* and *Oniscöides.*

Pallas.

In this year, the *Icones Insectorum præsertim Rossiæ, Siberiæque, peculiarium, quæ Collegit et Descriptionibus illustravit,* Petrus Simon Pallas, M. D. Erlangiæ, appeared in one volume quarto.

Herbst.

And Herbst published *Archiv der Insectengeschichte, Herausgegeben von* Jos. Caspar Fuesly; Zurich und Winterthur. In quarto.

Jacquin.

In this year, Nicolas Joseph Jacquin published in quarto, *Miscellanea Austriaca, ad Botannicam, Chemiam et Historiam Naturalem.*

Also the *Genera Insectorum of Linnæus,* &c, by James Barbut; London, quarto, another edition.

Thunberg.

And Thunberg published at Upsal, *Ejusdem Museum Naturalium Academiæ Upsalensis, &c.* Pars 1; to which twenty other parts, and an appendix, were added before the year 1800.

Knoch.

Also, *Beitrage zur Insektengeschichte von August,* &c. Wilhelm Knoch; Lipzig, octavo.

And J. C. Fabricii *Species Insectorum,* appeared in the same year.

In 1782, Moses Harris published his *Exposition of English Insects,* &c. illustrated by fifty-one copper-plates, in quarto, in which he has given figures of about 500 species. The text is in French and English, and the specific names are given in Latin, but many such as can never be adopted; such as, for example, (*Apis*) *Audeo,* &c.

Pontoppodan.

And in quarto, Eric Pontoppodan *Det forsle Forsog paa Norges Naturlige Historia, Kioberhavn.*

Morand.

In the Transactions of the Paris Academy for this

History. year, we find a paper by Morand, entitled, *Memoire sur les Vers de Truffes, et sur les Mouches qui en proviennent.*

Semler. J. S. Semler also published, in the German language, under the title *Versuch eines Diarium über die Œconomie Mancher Insecten im Winter.*

Fuesly. Another interesting work appeared this year, *Nues Magazin für die Liebhaber der Entomologie, Herausgegeben, von* Joh. Caspar Fuesly, Winderthur, in octavo.

A Part of the *Encyclopédie Methodique,* comprehending *Histoire Naturelle des Animaux,* was published in Paris in this year.

Retzius. In 1783, Retzius produced his *Genera et Species Insectorum,* in which the method of De Geer is simplified, and the terminology of Linné is partly adapted to that performance. He divides insects into fourteen classes, under the titles, *Lepidoptera, Alinguia, Neuroptera, Hymenoptera, Siphonata, Dermaptera, Hemiptera, Coleoptera, Halterata, Proboscidea, Suctoria, Ancenata, Atrichelia,* and *Crustacea.*

In this year, a tract on the *Aphides* (*plant-lice,* or *pucerons*), appeared, entitled, *Nachlese zur Bonnetischen Insectologie.*

Curtis. And W. Curtis published an interesting little pamphlet, *A short History of the Brown-tail Moth,* the larvæ of which appeared in such immense swarms in the fields surrounding London, during the summer of 1782, and despoiled so many trees of their foliage, as to create apprehensions of the total destruction to the whole vegetable tribe. The object of this tract was to show, that grass, not being the food of these voracious animals, would escape their attack. This is an additional proof, that some benefit at least may result from an acquaintance with the natural history of insects; for the author, by this publication, was enabled to dispel the uneasiness occasioned by these supposed "ministers of famine," and which prevailed to such an alarming extent throughout the whole population of that vast metropolis, that prayers were ordered to be read in all the churches to avert the supposed impending calamity.

And the following work, which we have never seen, but understand to be a valuable publication, *Abhandlungen der Hallischen Natur-forschenden Gesellschaft,* Dessan und Leipzig, in octavo.

Retzio. Also, the interesting work by Baron De Geer, *Genera et Species Insectorum, currante,* A. J. Retzio, Lipsiæ, octavo.

Bergstraesser. In 1784, an elementary work, in octavo, entitled, *Entomologia Scolarum in usu Concinnata,* was published by J. A. B. Bergstraesser.

Thunberg. Thunberg, in this year, published his *Dissertatio Sistens Insecta Svecica.*

Harrer. And, in the same year, Harrer wrote on the insects of Germany, under the title, G. A. Harrer's *Beschreibung Derjeniger Insecten Welche Her* D. I. C. Schæffer, &c. at Regensburg, in octavo.

Herbst. Herbst also produced his work, entitled, *Kurze Einleitung zur Kenntniss der Insekten,* Berlin, octavo.

Laicharting. Laicharting published at Zurich, *Johan Nepomuk, von* Laicharting *Verzeichniss der Tyroler Insecten,* 2 tom. octavo.

In 1785, the following works appeared:

Fourcroy. *Entomologia Parisiensis, sive Catalogus Insectorum quæ in agro Parisiensi reperiuntur, Secundum Methodum Geoffræanam, &c. edente* A. F. De Fourcroy, duodecimo, in two volumes.

Martyn. Matthew Martyn's *Aurelian's Vade Mecum,* &c. was published in Exeter. The insects are whimsically arranged, according to the Linnean classes and orders of plants on which they feed. History.

Bonsdorff. *Historia Naturalis Curculionum Sueciæ; auctore* Gabriel Bonsdorff, &c. Upsaliæ; in quarto.

Natursystem aller Bekanten in und Auslandischen Insecten, &c. von Carl. Gustaf. Jablonsky, Berlin, *Fortgesetzt von* J. F. W. Herbst.

Reise. Nath. Gotfr. Leske Reise *Durch Sachsen in Rücksicht der Naturgeschichte und Œconomie,* Leipzig; in quarto.

Schrank. Moll. *Natural-Historische Briefe über Œstreich, &c. von* Franz, *von* Paula Schrank, und Karl Erenbert Ritter, von Moll; Salzburgh.

Walfen. In 1786, Xavier Walfen published an account of the insects inhabiting the Cape of Good Hope.

Beitrage zur Geschichte der Schmetterlinge, Ausburg.

Schmiedleins Einleitung in die Insectenlehre, Leipzig, in octavo.

Scopoli *Deliciæ Floræ et Faunæ, &c. Ticini,* in folio.

In 1787, were published the following works:

Cyrillus. By Dominicus Cyrillus, a folio work on the insects of Naples, entitled *Entomologiæ Neopolitanæ.*

A curious little tract, on the gad-fly, was published in Leipsic, by J. S. Fischer, entitled *Observationes de Oestro ovino atque bovino factæ.*

Fabricius printed his *Mantissa Insectorum, &c.* Hafniæ, in two octavo volumes.

Petagnæ. Vincentii Petagnæ *Specimen Insectorum Ulterioris Calabriæ,* Francofurti et Moguntiæ.

Meidinger. Meidinger *Nomenclator,* (*Versuch einer Deutschen Systematischen Nomenclatur aller in der letzen Ausgabe des Linneischen Natursystems befindlichen Geschlechter der Thiere,* Wien.) octavo.

Kongb. Svenska Vetenskaps Academiens Handlingar, in octavo. This work is often quoted thus, *Act. Holm.*

Adams. John Adams published *Essays on the Microscope,* in quarto, at London.

Anderson. In 1789, a series of letters on the important subject of the cochineal insect, (which had been discovered at Madras a few years before,) from James Anderson, addressed to Sir Joseph Banks, from Madras were published. Two other letters on this important subject have been published since.

Swederus. And in the same year Swederus published a monograph on that curious and interesting genus *Cerapterus,* in a memoir entitled *Beskrifning poa elt nytt genus ibland insecterna, hörande til Coleoptera.*

Borkhausen. The work of M. B. Borkhausen, treating of the lepidopterous insects of Europe, part 1. appeared at Francfort, under the title *Naturgeschichte der Europaischen Schmetterlinge nach Systematischer ordnung.*

Gmelin. J. F. Gmelin published his edition of the Linnean *Systema Naturæ.* The entomological part is comprized in three parts, and was published in Leipsic. The editor is considerably indebted to the writings of Fabricius; and although he rejects his classification, yet he has copied the species, and incorporated them with the Linnean genera, which he has divided into families answering to the Fabrician genera, and has, by this means, very materially augmented and improved the original work of Linné; although we must allow that he has committed a vast number of the most inexcusable blunders, especially in his quotations and references to plates. He has also, in many instances, described the same animal twice, or three times, under different names. We are surprised that his errors are less numerous, as he can be esteemed in no other light than as an industrious closet compiler.

In this year, also, was published, in Leipsic, octavo, Goeze.

History. a work entitled *Nützliches Allerley aus der Natur und dem gemeinen Leben für allerley Leser von* Joh. Aug. E. Goeze.

Marsham. And Mr Marsham wrote the article entomology for Hall's Encyclopædia, which is illustrated by three plates. In this article he briefly explains the entomological system of Linné, and mentions the names of other authors of eminence; and likewise explains the mode of collecting and preserving insects.

Also *Beobachtungen und Entdeckungen aus der Naturkunde von der Gesellschaft Naturforschender Freunde zu* Berlin, in octavo.

Likewise J. T. Zs-chach, *Museum N. G. Leskeanum pars Entomologica*, octavo, Lipsiæ.

In 1789, a second edition of Berkenhout's outlines, under the title of *Synopsis of the Natural History of Great Britain, &c.* appeared.

Roemer. And Johannes Jacobus Röemer published his *Genera Insectorum Linnæi et Fabricii, Iconibus illustrata, &c.* Vitaduri Helvetorum, in quarto, with thirty-seven explanatory plates, nearly all of which had previously constituted the work of Sulzer.

Olivier. In this year, also, the first part of a most voluminous work, on entomology, was undertaken, at Paris, by the celebrated Olivier, entitled *Entomologie, ou Histoire Naturelle des Insectes, avec des charactères génériques et specifiques, &c.* par M. Olivier, M. D. a Paris, in quarto. From its title, we might infer, that the author intended to have treated on every class and order, and, in conformity with the first part, to have illustrated the whole with figures. He, however, has confined the work, which is very extensive, entirely to the order coleoptera, which was rendered as complete as possible; it is, however, as must be expected, a very defective, yet a valuable and useful work.

Paykull. Paykull published in this year, at Upsal, *Ejusdem Monographia Staphylinorum Sveciæ*, in octavo.

Villers. And C. de Villers published, at Lyons, a small work, under the title of *Linnæi Entomologia, &c. curante et augente Carolo de Villers*, Lugduni, in octavo, in which he professes to avail himself of the works of Scopoli, Geoffroy, De Geer, and Fabricius.

Jablonsky. In this year *Natursytem aller bekannten in und auslandischen Insecten, &c. von* Carl. Gustav. Jablonsky, *und fortgesetzt von* Johann. Friedrich. Wilhelm. Herbst, Berlin, appeared in octavo.

Leske. And at Leipsic, in octavo, *Anfangs-gründe der Naturgeschichte von*, Nath. Gotfr. Leske.

Mayer. In 1790, some remarks on the genus *Melolontha* occur in the *Journal für die Entomologie*, by Mayer, who, in the following year, published a work, in octavo, at Dresden, entitled *Sammlung Physikalischer aufsätze, besonders die Böhmische Naturgeschichte betreffend, von einer Gesellschaft Böhemischer Naturforscher; herausgegeben von*, Dr Johann. Mayer.

Preysler. In the same year, 1790, appeared Johann. Daniel Preysler *Verzeichniss Böhmischer Insecten*, Prag. in quarto, which is a catalogue of the insects of Bohemia.

Rossius. And *Fauna Etrusca, sistens Insecta, quæ in provinciis Florentina et Pisana præsertim collegit*, Petrus Rossius, &c. Liburni, in quarto.

Quesnel. Also, *Dissertatio Historico-Naturalis, ignotas Insectorum species Continens*, Conrad Quesnel, Lundæ, in quarto. Quesnel is author also of two tracts, but we are ignorant of their dates; they are entitled *Beskrifningar öfer 8 nya Suenska, Dagfjärillar*, on *Papilio*; the other on *noctua pruni, Beskrifning öfver en y Nattfjäril.*

Paykull. Paykull published, in the same year, his *Monographia Caraborum Sueciæ.*

History. Two works, by Scriba, were also published in this fertile year, *Beytrage zu der Insecten Geschichte, Herausgegeben von* Ludwig Gottlieb Scriba, Frankfurt, in quarto, part the first; and *Journal für die Liebhaber der Entomologie, Herausgegeben von* L. G. Scriba, Frankfurt, in octavo. Scriba.

And *Insecten Kalender, von* Nic. Jos. Brahm. Mainz, in octavo. Mainz.

Lastly, a work which we scarcely consider as worthy of notice, it is entitled the *Naturalist's Miscellany*, or, as it is also termed, *Vivarum Naturæ*, by G. Shaw; the figures by P. Nodder. It contains a variety of daubed, (or, as they are termed, coloured) figures, of the more beautiful and larger exotic insects, as well as other animals, with descriptions extremely suitable to the general class of readers, (children,) for whose purpose, we conjecture, it was designed by its author, who, with greater advantages than any other naturalist in this country, has produced this publication, which, we are sorry to state, reflects the greatest disgrace on the class of readers who could give encouragement to so contemptible a performance. We notice it, as we perceive it quoted by children, who, (with such a work as the author *might* have given to the world,) would very probably be induced to bestow some attention to the study of natural history, so much neglected in this country. Shaw.

In 1791, a year which produced several valuable entomological works, Meyer published a work which we have noticed under the year 1790, whilst speaking of another of his works.

The first volume of the *Transactions of the Linnean Society of London* was published in London, containing a paper on *Phalæna Bombyx Lubricepeda* of Linné, and some other species allied to it, by T. Marsham, Esq.; some observations on the natural history of *Curculio Lapathi*, and *Silpha grisea* of Linné, by W. Curtis, Esq.; account of a singular conformation in the wings of some species of moths, by Esprit Giorna of Turin; and descriptions of two new species of *Phalæna*, by Louis Bosc of Paris: lastly, under the head of extracts from the minute book, we find mention of a new *Buprestis*, communicated by Mr Dryander. Marsham.

In the same year, *Neuestes Magazin für die Leibhaber der Entomologie, herausgegeben von* D. H. Schneider *5 hefte.* Stralsund, in octavo. Schneider.

Also an interesting work on some of the Hymenoptera, entitled, *Naturgeschichte, Klassification, und Nomeuclatur der Insecten von Bienen, Wesgen, und Ameisengeschlet.* Frankfurt am Main, quarto, by Christius Johannes Ludwig. Ludwig.

In the year 1792, several valuable works were produced, and amongst others, the first part of a very considerable work, *the Natural History of British Insects*, by Edward Donovan, which has since been continued in monthly numbers until the present time. The design of this immense undertaking is to afford general and scientific descriptions of all the insects of Great Britain, accompanied with a coloured figure of each, as far as possible in their various states of transformation. The work at this time consists of eighteen volumes, and includes an extensive variety of the species, being the most extensive work hitherto undertaken as an elucidation of the Entomology of Britain. It is in octavo, and still continues to appear in monthly numbers. Donovan.

Thomas Martyn published in this year, in imperial quarto at London, *The English Entomologist, exhibiting all the coleopterous Insects found in England, including upwards of five hundred different Species, the* Martyn.

History. *Figures of which have never been given to the Public; the whole accurately drawn and painted after nature, arranged and named according to the Linnean system.* The figures given in this work are useless, and its letter-press is but indifferent.

Fabricius. Fabricius in this year published his *Entomologia Systematica:* a supplement appeared in 1798, under which head we shall notice his system.

Paykull. Paykull also, whose name we have often noticed, produced his *Monographia Curculionum Sueciæ*; a species of writing which has tended more than any other to the promotion of natural history.

Panzer. In 1793, the *Ejusdem Beyträge zur Geschichte der Insecten*, Erlangæ of Panzer, appeared, who in the same year began his most interesting work in monthly numbers, entitled *Fauna Insectorum Germanica Initia, oder Deutchland Insecten, auctore* W. F. Panzer, which still continues to be published.

Smith. Dr Smith's *Tour on the Continent in* 1786 and 1787, appeared in this year. It contains some interesting remarks on the insects which occurred in his journey.

Brahm. And Nicolaus Joseph Brahm. *Verzuch einer Fauna Entomologica der Gegend um Mainz. Rheinisches Magazin zur Erweiterung der naturkunde, herausgegeben von* Moriz Balthazar Borkhauzen. Giessen, 8vo.

Abtheilung. Also an interesting work in 4to, entitled, *Nomenclator über die in den Röselschen Insecten belustigungen und Kleemanschen Beytragen zur Insectengeschichte abgebildeten und beschriebenen Insecten und Würmer mit moglichst vollslandiger Synonymie.* Erste Abtheilung. Nurnberg.

In 1794, a second volume of *Linnean Transactions* was published, in which are the following papers: the history and descriptions of four new species of *Phalæna* by Mr J. Beckwith; a new arrangement of the genus Papilio of Linné, by W. Jones, which is so interesting, as coming from such excellent authority, that we cannot refrain from laying before our readers an account of his innovations. The object of his paper was, to point out that the shape of the wings, (which forms a principal character with Linné in his distribution of the families of that genus,) though various at first view, approach each other so gradually, that it is impossible to draw from them the distinguishing line between each family. Linné, he observes, was acquainted with about 274 species, whereas the writer of this memoir states, that he had seen above 1000 in different cabinets, and about 400 more in various publications; and from an attentive examination of these, is induced to offer the following amendments to the characters of each of the Linnean families. Linnè describes the *Equites* as having "the upper wings longer from the posterior angle to the point than to the base; antennæ often filiform." He corrects the character thus: "Upper wings longer from the posterior angle to the point than to the base, occasioned by having four instead of three nerves, visible in every other family. The palpi often only a brush; under wings, with a connecting nerve in the centre, and without an abdominal groove." —*Heliconii*: "Wings narrow, entire, often naked, or deprived of scales; upper wings long; under ones short." *Linné.* To this character is added, that the upper wings have "a connecting nerve in the centre, very slightly grooved to admit the abdomen, which, with the antennæ, are generally long."—*Damii*: "Wings entire." *Linné.* To which Jones adds, "the under wings, with a connecting nerve in the centre, and a deep abdominal groove; palpi projecting."—*Nymphales*: "Wings denticulated." *Linné.* Jones adds, "the under wings without a connecting nerve in the centre, with a deep abdominal groove; palpi projecting."—*Plebei*: "Small *rurales*; spots on wings obscure." *Linné.* Jones adds, "Thorax and abdomen slender; under wings with no connecting nerve; antennæ clubbed;" and these he divides into two sections, those with long, weak, flexible tails; and those without tails, and having the wings entire.—*Plebeii urbicolæ*: "Spots on the wings generally transparent." *Linné.* Mr Jones divides these into three sections, thus: 1. Thorax and abdomen short, thick or broad; under wings without a connecting nerve; antennæ hooked at their points. 2. Upper wings pointed at their extremities, and long in proportion to their width. 3. Upper wings less extended, and, together with their under wings, more round; their margins entire.—To the Linnean families, Mr Jones adds another, which he terms *Romani*, which are generally of a large size, without the abdominal groove; no connecting nerve; antennæ generally sharpened; and the nerves in both wings extending from their base to their extremities nearly in straight lines. We cannot conclude our account of this ingenious arrangement, without observing, that Mr Jones has made a series of drawings for the gratification of himself and friends, of every species which he could obtain access to, in a very elegant and correct style.—In this volume Mr Marwich has given an account of Gmelin's *Musca Pumilionis*, to which some ingenious remarks are added by Mr Marsham.

Fuesly. In this year *Archives de l'histoire des Insectes publiées en allemand*, par Jean Gaspar Fuesly, *traduites en François*. Winterthur, in 4to.

Panzer. Panzer also published *Faunæ Insectorum Americæ Borealis prodromus.* Norimburgæ, in 4to. who also edited the following work:

J. E. Voet *Icones Insectorum Coleoptratorum &c. illustravit* D. G. Wolfgang, F. Panzer, &c. Erlingæ, in quarto.

Schneider. *Neuestes Magazin für die Liebhaber der Entomologie herausgegeben, von* D. H. Schneider. Stralsund, in octavo.

Dunker. In 1793 was published at Halle, in octavo, *Entomologisches Bilderbuch für junge Insektensamler, von* Johann. Heinr. August. Dunker.

Hoppe. And David Henrici Hoppe, M. D. *Enumeratio Insectorum Elytratorum circa Erlangam Indigenarum.* Erlangae, 8vo.

Lewin. William Lewin published in this year, *The Papilios of Great Britain* in quarto; in which he describes in English, with very elegant figures, all the species of butterfly at that time known to inhabit these islands, which amounted to about sixty. We understand that the author intended to have figured all the Lepidoptera of Britain; but his untimely death prevented his proceeding farther than the Papiliones.

Latreille. Latreille in this year produced his *Precis du Charactére des Genres,* in which he divides insects into two sections, viz. those with and those without wings, and these he divides into the following orders: *Coleoptères, Orthoptères, Hémiptères, Neuroptères, Lépidoptères, Suceurs, Thysanours, Parasites, Acepheles, Entomostracés, Crustacés,* and *Myriapodes;* as he has completely altered this arrangement in his later works, we shall omit noticing this method farther, as it will be sufficiently obvious to the reader what these alterations are from the terms employed, &c.

Rossi. A new edition of Rossi's *Fauna Etrusca,* &c. was pub-

History. lished at Helmstad, by Dr Joh. Christ. Lud Hellwig.

Francillon. Mr Francillon published a small tract on a new coleopterous insect, accompanied with a coloured figure. It is entitled, *Description of a rare scarabæus, from Potosi in South America; with engraved representations of the same, coloured from nature. Scarabæus macropus* is the name applied to the singular insect.

In 1795, was published *Insecto-Theology*, or a *Demonstration of the Being and Perfections of God, from a consideration of the Structure and Economy of Insects.* This is a translation of Lesser's work, mentioned before under the year 1742, with Lyonnet's notes, and a few others by the translator. Lond. 8vo.

Schrank. In 1796, appeared *Sammlung naturhistorischer und Physikalischer aufsatze von Frans von Paula Schrank.* Nürnberg. In octavo.

Hoppe. Hoppe produced his *Entomologisches Taschenbuch.* Regensburg. In octavo.

Jacobæo. And an interesting work in folio, *Museum Regium descriptum* ab Oligerio Jacobæo. Hafn.

Hubner. Jacob Hübner published his *Der Samlung Europaischer Schmetterlinge*, Ausburg, in quarto. But few copies of this beautiful work have reached this country, and, as we have not examined it with care, must refrain from giving our opinion on it. From what we have seen, it appears to be a valuable publication.

Dryander. The second volume of *Catalogus Bibliothecæ Historica naturalis, Josephi Banks, Baroneti*, by T. Dryander, comprehending the entomological works of that immense collection of books, was published in 1796. We cannot speak too highly of its contents, which are admirably arranged, in such a manner as to be in itself a valuable bibliothecal system of entomological writers.

Hennert. In 1797, C. W. Hennert published at Berlin a work in quarto, entitled *Ueber den Raupenfras und Winbrüch in den Jahren.*

Smith. And Dr J. E. Smith published a magnificent work in folio, in London, entitled *The Natural History of the rarer Lepidopterous Insects of Georgia, collected from the Observations of Mr John Abbott.* It is comprised in two volumes, with about an hundred plates; and the insects are represented in their different states, on one of the plants on which they feed. Mr Abbot, the gentleman from whose notes and drawings the work was formed, was an assiduous collector of insects residing in North America, from whom many of the London cabinets have received the most valuable specimens of the insects of those regions, in the highest state of preservation.

Reich. In the same year, *Mantissa Insectorum Iconibus illustrata, Species novas aut nondum depictas exhibens, fas.* 1. *auctore*, Godofredo Christiano Reich, &c. Norimbergæ. In octavo.

The third volume of the Transactions of the Linnean Society of London, containing some interesting entomological papers, appeared, as follow: Observations respecting some rare British insects, by W. Lewin;—a History of three Species of *Cassida*, by the Rev. William Kirby;—Observations on the Economy of *Ichneumon Manifestator*, by Thomas Marsham, Esq.—Observations on the Insects that infested the Corn in the year 1795, by Thomas Marsham, Esq.—lastly, a most interesting and ingenious paper on the *Oestrus*, or Gad-fly, by Bracy Clark, Esq.

Fabricius. In 1798, Fabricius published the supplement to his *Entomologia Systematica*; which presents an outline of his system in its latest state; and being the result of such extensive knowledge as he possessed, demands a considerable share of our attention. He, in this work, divides insects into thirteen classes, as follow: History.

Class 1. ELEUTHERATA. Jaws naked, free, bearing palpi.

Class 2. ULONATA. Jaws covered with an obtuse galea or mouth-piece.

Class 3. SYNISTATA. Jaws elbowed near the base, and connected to the lower lip.

Class 4. PIEZATA. Jaws horny, compressed, and usually elongated.

Class 5. ODONATA. Jaws horny and toothed; two palpi or feelers.

Class 6. MITOSATA. Jaws horny, arched; no palpi.

Class 7. UNOGATA. Jaws horny, unguiculated.

Class 8. POLYGNATA. Jaws many, (generally two) within the lip.

Class 9. KLEISTAGNATHA. Jaws several, without the lip.

Class 10. EXOCHNATHA. Jaws several, outside the lip, but covered by the palpi.

Class 11. GLOSSATA. Mouth composed of a spiral tongue, situated between the two palpi.

Class 12. RHYNGOTA. Mouth composed of a beak, or articulated sheath.

Class 13. ANTLIATA. Mouth composed of a sucker, not jointed.

Clairville. In the same year, viz. 1798, Clairville published an octavo work on the insects of Switzerland, in which he proposes to divide insects into eight orders, nearly after the system of Linné; but he distinguishes them by different names, and denominates them sections instead of orders. The names are, *Elythroptera, Dictyoptera, Phleboptèra, Halteriptera, Lepidoptera, Hémimeroptèra, Rophopteira,* and *Pododunera.* The work is entitled, *Entomologie Helvétique, ou catalogue des Insectes de la Suisse, &c. avec Descrip. et Figures.* Zurich.

In the fourth volume of the Linnean Transactions, we find, an Essay on the Eye-like spot in the Wings of the *Locustæ* of Fabricius, as indicating the male sex; by Professor Anthony Augustus Henry Lichtenstein; —Account and Figure of a minute *Ichneumon*; by G. Shaw, M. D.—*Amophila*, a new genus of Hymenopterous insects, including the *Sphex sabulosa* of Linné; by Rev. William Kirby;—Further Observations on the Wheat Insect, in a Letter to the Rev. Samuel Goodenough, by T. Marsham, Esq.—History of *Tipula Tritici*, and *Ichneumon Tipulæ*, with some observations upon the Insects that attend Wheat; in a letter to Thomas Marsham, Esq. by the Rev. William Kirby; —Observations on the genus *Pausus*, and Description of a new Species; by Adam Afzelius, M. D.

Donovan. E. Donovan this year published in London, *Natural History of the Insects of China*, which is the first work on the entomological productions of that vast empire that has appeared. The materials composing this volume, (which is in 4to.), and from which it was in a great manner formed, were obtained from the first and most authentic sources, including many of the species collected at the time of the embassy of Lord Macartney, with many others obtained from the cabinets of the highest celebrity, and the communications of friends. The work is illustrated by fifty copper-plates, beautifully coloured. It has been translated into the French and German languages on the continent.

Cederhielm. *Faunæ Ingricæ Prodromus, exhibens methodicam Descriptionem Insectorum agri Petropolensis, &c. auctore* J. Cederhielm, Leipsiæ.

History.

Gottlieb. And *Verzeichniss der Käfer Prussens entdorfen von* Johann Gottlieb, *von Johann Karl Wilhelm Illiger, &c.* Halle, in 8vo.

Webersicht. Also Busch Webersicht, (*Almanack*) *der fortschrifte in Wissench.* Erfurt, in 8vo.

Zinke. Likewise, *Naturgeschichte der schädlichen Nadelholz-Insecten, nebst Anweisung zu ihrer Vertilgung, (Ein nützliches Lesebuch für Naturforscher, Forstmänner und Oekonomen).* Von Georg. Gottfr. Zinke. Weimar, in 8vo.

Voigt. Voigt, in this very fertile year, published his *Magazin für den neuesten Zustand der Naturkunde mit Büschricht auf die dazu gehörigen Hülfwissenschaften.* Von Joh. Heinr. Voigt. Weimar, in 8vo.

Schrank. Schrank also published his *Fauna Boica Durchgedachten Geschichte der in Bajern einheimischen und Zahmen Thiere.* Nurnberg, in 8vo.

Paykull. In the same year, Paykull published his valuable treatise on the insects of Sweden, entitled, Gustave Paykull *Fauna Suecica, Insecta,* Upsaliæ, in three octavo volumes.

Goeze. In 1799, a very useful work, entitled, *Europäische Fauna oder Naturgeschichte der Europäischen Thiere.* Von J. A. E. Goeze, &c. Kaefer, Leipzig, in 8vo.

Crutzer. And Christian Crutzer *Entomologische Versuche.* Wien, in 8vo.

In 1800, the science of entomology was considerably advanced, by a vast number of very valuable works.

Cuvier and Dumeril. Cuvier, with the assistance of Dumeril, published in Paris his *Anatomie Comparée,* in which the organization of insects is treated of at great length, and a new systematic arrangement is proposed, and insects are divided into two great sections; those with, and those without, jaws. In the first, are included the orders *Gnathaptères, Neuroptères, Hymenopteres, Coleopteres,* and *Orthopteres*; in the second, *Hemipteres, Lepidopteres, Dipteres,* and *Apteres.*

In the 5th volume of the Transactions of the Linnæan Society, published this year, we find two interesting papers, viz. a continuation of the history of *Tipula Tritici,* by the Rev. W. Kirby; and some observations on insects which prey upon timber, with a short history of *Cerambyx Violaceus* of Linné, by the same gentleman; both these communications are accompanied by plates.

Thunberg. In this year, Thunberg published his *Musæum Naturalium Academiæ Upsalensis, &c.* in 4to.

Donovan. And E. Donovan published his *Insects of India,* in 4to; and, like the *Insects of China,* embracing in a general, yet scientific view, a comprehensive display of the most rare and beautiful insects peculiar to those fertile regions.

Walther. Also Walther's *Forstphysiographie Herborn, &c.*

Wiedmann. In the same year *Archiv fur Zoologie und Zootomie.* Von C. R. W. Wiedmann. Berlin and Braunschweig, in four octavo volumes.

Sturm. And the *Verzeichniss meiner Insecten Samlung oder Entomologisches Handbuch fur Liebhaber und Samler.* Von Jacob Sturm, Erste Heft. Nurnberg, in 8vo.

Dryander. Lastly, the 5th volume of *Bibliotheca Hist. Nat. Banksiana,* by Dryander, contains some references to the works of entomological writers.

Lamarck. In 1801, a most interesting publication appeared in Paris, by the celebrated Professor of Zoology, Lamarck, entitled *Systeme des Animaux sans Vertebres,* in which we find considerable improvements in the entomological department. He removes the greater number of the Linnæan aptera to two other classes, viz. CRUSTACEA and ARACHNIDES. See our article CRUSTACEOLOGY. The INSECTA he divides into three subclasses: 1. Those with mandibles and maxillæ; 2. Those with mandibles and trunk; 3. Those without mandibles, but having a trunk or sucker. In the first, he places the orders *Coleopteres, Orthopteres,* and *Neuropteres*; the second is merely confined to the *Hymenopteres*; and in the third, the *Lepidopteres, Hemipteres, Dipteres,* and *Apteres,* (which last contains but one genus, viz. *Pulex,* the flea). His subdivisions of the orders we shall have occasion to notice hereafter at length. History.

Fabricius also published his *Systema Eleutheratorum Killiæ,* in two octavo volumes. Fabricius.

And Illiger produced his *Magazin fur Insectenkunde herausgegeben von* Karl Illiger. Braunschweig, in octavo. Illiger.

Likewise *Neue Beytrage zur Insectenkunde.* Von August. Wilhelm. Knoch. Leipzig, in octavo. Knoch.

Another interesting work, Frederici Weberi *Observationes Entomologicæ, continentes novorum, quæ condidit generum characteres, et nuper detectarum Specierum descriptiones.* Kiel, octavo. Weberi.

Lastly, Jacob Sturm's *Abbildungen zu Kare Illiger's Ueberfetzung von Olivier's Entomologie oder Naturgeschichte der Insecten.* Nurnberg, in quarto. Sturm.

In 1802, several works appeared in this country, and two in Paris, highly interesting, especially to the natural systematist. We may first notice *Histoire Naturelle des Fourmies, et recueil des Mémoires, et des Observations sur les Abeilles, les Araignés, les Francheurs et autres insectes.* Par P. A. Latreille, &c. Paris, octavo. Latreille.

The Rev. William Kirby this year produced that excellent work, entitled, *Monographia apum Angliæ,* &c. in two octavo volumes. Our author proceeds to point out his reasons for taking up this subject, and under the head of Introductory Remarks, gives us a minute account of the rise and progress of this department of entomology, with remarks on the various works treating on this subject, with definitions of the terms used in describing the genera and species by different authors; and after pointing out the confusion which reigned throughout the order Hymenoptera, gives us a new set of terms, with comments on terminology in general. The characters of the order Hymenoptera, with the generic characters and divisions of families, are next given, intermixed with the economy of each family and subdivision. Under the head of Addenda, we have some interesting remarks on other hymenopterous genera; and at the end of the first volume, a series of plates explaining the various parts of the mouth, &c. peculiar to each family and subdivision. The second volume treats of the species, with occasional remarks on the peculiar economy of each. The descriptions are laboured, and extremely accurate. It is certainly the most scientific work which has appeared in any branch of natural history in this country. In the work of Latreille, which we have mentioned above, we find the same divisions as those instituted by Mr Kirby; they differ merely in terms, Latreille considering each of Mr Kirby's subdivisions as a distinct genus. We wish we had room to give a complete account of this interesting publication, but we have already far exceeded our limits in this department of the article, and shall therefore lay before the reader as much of that valuable work as we can find room for, under the proper head, in our descriptions of the species. Kirby.

Thomas Marsham, Esq. the oldest of the British en- Marsham.

History. tomologists, this year published the first volume of his long intended work on entomology. This volume treats of the coleoptera, and is entitled, *Entomologia Britannica*. To the genera of Linné, he adds, *Cistela, Corticaria, Nitidula, Boletaria, Opatrum, Cryptocephalus, Auchenia, Crioceris, Tillus, Scaphidium, Clerus, Pyrochroa, Parnus, Heterocerus, Blaps, Lytta, Ips,* and *Hydrophilus*; the two last, however, are to be found in the MSS. of Linné. We cannot approve of this author having changed the names of some of the genera, and using them in a different sense from other authors, and in sometimes unnecessarily giving up one name, and imposing a new one; thus we have *Boletaria* for *Mycetophagus*, and *Corticaria* for *Lyctus, Ips*, and *Colidium*. In his descriptions he is very accurate; and although he has not adopted all the Fabrician genera, yet in many instances his families are composed of the same materials. We anticipate the completion of his work with great pleasure, as the abilities of the author are universally acknowledged, and his collection and manuscripts extremely valuable.

The sixth volume of the Transactions of the Linnean Society of London, which appeared this year, contains several valuable entomological tracts, viz. "A Dissertation on two natural genera, hitherto confounded under the name of Mantis; by Anthony Augustus Henry Lichtenstein, M.D. &c."—" Observations on Aphides, chiefly intended to shew that they are the principal causes of the blight in plants, and the sole cause of the honey-dew; by W. Curtis."—" Observations on the Curculio Trifolii, or clover-weevil, a small insect which infests the heads of the cultivated clover, and destroys the seed, in a letter to T. Marshman, Esq. by William Marwick, Esq.; with additional remarks by Mr Marsham."—" Farther remarks on the Curculio Trifolii, in a letter to William Marwick, Esq.; by Martin Christian Gottlieb Lehmann."—" Descriptions of some singular coleopterous insects; by Charles Schreibers."—" Observations on several species of the genus Apis, known by the name of humble bees, and called Bombinitrices by Linné; by P. Huber." This last paper is extremely valuable; and, with the others, will be mentioned when we are treating of the genera and species.

Stewart. This year, an anonymous work, in 2 vols. 8vo. appeared at Edinburgh, under the title of *Elements of Natural History*. It is a very useful elementary book, and does credit to the author, who, it is well understood, is Mr Charles Stewart of that place. The first volume treats of mammalia, birds, amphibia, and fishes; the second volume is entirely dedicated to insects and vermes. It is now out of print; and we may suggest, that if a new edition were altered to suit the present systems, it would prove still more valuable and interesting to the student of natural history: we may be excused for adding, that several species of insects are marked as natives of Britain, which have not been admitted as such into the best British collections,—a slight mistake, but one which is calculated to embarrass the beginner, and may easily be avoided in future.

Walckenaer. In the same year, *Faune Parisienne* (*Insectes*) *ou Histoire abrégée des Insectes des environs de Paris, classés d'apres le Systeme de Fabricius, &c.* Par C. A. Walckenaer, tome premiere.

Fallén. Likewise *Observationes Entomologicæ, &c.* Carl. Fred. Fallén. Lundæ.

Schellenberg. And *Entomologische Beytrage.* Von J. R. Schellenberg. Winterthur, 4to.

Haworth. In 1803, A. H. Haworth presented us with the first part of an elaborate work, entitled, *Lepidoptera Britannica*, the object of which is, as we are informed in the preface, to give descriptions of the various species of that beautiful order of insects which are natives of this country. The task is a very difficult one, this being perhaps the most difficult of all the orders; at least in describing the species, the entomologist will find himself more perplexed than in his examinations of any other. The author has acquitted himself, in our opinion, with considerable credit. Two other parts have since appeared, but the work is incomplete, one part being still unpublished. History.

In this year also appeared *Versuche über die Insecten. Ein Beytrag zur Verbreitung des Nützlichen und Wissenwürdigen aus des Insektenkunde;* von Carl. August. Schmid. Gotha. In octavo. Schmid.

Likewise *Voyage en Hongrie; précédé d'une Description de la Ville de Vienne et des Jardins impériaux de Schoenbrun,* par Robert Townson; publiée a Londres an 1797. Traduit de l'Anglois par Cantwell. Tom 3. Paris. Octavo. Townson.

Also *Entomologische Hefte, enthaltend Beiträge zur weitern kenntniss und Aufklärung der Insectengeschichte, &c. Ausgearbeitet von einigen Freunden der Naturgeschichte, mit Kupfertafeln,* von H. Sturm. Frankfort am Main. Octavo. Sturm.

Lastly, D. Joh. Fried. Blumenbach's *Handbuch der Naturgeschichte.* Edit. 7ma. Göttingen. Octavo. Blumenbach.

In 1804, James Sowerby published the first number of an octavo work, entitled, *The British Miscellany, or coloured figures of new, rare, or little known animal subjects, not before ascertained to be inhabitants of the British Isles,* &c. The few insects figured are highly interesting; but the work, from want of liberal support, has never been continued beyond 12 or 15 numbers. Sowerby.

The seventh volume of the Transactions of the Linnean Society of London appeared this year, in which is the following paper, " Account of the Tussech and Arrindy Silkworms of Bengal, by Wm. Roxburgh, M.D." Roxburgh.

In the same year, *Dictionnaire des Sciences Naturelles. Par plusieurs Professeurs du Muséum National d'Histoire Naturelle et des autres principales Ecoles de Paris,* (*l'Histoire des Insectes,* par le Professeur C. Duméril,) Paris. Octavo. Dumeril.

And *Naturhistorische Reise durch einer Theil Schwedens,* von Dr Fr. Weber, und D. M. H. Mohr. Gottengen. Octavo. Weber and Mohr.

The *Annales du Muséum National d'histoire naturelle a Paris,* appeared this year in quarto, volume first.

In 1805, Panzer published *Critische Revision der Insecten-faunæ Deutschlands, nach dem Systeme bearbeitet,* 1-96 *heft.* 1. *Bandchen.* Nürnberg. Octavo. Panzer.

E. Donovan this year gave to the world another work on exotic insects, in quarto, entitled, *An Epitome of the Natural History of the Insects of New Holland, New Zealand, and New Guinea, Otaheite, and other Islands in the Great Indian, Southern and Pacific Oceans, including the figures and descriptions of one hundred and fifty-three species,* &c. This publication is extremely valuable, not only from the beauty and accuracy of the engravings and descriptions, but also from its rarity, few copies having been published. Donovan.

Also, Georgii Augusti Goldfuss *Enumeratio Insectorum Eleutheratorum capitis bonæ Spei totiusque Africæ. Descriptione Iconibusque nonnullarum specierum novarum illustrata.* Erlangæ. Octavo. Goldfuss.

Likewise, *Journal de la Société des Naturalistes de*

History. *l'Université Imperiale de Moscow. Premiere année. No.* 1. *et* 2. *Avec figures.* Moscow. Quarto.

Beauvois. And *Insectes recueillées en Afrique et en Amérique, dans les Royaumes d'Ovare et de Benin, a Saint-Domingue et dans les etats-unis, pendant les années* 1786 *et* 7. Par A. F. J. Palisot de Beauvois. Paris. Folio.

Sturm. And *Deutschlands Fauna in Abbildungen nach der Natur mit Beschreibungen von* Jacob Sturm, &c. Nurnberg.

Bechstein and Scharfenberg. Lastly, *Vollständige Naturgeschichte der schädlichen Forstinsecten, nebst einem Nachtrag der Schonenswrethen Insecten, welche die schädlichen vertilgen helfen. Ein Handbuch für Forstmänner, Cameralisten und Œconomen. Herausgegeben von* Johan Math. Bechsteine *und* Georg Ludw. Scharfenberg, *in drey Theilen mit* 13 *Quartkupfern.* Leipzig. Quarto.

Duméril. In 1806, C. Duméril published at Paris, his *Zoologie Analytique ou Méthode Naturelle de Classification des Animaux,* &c. in which we have the *Insecta* and *Arachnides* classed together, with tabular views of the genera.

Schonherr. An interesting and highly useful work, entitled, *Synonymia Insectorum, &c. von* C J. Schönherr, &c. Stockholm, was published, Vol. I. Part I which contains synonymes of each species of insect, with descriptions of such as are new, with occasional remarks. If continued, it will form in itself a considerable part of an entomological library.

Latreille. P. A. Latreille also this year published the first volume of his *Genera Crustaceorum et Insectorum*; but as we shall follow his arrangement with but little alteration, in the insect class, we shall not enter into any account of the merits of the work, which we think the best on the subject hitherto published.

Panzer. Dr G. W. F. Panzer published a tract, in small octavo, on the Hymenoptera, entitled, *Entomologischer Versuch die Jürineschen Gattungen der Linnéschen Hymenoptern nach dem Fabriciusschen System zu Prüffen,* &c. *von* Dr G. W. F. Panzer. Nürnberg.

Burdach. Also, *Handbuch der Neuesten Entdeckungen in der Heilmittellehre, von* D. Karl. Friedr. Burdach. Leipzig. Octavo.

Iser. And *Svensk Entomologi ab* Carl Iser. Linköping. Octavo.

Palmstruch. Lastly, *Svensk Zoologi, eller Svenska Djurens Historia, börjad ab* C. Quesnel, *fortsatt ab* O. Swartz, *utgifver med illuminerande figurer ab* J. W. Palmstruch. Stockholm. Octavo.

In 1807, a beautiful work, entitled, *Coloured specimens, to illustrate the Natural History of Butterflies, from the collection of Mr Lee of Hammersmith.* This publication is illustrated by twenty copperplates, beautifully coloured, and so admirably executed as to resemble highly finished drawings. It is the production of a lady, whose name we are not at liberty to mention, although the work has done her infinite credit.

Latreille this year published the second and third volume of his *Genera Crustaceorum et Insectorum.*

Fallen. An interesting work was also produced, entitled, *Dissertatio Monographia Cantharidum et Malachiorum Sveciæ, Auctor.* Carl. Fried. Fallén. Lundæ.

The first part of the *Transactions of the Entomological Society of London,* was published this year, and contains notices of a few new British insects, &c. which we shall notice under their proper head hereafter.

In 1808, Schönherr published a second part of his *Synonomia Insectorum.*

Gyllenhal. And a very interesting work on the insects of Sweden, entitled *Insecta Svecica descripta a* Leonardo Gyllenhal, volume the first, which treats of the coleoptera; a second volume, on the same order, has lately reached this country. The descriptions of the species are far more elaborate than any we have yet seen, except Mr Kirby's *Monog. Ap. Aug.*; and if continued, will be the best general work on the Swedish insects that has hitherto appeared. History.

The ninth volume of the Transactions of the Linnean Society of London appeared this year, in which we find, "The genus *Apion* of Herbst's Natur. System considered, its characters laid down, and many of the species described, by the Rev. W. Kirby."—"Some observations on the insect which destroys the wheat, supposed to be the wire-worm, by Thomas Walford, Esq. with additional notes by T. Marsham, Esq."—"Descriptions of *Notoclea,** a new genus of coleopterous insects, from New Holland, by T. Marsham, Esq." Kirby.

In 1809, the fourth volume, completing the *Genera Crustaceorum et Insectorum* of Latreille, was published.

In 1810, P. A. Latreille published an interesting work, in one volume, in the French language, entitled, *Considerations sur l'Ordre Naturél des Crustacées, des Arachnides et des Insectes.* Latreille.

In 1811, the second part of the tenth volume of the Transactions of the Linnean Society of London was published, in which we find, "Description of several new species of Apion, by the Rev. W. Kirby;"—"Some account of an insect of the genus Buprestis, taken alive out of wood composing a desk which had been made more than twenty years; in a letter to Alex. M'Leay, Esq. by Thos. Marsham, Esq." And among the extracts from the minute book, we find notice of *Forficula gigantea* of Fabricius having been taken in Britain.

In 1813, the first part of the eleventh volume of the Transactions of the Linnean Society of London appeared, in which the following entomological papers are given: "An Essay on the British species of the genus Meloë, with descriptions of two exotic species; by William Elford Leach, Esq. F.L.S."—"Strepsiptera, a new order of insects proposed, and the characters of the order with those of its genera laid down; by the Rev. William Kirby, F. L. S."—"A Monograph of the British species of the genus Cholera; by William Spence, Esq. F. L. S."

In 1814, commenced a new work, (which has since been continued in monthly numbers), entitled, *The Zoological Miscellany, or Descriptions of new, rare, or highly interesting Animals*; by Wiliam Elford Leach, M.D. &c. *Illustrated with Coloured Figures, accurately drawn from Nature*; by R. P. Nodder, animal painter. This work contains descriptions and figures of several new and curious insects.

List of Entomological Works not mentioned in the preceding pages.

Works not mentioned before.

Coquebert (Anton. Joann.) *Illustratio Iconographica Insectorum quæ in Musæis Parisenis Observavit et in lucem edidit* J. C. Fabricius. *Tabularum decas prima.* Fol. Parisiis. An. 7.

Espers *Der Europaischen Schmetterlinge Welcher die Tagschmetterlinge.* Quarto.

An Essay preceding a Supplement of the Aurelian, by Moses Harris. London.

Jacobi Petiver *Gazophylaceum Naturæ et Artis.* Londini. Folio.

* This genus was constructed by Olivier long before the publication of Mr Marsham's Dissertation, under the name Paussus.

History.

Sepp's *Beschouwing der Wonderin Gods in de Miusgeachte Schepzelln of Nederlandsche Insecten.* Amsterdam. In three volumes, quarto.

Planches enluminées, par Daubenton le jeune. Folio. This work contains figures of several very rare insects, principally of the lepidopterous order.

Ephemerides Academiæ Cesareæ Naturæ Curiosorum. Quarto.

Erucarum Ortus, Alimentum et Paradoxa Metamorphosis, par Mariam Sibillam Merian. Amstelodami.

Johannis Eusebii *Voet Descriptiones et Icones Coleopterorum.* Quarto.

Lichtenstein *Catal. Mus. Holthuysen.*

Schriften d. Gesellschaft Naturforschender Freunde zu Berlin. Quarto.

Abhandlungen der Hallischen Naturforschenden Gesellschaft. Dessau und Leipzig. Octavo.

Nova Commentaria Petropolitana. Quarto.

George Heinrich Barowsky *Gemeinützige Naturgeschichte des Thierreichs.*

Bocks *Naturgeschichte von Preusen.* Tom. 5.

Dominicus Cyrilli *Entomologiæ Neapolitanæ Specimen.*

Johanno Leonhard Frischs *Beschreibung von allerley Insecten in Deutschland* 13 *Theile.* Quarto.

Gleditsch Einleitung in die Forstwissenschaft.

Hamburgisches Magazin, oder gesammlete Schriften aus der Naturforchung, &c.

Herbst *Gemeinnützige Naturgeschichte.*

Petri Löfling *Iter Hispanicum.* Octavo.

Georgius Maregraaf de Leibstatt *Historia Naturalis Brasiliæ.*

Piller et Mitterpacher *Iter per Poseg.*

Nicolas Robert *Species Florum Variæ, æneis tabulis.* Paris. Folio.

Neuer Schauplaz der Natur.

Schmeidleins Taschenbuch für Insectenfreunde.

CLASSIFICATION.

Classification.

By this term, we mean the distribution of insects into subclasses, orders, tribes, families, genera, and species; and we shall take our outline from the system proposed by Dr Leach, of which the following is a tabular view.

Subclass I. AMETABOLIA.
Insects undergoing no metamorphoses.

Order I. Thysanura. Tail armed with setæ.
Order II. Anoplura. Tail without setæ.

Subclass II. METABOLIA.
Insects undergoing metamorphoses.

Century I. Elythroptera. Insects with elytra.
Cohors. I. Odontostoma. Mouth with mandibles.
* Metamorphoses incomplete.
Order III. Coleoptera. Wings transversely folded; elytra crustaceous, covering the wings, with the suture straight.
** Metamorphosis nearly coarctate.
Order IV. Strepsiptera. Wings longitudinally folded; elytra coriaceous, not covering the wings.
*** Metamorphoses semi-complete.
Order V. Dermaptera. Wings longitudinally and transversely folded; elytra somewhat crustaceous, abbreviated, with the suture straight.
Order VI. Orthoptera. Wings longitudinally folded; the internal margin of one elytron covering the same part of the other; elytra coriaceous.
Order VII. Dictuoptera. Wings longitudinally folded twice or more; elytra coriaceous, nervous, one decussating the other obliquely.
Cohors. II. Siphonostoma. Mouth with an articulated rostrum.
Order VIII. Hemiptera. Elytra somewhat crustaceous, or coriaceous; towards the apex generally membranaceous, horizontal, one decussating the other obliquely. Metamorphoses half complete.
Order IX. Omoptera. Elytra entirely coriaceous, or membranaceous, and meeting obliquely, with a straight suture. Metamorphoses semi-complete, or incomplete.
Century II. Medamoptera. Insects without wings or elytra.
Order X. Aptera. Mouth with a tubular sucking rostrum. Metamorphoses incomplete.
Century III. Gymnoptera. Insects with wings, but no elytra.
Cohors. I. Glossostoma. Mouth with a spiral tongue.
Order XI. Lepidoptera. Wings four, membranaceous, with pterigostea, covered with meal-like scales.
Cohors. II. Gnathostoma. Mouth with maxillæ and lip.
Order XII. Trichoptera. Wings four, membranaceous, with pterigostea, and hairy.
Cohors. III. Odontostoma. Mouth with mandibles, maxillæ, and lip.
Order XIII. Neuroptera. Four highly reticulated wings, generally equal in size; anus of the female without a sting, or compound borer.
Order XIV. Hymenoptera. Four venose wings, hinder ones smallest; anus of the female with a sting, or with a compound borer or oviduct.
Cohors. IV. Siphonostoma. Mouth tubular, formed for sucking.
Order XV. Diptera. Wings, and halteres or balancers two.

Ametabolia.

Subclass I. INSECTA AMETABOLIA.

Order I. THYSANURA.

Thysanura.

Tail furnished with setæ, or filaments. Mouth with mandibles, palpi, labrum, and labium.

The bodies of the animals which compose this order, are generally covered with scales or hair. Their motion is extremely rapid, or performed by leaping.

Tribe I. Lepismides.

Palpi very distinct and prominent, or exserted. Antennæ composed of a vast number of very short joints. Tail with three exserted setæ.

Family I. *Lepismida.*

Genera and Species.

Body depressed, and moving with a running motion. Tail with three nearly equal filaments.

1. Lepisma.

Genus I. Lepisma. Linn. De Geer, Fabr. Latr.
Setoura. Brown.
Forbicina. Geoff. Lamarck.

Antennæ inserted between the eyes. Maxillary palpi slender, composed of five joints, the last of which is elongate, and very slender. Labial palpi with their joints compressed, dilated, and round. Eyes small and remote.

Sacharina.

Sp. 1. *Sacharina.* Body covered with silvery scales.
Lepisma sacharina. Linn. Fabr. Latr.

Ametabolia.

La Forbicine plate. Geoff. *Hist. des. Ins.* ii. 613. plate 20. f. 3.

This is the only species known. It is very common amongst books, clothes, &c. and wanders about during the night. It is supposed to have been originally introduced into Europe from America, where it is said to live amongst sugar.

FAMILY II. *Forbicinida.*

Body convex, with an arched back formed for springing. Tail with three setæ, the middle one longest.

2. FORBICINA. GENUS II. FORBICINA. Geoff.
LEPISMA. Linn. Oliv.
MACHILIS. Latr.

Antennæ inserted under the eyes, shorter than the body. Maxillary palpi thick, with six joints, the last conic. Labial palpi, with the apex membranaceous. Eyes large and contiguous.

Polypoda. *Sp.* 1. *Polypoda.* Smoky brown, with obscure rust-coloured spots.

Lepisma polypoda. Linn
Lepisma saccharina. Vill. *Ent.* 4. tab. 11. fig. 1.
Machilis polypoda. Latr. *Gen. Crust. et Ins.* i. p. 165. tab. 6. fig. 4. magnified.
La Forbicine cylindrique. Geoff.

Inhabits all the temperate parts of Europe, and is found in woods, and under stones.

3. PÆTROBIUS. GENUS III. PÆTROBIUS. Leach.
LEPISMA. Fabr.?

Antennæ longer than the body, inserted under the eyes. Maxillary palpi six-jointed, the fifth joint inversely conic, the sixth conic. Labial palpi, with the last joint obliquely truncate, with the apex acute, and not membranaceous. Eyes large and contiguous.

Maritimus. *Sp.* 1. *Maritimus.* Blackish, with golden scales. Feet yellowish. Setæ of the tail annulated with white.

Inhabits all the rocky shores of Britain. Dr Leach first observed this species on the Devonshire coast, and afterwards in Ireland, Scotland, and Wales. Can it be the *Lepisma polypoda* of Fabricius?

TRIBE II. PODURELLIDES.

Palpi not exserted, nor very conspicuous. Antennæ composed of four joints, the last sometimes formed of several other minute articulations. Tail forked, and bent beneath the abdomen

4. PODURA. GENUS IV. PODURA. Linn. Geoff. De Geer, Fabr. Lam. Hermann.

Antennæ with the last joint solid, not articulated. Abdomen elongate, linear.

Plumbea. *Sp.* 1. *Plumbea.* Lead coloured, shining, with griseous head and feet.

Podura plumbea. Linn. Fabr. Lat.
Podure plumbée. De Geer.
La Podure grise commune. Geoff.

Inhabits Europe, under stones. A good figure may be found in Roemer's *Genera Insectorum*, tab. 29 fig. 2.

There are a vast number of species in this and the following genus, which are worthy of attention. Fabricius, who placed these two genera together without the slightest distinction, has described several species, to which we cannot refer, from not having studied his species, which we trust some future zoologist will be induced to examine.

5. SMYNTHURUS. GENUS V. SMYNTHURUS. Latr.
PODURA. Linn. Fabr. De Geer, Geoff.

Fuscus. *Sp.* 1. *Fuscus.* Body entirely brown.

La Podure brun enfumée. Geoff.
Podure brun, ronde. De Geer, *Mem. sur les Ins.* vii. 35. tab. 3. fig. 7, 8.
Podura atra. Linn.? Fabr.
Smynthurus fuscus. Latr.

Ametabolia.

Inhabits Europe, is common on the ground, and in damp hedges.

Viridis. *Sp.* 2. *Viridis.* Body green.

Podura viridis. Linn. Fabr.
La Podure verte aux yeux noirs. Geoff.
Smynthurus viridis. Latr.

Inhabits various trees in Europe.

ORDER II. ANOPLURA.

Tail without setæ or filaments. Mouth in some furnished with two teeth, (or mandibles?) and an opening beneath; in others with a tubulose, very short haustellum.

The animals of this order are parasitical, and were by Latreille placed in an order which he named *Parasita.* This name Dr Leach has changed for the sake of harmony, and also to render the name more easy of retention in the memory, the characters being drawn from the same parts.

Their motion is slow, and their nourishment is derived from the blood of mammalia, birds, and insects.

It is almost an established fact, that every species of bird (and probably mammiferous animal) has its own peculiar parasite; and there is no instance of the same species of louse having been observed on two distinct species of birds, although some birds (as the raven, oyster-catcher, &c.) are infested with several species of parasites. The importance of clearly ascertaining the truth, is such to the ornithologist, that Dr Leach has employed a considerable portion of time, for the purpose of investigating and of describing the species with accuracy, little more than a bare catalogue of names and habitats having been given in the works of Linnæus, Fabricius, and Gmelin. The result of his examinations he does not consider himself as able to communicate at present; but it is his intention, when the subject has arrived at maturity, to give a paper on this order to the Linnean Society of London.

TRIBE I. PEDICULIDES.

Mouth consisting of a tubulose, very short haustellum.

6. PTHIRUS. GENUS VI. PTHIRUS. Leach.
PEDICULUS. Linn. Redi, Latr. Fabr.

Anterior pair of feet simple, two hinder pair didactyle. Thorax extremely short, scarcely visible.

Inguinalis. *Sp.* 1. *Inguinalis.* Body whitish.

Pediculis inguinalis. Redi.
Pediculis pubis. Linn. Fabr. Latr.
Le morpion. Geoff.

Inhabits the pubes and eyebrows of men and women, especially of those of easy virtue, being commonly known under the titles crabs, crab-lice, &c.

7. PEDICULUS. GENUS VII. PEDICULUS. Linn. Fabr. De Geer, Geoff. Redi, Hermann, Lam.

Feet all armed with a finger and thumb. Thorax composed of three distinct equal segments.

Humanus. *Sp.* 1. *Humanus.* Body oval, lobate, white, and nearly immaculate.

Pediculus humanus. Fabr. Linn. Latr.
Pou humain du corps. De Geer, *Mem. sur les Ins.* tom. vii. p. 67. plate 1. fig. 7.

Inhabits the bodies and garments of men, and is known by the name of the body-louse. On the continent of Europe, especially in Spain and Portugal, it is very abundant. In Britain it is of very rare occurrence, and may have been introduced from the neighbouring countries.

Metabolia. Cervicalis. *Sp.* 2. *Cervicalis.* Body oval, lobed, cinereous, with a black interrupted band on either side.

Le pou ordinaire. Geoff.

Pou humaine de la tête. De Geer, *Mem. sur les Ins.* vol. vii. p. 67. tab. 1. fig. 6.

Pediculus humanus var. Linn.

Pediculus cervicalis. Latr.

Inhabits the heads of man throughout Europe. In Britain it is extremely common, especially in the heads and upper part of the necks of children, whence they are extracted by means of a fine toothed comb, or are destroyed by rubbing calomel, mixed with a little fat, amongst the roots of the hair. This species has been by many authors confounded with the preceding species.

Tribe II. Nirmides.

Mouth with a cavity, and two teeth, or mandibles.

7. Nirmus. Genus VII. Nirmus. Hermann.

Ricinus. De Geer, Oliv. Lam. Latr.

Pediculus. Linn. Geoff. Fabr.

The character of this genus is given in that of the tribe. All the species inhabit birds. The term *ricinus* having been used in botany is rejected, and that of Dr Hermann's is adopted.

Cornicis. *Sp.* 1. *Cornicis.* Whitish; head heart-shaped; segments of the thorax on each side produced into a tooth; abdomen oval, transversely banded with brown.

Ricin de la Corneille. De Geer, *Mem. sur les Ins.* tom. vii. p. 76. plate 4. fig. 11.

Ricinus cornicis. Latr.

Inhabits the *Corvus cornix* of Linnæus.

Subclass II. INSECTA METABOLIA.

Order III. COLEOPTERA.

Order Coleoptera, Linn. Cuv. Lam. Latr.

Class Eleuterata, Fabr.

This order is divided into five great sections, from the general number of joints in the tarsi.

Section I. Pentamera.

The number of joints in the tarsi is generally five, but in some of the aquatic genera the number is less.

Tribe I. Cicindelides.

Maxillary palpi four, the interior ones two-jointed. Labial two. Antennæ filiformes. Maxillæ furnished at their extremities with a distinct articulated hook. Mandibles with many teeth. Feet formed for running; hinder ones with trochanters.

Mentum broadly notched; internal side of the anterior tibiæ never notched; antennæ not moniliform.

8. Manticora. Genus VIII. Manticora, Fab. Oliv. Lam. Latr.

Carabus. De Geer.

Cicindela. Thunberg, Clairville.

Thorax somewhat heart-shaped. Abdomen very large, pedunculated, nearly inversely heart-shaped. Elytra embracing and shielding the whole of the abdomen, connected at the suture.

Antennæ inserted beyond the apex of the eyes, under a little process. Clypeus of the same size with the labrum. Labial and external maxillary palpi, with the last joint at the apex much compressed, and gradually a little broader. Scutellum scarcely visible.

Maxillosa. *Sp.* 1. *Maxillosa.* Black, with rough elytra.

Manticora maxillosa. Fabr.

Manticora maxillaris. Oliv. Latr.

Cicindela gigantea. Thun.

Carabe a tubercules. De Geer. *Mem.* 7. 623. pl. 46. fig. 14.

Inhabits the Cape of Good Hope, and is figured by Herbst's Archives, tab. 46. fig. 6.

Metabolia.

9. Colliuris. Genus IX. Colliuris. Latr.

Collyris. Fabr.

Cicindela. Oliv.

Thorax long, cylindric-conic, narrow, attenuated in front. Abdomen long and narrow. Elytra not embracing the abdomen.

* With wings.

Longicollis. *Sp.* 1. *Longicollis.* Cyaneous; apex of the elytra notched; thighs red.

Collyris longicollis. Fabr.

Cicindela longicollis. Oliv.

Colliuris longicollis. Latr. *Gen. Crust. et Ins.* 1. tab. 6. fig. 8.

Inhabits Bengal.

** Without wings.

Aptera. *Sp.* 2. *Aptera.* Black; elytra connected with the middle part rough; thighs red.

Collyris aptera, Fabr.

Cicindela aptera, Oliv.

Colliuris aptera, Latr.

Inhabits the East Indies.

10. Megacephala. Genus X. Megacephala. Latr.

Gnatho, Illiger.

Cicindela, Linn. De Geer, Fabr. Oliv.

Thorax short, cylindric. Elytra convex-rounded. Labial palpi much longer than the external maxillary palpi.

* Elytra connected; no wings.

Senegalensis. *Sp.* 1. *Senegalensis.* Black-green; antennæ and feet ferrugineous.

Cicindela megalocephala, Fabr. Oliv.

Megacephala Senegalensis, Latr.

Inhabits Senegal.

** Elytra not connected; wings.

Carolina. *Sp.* 2. *Carolina.* Purple-green; antennæ, mouth, a lunula at the apex of the elytra, and the feet ferruginous-yellowish.

Cicindela Carolina, Linn. Fabr.

Megacephala Carolinensis. Latr. *Gen. Crust. et Ins.* 1. tab. 6. fig. 9.

Inhabits Carolina, where it is very abundant.

11. Cicindela. Genus XI. Cicindela, Linn. De Geer, Fabr. &c.

Buprestis, Geoff.

Thorax short. Elytra flat, rounded. External maxillary palpi as long as the labial. Antennæ inserted into the anterior margin of the eye. Clypeus shorter than the labrum.

Sylvatica. *Sp.* 1. *Sylvatica.* Obscure æneous above; each elytron with an external lunule at the base, with a mark at the apex, and an intermediate transverse, narrow, sinuated band of white; with many impressed punctures near the suture.

Cicindela sylvatica, Linn. Oliv. Latr.

Cicindèle des forêts. De Geer. *Mem.* 4. 114. tab. 4. fig. 7.

Inhabits Europe. Is found on Martlesome Heath, Suffolk, occasionally; near Christchurch, in Hampshire, it is very common.

Hybrida. *Sp.* 2. *Hybrida.* Coppery-green, or obscure copper-black above, often with a purple tint; each elytron with an external lunule at the base, another at the apex, with an intermediate transverse sinuous-toothed band of white; suture cupreous.

Cicindela hybrida. Linn. Oliv. Fab. Latr.

Cicindèle tachetée. De Geer, *Mem.* 4. 115. pl. 4. fig. 8.

Inhabits the sandy maritime plains of Europe; near

Metabolia. Swansea, at Cromblyn Burrows, and on the sea-shore near Yarmouth, it is taken in profusion.

Campestris. *Sp.* 3. *Campestris.* Green; sides of the head and thorax, with the thighs, coppery-purple; each elytron with four white marginal spots, and a fifth near the suture.

Cicindela campestris. Linn. Fab. Oliv. Latr.

Cicindèle champêtre. De Geer, *Mem.* 4. p. 113. pl. 4. fig. 1.

Inhabits the sandy plains and pathways of Europe, and is very plenty.

TRIBE II. CARABIDES.

Maxillary palpi four, the interiores two-jointed. Labial two. Maxillæ bent at the apex, hooked without a distinct joint. Mandibles rarely with more than one tooth, which is towards the apex. Feet formed for running; hinder ones with a trochanter.

Mentum broadly notched. Internal edge of the anterior tibiæ often notched. Antennæ filiform, sometimes moniliform.

I. Body oblong, or ovoid. Labial palpi, inserted at the inferior sides of the lip. (*Observe.* The insects of this division do not live in the water.)

A. Anterior tibiæ notched in their internal edge.

a. Labial and maxillary palpi abruptly terminated, with a joint very different in size from the others. Antennæ straight.

12. NOTHIOPHILUS. GENUS XII. NOTHIOPHILUS. Dumeril.

CICINDELA. Linn. Marsh.

ELAPHRUS. Fabr. Latr. Illig.

Palpi maxillary external and labial, with the last joint larger than the preceding joint, and somewhat cylindric.

Thorax flat, smooth, nearly quadrate, with the transverse diameter exceeding the longitudinal.

Aquaticus. *Sp.* 1. *Aquaticus.* Brown-brassy shining. Front corrugated. Elytra with punctured striæ, and a longitudinal smooth interval near the suture.

Cicindela aquatica. Linn. Marsh.

Elaphrus aquaticus. Fabr. Latr.

Inhabits pathways and the banks of ponds. *Cicindelā semipunctata* of Linné, *Elaphrus semipunctatus* of Fabricius, &c. is the same species. There is a variety β of Paykull which has been taken in Norfolk and on the shore near Porto-Bello, Scotland, having little of the æneous lustre.

Biguttatus. *Sp.* 2. *Biguttatus,* may be at once distinguished by the whitish termination of its elytra.

Cicindela biguttata. Marsh.

Elaphrus biguttatus. Fabr.

13. ELAPHRUS. GENUS XIII. ELAPHRUS. Fab. Latr. Dum. Illig.

CICINDELA. Linn. Marsh.

Labial and external maxillary palpi, having the last joint longer than the preceding, and somewhat cylindric. Thorax truncate-obcordate, convex and unequal, with nearly equal diameters, or with the longitudinal rather the longest.

Riparius. *Sp.* 1. *Riparius.* Green or brownish bronze; elytra equally punctured, with impressed spots having a purple centre, with a pale green margin and coppery spot on each near the suture.

Elaphrus riparius. Fabr. Latr.

Cicindela riparia. Linn. Marsh.

Inhabits moist banks, and marshes every where.

Uliginosus. *Sp.* 2. *Uliginosus.* Coppery-æneous, with round cicatrices, more distinctly punctured, centres purple, margin green, elevated, with cupreous spots between.

Elaphrus uliginosus. Fabr. Latr.

Inhabits marshy and boggy ground. It is esteemed a rare species. It occurs in Battersea fields, near London, and in the banks of wet ditches on the borders of the Links near Edinburgh, in great numbers.

Metabolia.

14. BEMBIDIUM. GENUS XIV. BEMBIDIUM.

BEMBIDION. Latr.

CICINDELA. Linn. Marsh.

CARABUS. Linn. Marsh. Fabr. Oliv.

ELAPHRUS. Fabr. Illig. Oliv.

OCYDROMUS. Frolich, Clairville.

Flavipes. *Sp.* 1. *Flavipes.* Thorax somewhat narrower than the head, equally broad and long, with very prominent eyes; body æneous above, black-green beneath. Elytra marbled with copper, with two impressed dots in each near the suture. Palpi, base of antennæ, and feet, yellowish.

Cicindela flavipes. Linn. Marsh.

Elaphrus flavipes. Fabr. Oliv.

Bembidion flavipes. Latr.

Inhabits the sandy shores of ponds and rivulets, but is not common in Britain.

Littorale. *Sp.* 2. *Littorale.* Thorax somewhat broader than the head, truncate-obcordate, punctured and excavated at the angles. Body æneous black. Elytra with punctured striæ, and each with a humeral spot, another at the apex, and with the feet rufous.

Carabus littoralis. Oliv.

Elaphrus rupestris. Illiger.

Bembidium littorale. Latr.

Inhabits France and Germany.

Observe. This genus contains a vast number of species, which require some distribution into sections.

b. Labial and external maxillary palpi not abruptly terminated by a joint distinct from the rest in size. Antennæ straight.

* Lip prominent; mandibles very strong, their internal edge prominent or toothed.

† Elytra not truncate.

15. SCARITES. GENUS XV. SCARITES. Fabr. Oliv. Lam.

Antennæ moniliform, third joint much longer than the second. Mandibles dentated on their internal edge. Lip short and broad, without auricles. Tibiæ, anterior ones palmated.

Gigas. *Sp.* 1. *Gigas.* Black, shining. Thorax lunate, behind on each side with one dent. Elytra smooth, shoulders one-dentate. Mandibles sulcate, with the internal process large, dentate, with the apex acute.

Scaritas gigas. Fabr. Oliv. Latr.

Inhabits Barbary and the south of France.

16. CLIVINA. GENUS XVI. CLIVINA. Latr.

SCARITES. Fabr.

TENEBRIO. Linn.

CARABUS. Marsham.

Antennæ moniliform, second joint longer than the third. Mandibles without teeth on their internal edge. Lip elongate, with two auricles. Anterior tibiæ generally notched.

* Anterior tibiæ externally dentate.

Fossor. *Sp.* 1. *Fossor.* Blackish or brunneous. Thorax somewhat quadrate, middle of the front impressed. Elytra with punctured striæ.

Tenebrio fossor. Linn.

Scaritas arenarius. Fabr.

Clivina arenaria. Latr.

Carabus distans. Marsham.

Inhabits Europe under stones, especially in moist situations, where the ground is sandy.

** Anterior tibiæ, with obsolete teeth.

Gibba. *Sp.* 2. *Gibba.* Black brown. Thorax nearly globose. Elytra with punctured striæ, smooth towards their apex. Feet paler.

Scarites gibbus. Fabr.

Metabolia.

Clivina gibba. Latr.

Inhabits France and England in moist or damp banks. In Battersea fields it is very common during the summer months.

17. Morion.

Genus XVII. Morion. Latreille.

Antennæ moniliform, second joint much shorter than the third.

Monilicornis.

Sp. 1. *Monilicornis.* Plain, elongate, very black, shining; thorax on each side at the posterior angles impressed; elytra striated.

Inhabits the American islands.

18. Apotamus.

Genus XVIII. Apotamus. Hoffmansegg, Latreille.

Scarites. Rossi.

Antennæ filiform. Mandibles pointed. Exterior maxillary palpi very long and filiform; labial palpi much shorter and subulate.

Rufus.

Sp. 1. *Rufus.* See Rossi *Faun. Etrus.*

19. Siagona.

Genus XIX. Siagona. Latr.

Cucujus. Fabr.

Antennæ somewhat setaceous. Mandibles pointed; the internal edge projecting. Labial and exterior maxillary palpi terminated by a nearly securiform joint.

Rufipes.

Sp. 1. *Rufipes.* Brunneous-black, punctate; thorax somewhat sulcate; antennæ and feet red.

Cucujus rufipes. Fabr.

Siagona rufipes. Latr. *Gen. Crust. et Ins.* tom. i. p. 209, tab. 7, fig. 9.

Inhabits Barbary.

20. Sphodrus.

Genus XX. Sphodrus. Clairville.

Harpalus. Latreille.

Carabus. Linn. Fabr. Marsh. Payk.

Antennæ not moniliform, with the third joint much elongate. External maxillary palpi with the last joint, save one, longer than the last.

Planus.

Sp. 1. *Planus.* Oblong, black more shining beneath; elytra with fine punctured striæ; trochanters of hinder thighs acute.

Carabus leucophthalmus. Lin. Marsh.

Carabus planus. Fabr.

Carabus spiniger. Paykull, Oliv.

Harpalus leucophthalmus. Latreille.

Sphodrus planus. Clairville.

Inhabits Europe. It is found in cellars and woods. The Linnean name is rejected as absurd, most of the *Carabides* having white eyes after death, but never whilst living.

21. Stomis.

Genus XXI. Stomis. Clairville.

Harpalus. Latr.

Carabus. Illig. Panz.

Antennæ not moniliform, with the third joint not longer than the following articulations. External maxillary palpi with the last joint somewhat cylindric longer than the one before it, a little attenuated at its base, and truncate at the apex.

Pumicatus.

Sp. 1. *Pumicatus.* Oblong, blackish brown; antennæ and feet rufescent; thorax with an impressed dorsal line, and a little groove on each side behind; elytra with punctured striæ.

Carabus pumicatus. Illig. Panz.

Inhabits France, Germany, and England, under stones.

22. Harpalus.

Genus XXII. Harpalus. Latr.

Carabus. Linn. Fabr. Marsh.

Antennæ with the third joint a little longer than those which follow. External maxillary palpi with the two last joints equal in length, the last attenuated at the base and apex.

Ruficornis.

Sp. 1. *Ruficornis.* Head and thorax black; elytra obscure blackish brown, downy, punctulate, striated; thorax without foveolæ behind; antennæ and feet red.

Carabus ruficornis. Oliv. Panz. Marsh.

Harpalus ruficornis. Latr.

Inhabits Europe, under stones; the most common species of the genus.

Genus XXIII. Zabrus. Clairville.

23. Zabrus.

Harpalus. Latr.

Carabus. Fabr.

Antennæ not moniliform. External maxillary palpi with the last joint shorter than the one before it.

Tardus.

Sp. 1. *Tardus.* Black above, somewhat fuscous beneath; antennæ, tibiæ and tarsi brown; thorax without foveolæ, the hinder margin and abdomen widely punctured; elytra with punctured striæ.

Harpalus tardus. Latr.

Carabus gibbus. Fabr.

Inhabits the plains of France and Italy.

Genus XXIV. Trechus. Clairville, Latr.

24. Trechus.

Carabus. Linn. Marsh.

Antennæ not moniliform. Mandibles pointed. Exterior maxillary and labial palpi filiform, terminated by a sharp-pointed joint.

Meridianus.

Sp. 1. *Meridianus.*

Genus XXV. Licinus. Latr.

25. Licinus.

Carabus. Fabr.

Antennæ not moniliform. Mandibles very obtuse. Labial and external maxillary palpi terminated by a nearly secuniform joint.

Emarginatus.

Sp. 1. *Emarginatus.* Obscure black; elytra (without the aid of a lense) smooth.

Carabus cassidens. Fabr. Illig.

Licinus emarginatus. Latr. *Gen. Crust. et Ins.* tom. i. p. 199, tab. 7, fig. 8.

Inhabits Europe; but is very rare.

Genus XXVI. Badister. Clair. Latr.

26. Badister.

Carabus. Fabr.

Antennæ not moniliform. Mandibles very obtuse. Exterior maxillary palpi filiform; the labial palpi terminated by a thick short-ovoid joint.

Bipustulatus.

Sp. 1. *Bipustulatus.* Black; base of antennæ, feet, thorax, and wing-cases, red, the latter with a sutural lunate mark of black.

Carabus bipustulatus. Fabr.

Badister bipustulatus. Latr.

Inhabits France, Germany, and Britain.

** Elytra truncate at their extremities. Head and corselet narrower than the abdomen.

Genus XXVII. Anthia. Web. Fabr. Latr.

27. Anthia.

Carabus. Oliv. Linn.

Thorax cordiform. Head not narrow behind. Neck not apparent. Palpi filiform. Lip projecting in the form of a horny tongue. Abdomen oval, convex.

Decemguttata.

Sp. 1. *Decemguttata.* Black; coleoptra with nine grooves, and ten white spots.

Carabus decemguttatus. Linn. Oliv.

Anthia decemguttata. Latr.

Inhabits the Cape of Good Hope, where it is common.

Genus XXVIII. Graphipterus. Latr.

28. Graphipterus.

Cicindela. De Geer.

Anthia. Fabr.

Thorax cordiform. Head not narrow behind. Neck not apparent. Palpi filiform. Lip nearly square, with the sides membranaceous, and rounded at the extremity. Abdomen orbicular, much depressed.

Multiguttatus.

Sp. 1. *Multiguttatus.* Black; front, sides of the thorax, and margins of the wing-cases and sixteen spots white tomentose; the marginal band of each elytron bidentate within.

Metabolia.

Carabus multiguttatus. Oliv.
Anthia variegata. Fabr.
Graphipterus multiguttatus. Latr. *Gen. Crust. et Ins.* tom. i. p. 186, tab. 6, fig. 11.
Inhabits Egypt.

29. Brachinus.

Genus XXIX. Brachinus. Web. Fabr. Latr. Clair.
Carabus. Linn. Marsh.
Thorax cordiform. Head not narrow behind. Neck not apparent. Palpi filiform. Lip nearly square, sides membranaceous, and terminated by a point. Abdomen parallelopiped. Tarsi with entire joints.
Obs. All the species of this genus have the power of emitting a smart sound, accompanied by an evolution of some gas, which they repeat two or three times at short intervals when they are first taken.

Crepitans.

Sp. 1. *Crepitans.* Red-rusty; thorax narrowly truncate cordiform; elytra black-blue-green; abdomen blackish; antennæ, with the exception of the tips of the third and fourth joints, obscure blackish.
Carabus crepitans. Linn. Marsh.
Brachinus crepitans. Web. Fabr. Latr. Clairv.
Inhabits Europe under stones. It is rare in England. There is a small variety found in France and Germany, that has not hitherto occurred in Britain.

30. Echimuthus.

Genus XXX. Echimuthus. Leach.
Carabus. Linn. Marsh. Fabr.
Lebia. Latr.
Brachinus. Clairv.
Thorax short, cordiform, broader than long. Head not narrow behind. Neck not apparent. External maxillary palpi distinctly truncate; labial palpi with the last joint thicker. Abdomen nearly perfectly quadrate. Tarsi with the fourth joint bifid.

Cyanocephalus.

Sp. 1. *Cyanocephalus.* Intense blue-green; first joint of the antennæ, thorax, thighs, and tibiæ, red; elytra with punctured striæ, the spaces between the striæ punctulated; knees black.
Carabus cyanocephalus. Linn. Marsh. Fabr.
Lebia cyanocephala. Latr. *Gen. Crust. et Ins.* vol. i. p. 191, tab. 6, fig. 12.
Inhabits Europe under the bark of trees, and on hot dry banks.

31. Risophilus.

Genus XXXI. Risophilus. Leach.
Carabus. Linn. Fabr. Marsh.
Lebia. Latr.
Thorax condiform, a little longer than broad. Head a little narrowed behind. Neck not apparent. Palpi filiform, terminated with a thick ovoid truncate joint. Abdomen very much depressed. Tarsi with the fourth joint bifid.

Atricapillus.

Sp. 1. *Atricapillus.* Body pale yellowish: head black; mouth and thorax reddish; elytra obsoletely striated.
Carabus atricapillus. Linn. Fabr.
Lebia atricapilla. Latr.
Inhabits Europe under the bark of trees. In Britain it very frequently occurs, on the sandy plains which are thrown up from the sea, amongst the roots of junci and other plants which grow in those parts.

32. Lebia.

Genus XXXII. Lebia. Latr.
Carabus. Linn. Fabr.
Thorax cordiform, a little broader than long. Head but little narrowed behind. Neck not apparent. Palpi filiform, terminated with a large ovoid, truncate joint. Abdomen much depressed. Tarsi with entire joints.

Quadrimaculata.

Sp. 1. *Quadrimaculata.* Thorax ferrugineous; head rugulose, black, with the mouth reddish; elytra striated, black, with two pale yellow spots on each; feet pale yellow.
Carabus quadrimaculatus. Linn. Fabr.
Lebia quadrimaculata. Latr.
Inhabits Europe under the bark of trees.

33. Cymindis.

Genus XXXIII. Cymindis. Latr.
Carabus. Fabr. Oliv. Marsh.
Tarus. Clairville.
Thorax cordiform. Head not narrowed behind. Neck not apparent. Exterior maxillary palpi filiform; labial palpi terminated by a large securiform joint. Body depressed. Tarsi with entire joints.

Humeralis.

Sp. 1. *Humeralis.* Black, punctate; antennæ, mouth, thorax, lateral margins of the elytra, the shoulders, and feet, red; elytra striated.
Carabus humeralis. Fabr. Oliv. Payk. Rossi.
Cymindis humeralis. Latr.
Inhabits France, Sweden, Germany, and England; but is extremely rare.

34. Zuphium.

Genus XXXIV. Zuphium. Latr.
Carabus. Ross. Oliv.
Galerita. Fabr. Clairv.
Thorax cordiform. Head not narrowed behind. Neck very apparent. External maxillary and labial palpi terminated by a large nearly obconic joint. Body very much depressed.

Oleus.

Sp. 1. *Oleus.* Red, minutely punctate; head (mouth excepted) black; elytra brown, obsoletely striate, with common red spot at the base, and another at the apex.
Carabus oleus. Rossi *Faun. Etrus.* i. tab. 6, Fig. 2, Fabr.
Zuphium oleus. Latr.
Inhabits Italy and the southern parts of France.

35. Galerita.

Genus XXXV. Galerita. Fabr. Latr.
Carabus. De Geer, Oliv.
Thorax cordiform. Head narrowed, and lengthened behind. Neck very distinct. External maxillary and labial palpi terminated by a large securiform joint. Body not very much depressed.

Americana.

Sp. 1. *Americana.* Black; first joint of antennæ, thorax, and feet, ferrugineous; elytra black-blue.
Galerita Americana. Fabr. Latr. *Gen. Crust. et Ins.* tab. 7, fig. 2.
Inhabits North America. Is very well figured by Drury, in his *Illustrations of Insects*, tom. i. pl. 42. fig. 2.

36. Drypta.

Genus XXXVI. Drypta. Latr. Fabr.
Carabus. Ross. Marsh.
Cicindela. Oliv.
Thorax cylindric. Head not narrowed or lengthened behind. Mandibles much elongated and very prominent. Exterior maxillary and labial palpi terminated by a large nearly obconic joint, (maxillary ones much lengthened). Lip elongate linear, with two auricles.

Emarginata.

Sp. 1. *Emarginata.* Blue, punctate, villose; mouth, antennæ, and feet, red; thorax with an impressed longitudinal line; elytra with punctured striæ; apex of the first, and middle of the third joint of the antennæ, brown.
Drypta emarginata. Fabr. Latr. *Gen. Crust. et Ins.* tom. i. p. 197, tab. 7, fig. 3.
Cicindela emarginata. Oliv.
Carabus dentatus. Ross.
Carabus chrysostomos. Marsham.
Inhabits France, Germany, Italy, and England. In the former and latter of these countries it is extremely rare. It has been taken near Hastings in Suffolk; specimens from that neighbourhood are preserved in Dr Leach's cabinet.

Metabolia.

Genus XXXVII. Odacantha. Payk. Fabr. Latr.
Attelabus. Linn.
Carabus. Oliv.

37. Odacantha.

Thorax cylindric. Head not lengthened or narrowed behind in any great degree. Mandibles not remarkably long or prominent. Palpi filiform.

Observation. The structure of the mouth and the general appearance of this genus is that of *Lebia*.

Melanura.

Sp. 1. *Melanura.* Green-blue; first joints of the antennæ, elytra (apex excepted), breast, and feet, pale-rusty-red; thorax distinctly punctured; elytra slightly and widely punctured, the punctures arranged into obscure striæ; knees, tarsi, and antennæ (base excepted), blackish.

Attelabus melanurus. Linn.
Odacantha melanura. Payk. Fabr.

Inhabits Europe. In Britain it occurs near Swansea, and near Norwich in considerable abundance.

38. Agra.

Genus XXXVIII. Agra. Fabr. Latr.

Thorax nearly conic. Head much narrowed behind and lengthened. Palpi filiform, the labial ones with the last joint oval-round.

Observation. In the structure of the mouth, this genus makes a near approach to *Lebia*, from which it differs in having the last joint of the labial palpi more elongate. Latreille makes two divisions, which we suppose should constitute genera.

* Fourth joint of the tarsi bifid.

Ænea.

Sp. 1. *Ænea.* Thorax punctate; elytra bidentate.

Agra ænea. Fabr.
Agra cajennensis. Latr.

Inhabits South America.

** All the joints of the tarsi entire.

Surinamensis.

Sp. 2. *Surinamensis.* Brunneous; head and thorax black; antennæ intersected with white and black; elytra striated, with their apex bidentate; feet red.

Agra surinamensis. Latr.

Inhabits Surinam.

Pennsylvanica.

Sp. 3. *Pennsylvanica.* Black; elytra red, with punctured striæ at the base; marginal spot, another on the suture, and the tip. black; feet red; knees black.

Inhabits Pennsylvania.

** Lip not prominent; mandibles small, their internal edge neither toothed or prominent.

39. Panagæus.

Genus XXXIX. Panagæus. Latr.
Carabus. Linn. Fabr. Marsh.

Thorax orbicular. Head narrower than the abdomen, with very prominent globular eyes. Neck distinct. Abdomen large, nearly quadrate.

Crux-major.

Sp. 1. *Crux-major.* Black, deeply punctured; elytra red, with punctured striæ, and a cross, and tips black.

Carabus crux-major. Linn. Fab. Marsh. Panz.
Panagæus crux-major. Latr.

Inhabits Europe.

c. Labial and external maxillary palpi with the last joint cylindric-oval. Antennæ crooked. Mandibles short.

40. Loricera.

Genus XL. Loricera. Latr.
Carabus. Fab. Marsh.

Antennæ incurved, the first joints differing in size and in proportion from the others. Mandibles with the back notched and unidentate. Thorax nearly orbicular. Neck distinct.

Ænea.

Sp. 1. *Ænea.* Elytra with punctured striæ; the fourth stria from the suture with three foreæ.

Carabus pilicornis. Fab. Oliv. Marsh.
Loricera ænea. Lat. *Gen. Crust. et Ins.* 1. Tab. 7. fig. 6.

Inhabits France, Germany, and England.

B. Anterior tibiæ not notched on their internal edge. Metabolia.

a. Lip very short, not projecting beyond the first joint of the palpi. External base of the maxillæ not remarkably ciliated. Abdomen more or less thick.

41. Cychrus.

Genus XLI. Cychrus. Fab. Payk. Latr.
Carabus. De Geer, Oliv. Marsh.
Tenebrio. Linn.

Mandibles narrow, very long, bidentate at their extremities. Elytra embracing the abdomen. Labial and external maxillary palpi with the last joint much compressed, concave and securiform, or rather spoon-shaped. Thorax somewhat cordate.

Rostratus.

Sp. 1. *Rostratus.* Black, elytra sharply punctate-rugose.

Cychrus rostratus. Fabr. Latr.
Tenebrio rostratus. Linn.
Carabus rostratus. Marsh. Oliv.

Inhabits Europe. In England it is rather uncommon, but in Scotland it occurs very frequently under stones.

42. Calosoma.

Genus XLII. Calosoma. Web. Fabr. Latr.
Carabus. Linn. De Geer, Oliv.

Mandibles neither very narrow or long. Thorax nearly orbicular. Abdomen nearly quadrate. Labial and external maxillary palpi with the last joint somewhat conic or triangular.

Sycophanta.

Sp. 1. *Sycophanta.* Violet-black; elytra gold or coppery green, with about sixteen punctured striæ on each, the intervals obsoletely intersected transversely, the fourth, eighth, and twelfth from the suture, with some impressed spots.

Carabus Sycophanta. Linn.
Calosoma Sycophanta. Fabr. Latr.

Inhabits the European woods. There are but few instances of its having occurred in this country, six specimens only being known to us that have been clearly ascertained to be British. Two of these from Ireland are preserved in the collection of Mr Sowerby; one in the collection of W. J. Hooker, Esq. of Halesworth; another in the museum of S. Wilkin, Esq. which was taken in the county of Norfolk with the preceding specimen; a fifth occurred in Devon, near Kingsbridge, which is now, with another specimen, in the collection of Dr Leach.

Calosoma Inquisitor of Fabricius is sometimes taken near London, and it has been taken by Dr Leach near Tavistock in Devonshire; but it must be esteemed a rare British insect. It is said sometimes to occur in plenty near Windsor, on the white thorn hedges, feeding on the larvæ of lepidopterous insects.

43. Carabus.

Genus XLIII. Carabus. Linn. Fabr. Oliv. Latr. Panz. Marsh.

Mandibles neither very narrow or long. Thorax cordiform, truncate, and notched behind. Abdomen ovate.

Obs. As the British species of this genus have been most sadly confused, we shall describe the species, for the purpose of correcting the errors of nomenclature, which Mr Marsham has tended not a little to increase.

Violaceus.

Sp. 1. *Violaceus.* Black; margins of the thorax and elytra violet-copper; elytra finely ragulose, somewhat smooth; abdomen elongate oval.

Carabus violaceus. Linn. Fabr. Oliv. Marsh. Latr.

Inhabits Europe.

Carabus purpurascens is said to have been taken in Britain; but we have not been enabled to identify it with certainty.

Catenulatus.

Sp. 2. *Catenulatus.* Black; margins of thorax and elytra violet; thorax broader than long, deeply emar-

Metabolia.

ginate behind; each elytron with about fourteen striæ; the fourth, eighth, and twelfth from the suture interrupted; the intervals with a distinct somewhat rugose line; abdomen oval.

Carabus catenulatus. Scop. Fabr. Latr.

Carabus intricatus. Marsh. Oliv.

Inhabits the south of France, Germany, and Britain It is sometimes found quite black, at other times with a tinge of fine violet. It is very plentiful in Ireland, Scotland, and England, especially in the two former countries.

Intricatus.

Sp. 3. *Intricatus.* Black violet above, black beneath; thorax narrow, with nearly equal diameters; elytra with irregular striæ, the intervals punctate-rugose; each elytron with three elevated catenulated lines.

Carabus intricatus. Linn. Latr.

Carabus cyaneus. Fabr. Panzer.

Inhabits Europe. Is common in Germany and Sweden, but is rare in France. There is but one instance of its having occurred in Britain: Dr Leach took a single specimen under a stone in a wood opposite the Virtuous-Lady Mine, on the river Tavy, below Tavistock in Devonshire, in the last week in May. It is singular, that Mr Marsham, (who has every opportunity of examining the Linnean cabinet,) should have confounded the former species with this, as it will in no way agree with the character.

Nemoralis.

Sp. 4. *Nemoralis.* Black; margin of the elytra and sides of the thorax violet; elytra obscure copper, rugulose, with three longitudinal rows of excavated spots.

Carabus nemoralis. Illig, Latr.

Carabus hortensis. Oliv. Marsh. Fabr.

Inhabits France and Germany.

Monilis.

Sp. 5. *Monilis.* Brassy-green or violet-black above, black beneath: each elytron with about fourteen elevated lines, two in the middle more distinct than the rest; the fourth, eighth, and twelfth from the suture catenulated; abdomen elongate-oval.

Carabus monilis. Fabr. Latr.

Carabus catenulatus. Marsh.

Inhabits England, France, and Germany. It varies in sculpture, those lines on each side of the entire line being very frequently uninterrupted.

Morbillosus.

Sp. 6. *Morbillosus.* Brassy or black copper above, black beneath; each elytron with three ribs, one at the suture; the interstices with a catenulated line, and on each side of it, with a less distinct smooth punctate-rugose line; abdomen elongate-oval.

Carabus morbillosus. Fabr. Latr.

Carabus granulatus. Marsh.

Antennæ quite black; thorax often or generally cupreous or coppery; intermediate tibiæ with a reddish-tomentose line. It varies in colour, being sometimes violet, with the sides green, or entirely black-bronze.

Inhabits Europe, under stones.

Arvensis.

Sp. 7. *Arvensis.* Coppery or black above; antennæ altogether black; each elytron with fourteen elevated lines, three slightly notched transversely; the fourth, eighth, twelfth from the suture catenulated; abdomen oval.

Carabus arrensis. Fabr. Illig.

Inhabits Germany, Sweden, and England.

b. Lip projecting as far as the first joint of the palpi; exterior base of the maxillæ distinctly ciliated; abdomen generally very flat.

44. NEBRIA.

GENUS XLIV. NEBRIA. Latr.

CARABUS. Linn. Fabr. Marsh. Schönher.

Lip nearly quadrate, not projecting as far as the labrum, nor tricuspidate at its extremity; labial palpi not twice as long as the head; mandibles but little dilated externally.

Metabolia.

* Back very much depressed.

Complanata.

Sp. 1. *Complanata.* Pale-yellowish; elytra paler, striated with two transverse bands, composed of black lines.

Carabus complanatus. Linn.

Carabus arenarius. Fabr. Oliv.

Nebria arenaria. Latr. *Gen. Crust. et Ins.* vol. i. p. 221. tab. 7. fig. 6.

Inhabits the sandy maritime shores of France, Germany, and South Wales.

Brevicollis.

Sp. 2. *Brevicollis.* Black shining antennæ; palpi, tibiæ, and tarsi, brown; elytra with punctured striæ.

Carabus brevicollis. Fabr. Schönher.

Carabus infidus. Rossi.

Carabus rugimarginatus. Marsh.

Nebria brevicollis. Latr.

Inhabits Europe; is found under stones and under the bark of trees.

Carabus Gyllenhalli of Schönher, which was discovered as a native of Britain by Dr Leach, at the base of Ben Lomond in Scotland. Has since been taken in some plenty near Edinburgh, by the late Richard Rawlins, Esq. one of the most promising entomologists of our day. *Nebria sabulosa* has likewise been taken near Hull in Yorkshire, by W. Spence, Esq.

** Back convex. Gen. HELOBIUM, Leach's MSS.

Multipunctata.

Sp. 3. *Multipunctata.* Black-brassy above, black beneath; middle of each elytron with impressed diluted spots, in a double longitudinal series; the intervals somewhat catenated.

Carabus multipunctatus. Linn. Fabr. Oliv. Marsh.

Nebria multipunctata. Latr.

Helobium multipunctatum. Leach's MSS.

Inhabits the northern parts of Europe. In England it occurs near London occasionally, especially in Battersea-fields. It should be placed, in a natural series, next to ELAPHRUS, to which genus it approaches in habit and economy.

45. POGONOPHORUS.

GENUS XLV. POGONOPHORUS. Latr.

CARABUS. Linn. Fabr. Oliv. Marsh.

LEISTUS. Froelich, Clairville.

MANTICORA. Jurine.

Lip elongate, even to the labrum, the extremity with three spines; labial palpi twice as long as the head; mandibles with their external base much dilated.

Cæruleus.

Sp. 1. *Cæruleus.* Blue above; antennæ, mouth, tibia, and tarsi red-brown.

Carabus spinibarbis. Fabr. Panz.

Pogonopherus cæruleus. Latr. *Gen. Crus. et Ins.* 1. tab. 7. fig. 4.

Inhabits England, France, and Germany.

II. Body short ovoid, nearly hemispherical; labial palpi inserted nearly on the superior side of the lip. (*Obs.* These insects live near the water, and prepare the way to the following tribe.) Anterior tibiæ notched.

46. OMOPHRON.

GENUS XLVI. OMOPHRON. Latr.

SCOLYTUS. Fabr. Clairville.

CARABUS. Oliv.

Lip very small; labial palpi inserted on the superior margin of the lip.

Limbatum.

Sp. 1. *Limbatum.* Pale-ferruginous; vertex of the head, a spot behind the thorax, a humeral spot on the elytra, and the suture with two bands of green.

Scolytus limbatus. Fabr.

Omophron limbatum. Latr.

Carabus limbatus. Oliv.

Inhabits France and Germany, in moist situations.

Metabolia.

Tribe III. Dyticides.

This tribe is at once distinguished from the *Carabici*, by the superior length of the hinder legs, which are formed for swimming.

I. Labial and external maxillary palpi filiform.

A. All the tarsi with five joints, the last of which is longest.

47. Dyticus.

Genus XLVII. Dyticus. Geoff. Illig. Latr.
Dytiscus. Linn. Fabr. Oliv. Lam.
Scutellum distinct; anterior tarsi of the male patelliform; elytra of the female sulcated; external maxillary palpi with the last two joints equal.

Marginalis.

Sp. 1. *Marginalis.* Ovate, olive-black above; luteous red beneath the scutellum, of the same colour with the elytra; clypeus, whole margin of the thorax, and border of the elytra, red clay-colour; bifurcatur of the sternum lanceolate.
Inhabits Europe.
Linnæus considered the sexes of this insect as distinct species, under the names *Dytiscus semistriatus* and *marginalis*.
Dytiscus circumflexus of Fabricius, the *flavoscutellatus* of Latreille, is very abundant near London. It is distinguished from *marginalis* by its more elongate shape, by the bifurcate processes of the sternum being spine-shaped, and by the colour of the scutellum, which is invariably ferruginous.

48. Colymbetes.

Genus XLVIII. Colymbetes. Clairville.
Dytiscus. Linn. Fabr. Gyll.
Dyticus. Latreille.
Scutellum distinct; anterior tarsi of the male dilated, but not patelliform; elytra of the female not sulcated; exterior maxillary palpi with the last joint longer than the one before it.

Bupustulatus.

Sp. 1. *Bupustulatus.* Oval, depressed, black; finely striated above the elytra with impressed points, which are obsolete; antennæ labrum, two frontal spots; anterior tibiæ and tarsi obscure red; eyes gray.
Dytiscus bipustulatus. Linn. Fabr.
Dyticus bipustulatus. Latr.
Dytiscus carbonarius. Gyll.
Inhabits the European waters every where.

49. Laccophilus.

Genus XLIX. Laccophilus. Leach.
Dytiscus. Linn. Marsh. Gyll.
Scutellum, none. Antennæ, setataceous. Palpi, filiform.

Minutus.

Sp. 1. *Minutus.* Greenish-testaceous; legs yellowish.
Dytiscus Minutus. Linn. Marsh. Gyll.
Laccophilus Minutus. Leach.
Inhabits stagnant waters.

50. Noterus.

Genus L. Noterus. Clairv. Latr.
Dytiscus. Fabr. Marsh.
Dyticus. Latr.
Scutellum, none. Antennæ, with a fifth or seventh joint dilated. Labial palpi, bifurcate.

Crassicornis.

Sp. 1. *Crassicornis.* Oval, convex, brown; head and thorax ferruginous; elytra sprinkled with impressed dots; antennæ of the male thick.
Dytiscus crassicornis. Fabr. Oliv.
Dyticus crassicornis. Latr.
Inhabits Germany and France. Thorax in each sex, with margined sides, with an impressed longitudinal line.

B. The four anterior tarsi, with four joints; no scutellum.

51. Hydroporus.

Genus LI. Hydroporus. Clairville.
Hyphydrus. Illig. Duméril.
Dytiscus. Marsh.
Body oval; the breadth exceeding the height.

Fusculus.

Sp. 1. *Fusculus.* Oval, plain, black, pubescent, finely punctulated; elytra fuscous; antennæ, feet, shoulders and external margins of the elytra, rufous.
Dytiscus fusculus. Illiger. Latr.
Inhabits the waters of Europe.

52. Hyphydrus.

Genus LII. Hyphydrus. Illig. Clairville.
Hydrachna. Fabr.
Dytiscus. Linn. Marsh.
Body nearly globose; the height exceeding the breadth.

Ferrugineus.

Sp. 1. *Ferrugineus.* Obscure ferruginous, impunctate; the base of the elytra with an impression at the base of the suture.
Dytiscus ovatus. Linn.
Hydrachna gibba. Fabr.
Hyphydrus ferrugineus. Latr.
Inhabits Europe.
Dytiscus ovalis of Illiger, *Hydrachna ovalis* of Fabricius, differs from the above species, in having a more shining colour, in having the elytra darker and distinctly and widely punctured. May not the above be but sexual distinctions? Such is the opinion of Dr Leach, who could never find the sexes of each kind.

C. All the tarsi five-jointed; the first joint largest; with a scutellum.

53. Pælobius.

Genus LIII. Pælobius. Schönher, Leach.
Hygrobia. Clairville.
Hyphydrus. Latreille.
Dytiscus. Marsham.
Hydrachna. Fabricius.
Antennæ with the first joint longer and thicker than the rest.

Hermanni.

Sp. 1. *Hermanni.* Black; head, transverse band on the thorax; base and border of the elytra and feet ferruginous.
Dytiscus Hermanni. Marsh. Oliv.
Hydrachna Hermanni. Fabricius.
Hyphydrus Hermanni. Latr. *Gen. Crust. et Ins.* 1. tab. 6. fig. 5.
Inhabits the marshes of France and England. The last segments of the abdomen, when rubbed against the elytra, produce a noise.

II. External maxillary and labial palpi subulate; hinder thighs covered at their base with a shield-shaped plate.

54. Haliplus.

Genus LIV. Haliplus. Latreille.
Hoplitus. Clairville.
Cnemidotus. Illiger.
Dytiscus. Geoffroy, Marsham.
Scutellum, none; body oval, thick.

Impressus.

Sp. 1. *Impressus.* Yellowish or ferruginous; elytra with some obsolete abbreviated punctured striæ, and with blackish lines and spots.
Inhabits France, England and Germany.

Tribe IV. Gyrinides.

Internal maxillary palpi composed of one part. Antennæ very short. Eyes divides so as to appear as four. Four hinder feet compressed, foliaceous, formed for swimming.

55. Gyrinus.

Genus LV. Gyrinus. Linn. Fabr. Latr. Gyll.

Natator.

Sp. 1. *Natator.* Oval; elytra with punctured striæ; the inflexed margin testaceous.
Gyrinus Natator. Gyll.
Inhabits stagnant waters.

Metabolia.

Tribe V. Buprestides.

Mandibles with their extremities entire. Antennæ filiform or setaceous, often pectinated or serrated. Body convex, not jumping.

I. Palpi filiform.

56. Buprestis. Genus LVI. Buprestis. Linn. Fabr. Latr.

Antennæ filiform, serrated in both sexes. Thorax with the hinder margin applied to the base of the elytra. Body cylindric, linear.

Biguttata. *Sp.* 1. *Biguttata.* Green above, blue-green beneath; scutellum transversely impressed; apex of the elytra serrated; a white villose spot on each side of the suture, and three on the sides of the abdomen.

Buprestis biguttata. Fabr. Oliv. Marsh. Latr.

Inhabits France and Germany. In England it is very rare, but was once observed in very great abundance, by Dr Latham, in Darentwood, Kent.

57. Trachys. Genus LVII. Trachys. Fabr. Gyll.

Antennæ serrated and filiform. Thorax with the hinder margin lobed, and applied to the base of the elytra. Scutellum obsolete. Body short, ovate or triangular.

Minuta. *Sp.* 1. *Minuta.* Coppery-brown above; front impressed; elytra with slightly elevated spaces, and transverse undulating bands of white hair.

Buprestis minuta. Linn. Marsh. Latr.

Trachys minuta. Gyll. Fabr.

Inhabits the nut-tree and elm.

58. Aphanisticus. Genus LVIII. Aphanisticus. Latreille.

Buprestis. Fabricius.

Antennæ massive.

Emarginatus. *Sp.* 1. *Emarginatus.*

Buprestis emarginatus. Fabr.

II. Palpi terminated by a thick joint.

59. Melasis. Genus LIX. Melasis. Oliv. Fabr. Lam.

Elater. Linn.

Tarsi with entire joints.

Flabellicornis. *Sp.* 1. *Flabellicornis.* Obscure blackish; antennæ, tibiæ, and tarsi red-brown; head punctate; thorax rough, with elevated punctures, having an impressed dorsal line; elytra finely rugulose and striated.

Elater buprestoides. Linn.

Melasis flabellicornis. Oliv. Panz. Fabr.

Melasis buprestoides. Latr.

Inhabits Germany and the south of France. In England it has been once taken, by Mr John Curtis of Norwich, a most industrious entomologist.

60. Cerophytum. Genus LX. Cerophytum. Latr.

Tarsi with the last joint bifid.

Elateroides. *Sp.* 1. *Elateroides.*

Tribe VI. Elaterides.

Mandibles notched, or bifid at their extremities. Antennæ filiform. Body leaping. Hinder thighs with a trochanter.

61. Elater. Genus LXI. Elater. Linn. Fabr. Geof. De Geer, Fabr. Oliv. Lam.

Obs. This genus should be divided into several others, but the characters have not yet been developed. In Latreille's *Genera Crustaceorum et Insectorum*, we find several sections, of which we shall give some account. The last joint of the tarsi is not notched. The maxillary palpi much exserted.

* The last joint of the antennæ with the apex so abruptly acuminated as to give the appearance of a twelfth joint.

Ferrugineus. *Sp.* 1. *Ferrugineus.* Antennæ serrated; colour black. Thorax, with the exception of the hinder margin and elytra, red, finely punctated, pubescent; elytra with punctured striæ.

Elater ferrugineus. Linn. Fabr. Oliv. Panz. Marsh.

Inhabits rotten trees, especially willows. In Britain it is very rare. It sometimes occurs in Kent, varies in size, and occasionally is found with the thorax entirely black. This last variety is in Dr Leach's collection.

** Last joint of the antennæ oval or oblong, not abruptly acuminate.

1. Body not linear, but three times as long as broad; abdomen oblong-triangulate.

A. Antennæ (of the male at least) pectinated or serrated.

Castaneus. *Sp.* 2. *Castaneus.* Antennæ of the male pectinated; colour black; head and thorax red-tomentose; elytra yellow punctate-striated; apex black.

Elated Castaneus. Linn. Fabr. Panz.

Inhabits Europe.

B. Antennæ simple; joints conic.

Murinus. *Sp.* 3. *Murinus.* Black-fuscous, clouded with cinereous down; thorax bituberculate; antennæ and tarsi red.

Elater murinus, Linn. Fabr. Marsh.

Inhabits Europe. Is common on thistles.

2. Body linear, nearly four times longer than broad; thorax oblong-quadrate.

Marginatus. *Sp.* 4. *Marginatus.* Black; front retuse; antennæ, sides of the thorax, feet, anus, and hinder margins of the abdominal segments brownish-yellow; suture and outer margin of the elytra, black.

Elater marginatus. Linn. Fabr. Oliv. Marsh.

Inhabits Europe. Is found on various herbaceous plants in fields.

Tribe VII. Telephorides.

Tarsi with the last joint but one bifid. Antennæ filiform, composed of ten joints. Elytra soft, flexible. Thorax nearly quadrate, or semicircular.

62. Atopa. Genus LXII. Atopa, Paykull, Fabricius.

Chrysomela. Linnæus.

Cistela. Olivier.

Crioceris. Marsham.

Dascillus. Latreille.

Maxillary palpi filiform, with the last joint somewhat cylindric; labial palpi not bifurcate. Body ovate. Feet all simple.

Cervina. *Sp.* 1. *Cervina.* Black, with cinereous down; antennæ, feet, and elytra, pale-yellow.

Chrysomela cervina. Linnæus.

Atopa cervina. Paykull, Fabricius.

Dacillus cervinus. Latr. *Gen. Crust. et Ins.* i. 252. tab. 7. fig. 11.

Inhabits Europe.

63. Cyphon. Genus LXIII. Cyphon. Fabricius, Paykull, Gyllenhall.

Elodes. Latreille.

Maxillary palpi filiform, the last joint somewhat cylindric. Labial palpi bifurcate. Body sub-ovate or round-ovate. Feet with their tibiæ simple, and their thighs not thickened.

Pallidus. *Sp.* 1. *Pallidus.* Sub-ovate, pale-red, punctulated, pubescent, eyes, antennæ, with the exception of their base, apex of the elytra, and abdomen, blackish; thorax somewhat semicircular, transverse, lobate behind.

Cyphon pallidus. Fabricius.

Elodes pallida. Latr. *Gen. Crust. et Ins.* i. 253. tab. 7. fig. 12.

Inhabits Europe in moist places.

Fuscescens. *Sp.* 2. *Fuscescens.* Somewhat round-ovate, yellowish-

Metabolia. red-fuscous or blackish, pubescent; thorax short, transverse, anterior margin nearly strait; feet and base of the antennæ reddish.

Elodes fuscescens. Latreille.

Inhabits France, in Petit-Gentilli near Paris.

64. Scirtes. Genus LXIV. Scirtes. Illiger.

Cyphon. Paykull, Fabricius.

Elodes. Latreille.

Chrysomela. Linn. Marsham.

Maxillary palpi filiform, the last joint somewhat cylindric; labial palpi, bifurcate. Body ovate, inclining to round, convex. Feet, with their tibiæ, terminated with a strong spine. Hinder thighs thickened and formed for leaping.

Hemisphærica. *Sp.* 1. *Hemisphærica.* Black, smooth; thorax short, transverse, anterior margin somewhat concave; tibiæ, tarsi, and base of the antennæ, pale fuscous.

Cyphon hæmisphæricus. Fabr. Payk.

Elodes hæmisphærica. Latreille.

Chrysomela hæmisphærica. Marsham, Linn.?

Inhabits France, England, and Sweden.

65. Cupes. Genus LXV. Cupes. Fabricius, Latreille.

Palpi equal, the last joint truncate; maxillary palpi with their joints thick. Antennæ, cylindric, simple. Maxillæ, with a double process, the external linear, internal small. Mandibulæ with their points notched. Lip bifid. Body linear, solid, rigid. Feet short.

Capitata. *Sp.* 1. *Capitata.* Obscure fuscous, head unequal, reddish-yellow.

Cupes capitata. Fabr. Latr. *Gen. Crust. et Ins.* 1. 255. tab. 8. fig. 2.

66. Drilus. Genus LXVI. Drilus. Oliv. Lam. Latr.

Ptilinus. Fabr. Geoffroy.

Cantharis. Marsham.

Maxillary palpi with their apex acute; labial short, somewhat cylindric. Antennæ with their internal edge pectinated. Maxillæ with one process. Mandibles notched at their points. Body soft, anteriorly arcuate, inflexed.

Flavescens. *Sp.* 1. *Flavescens.* Black, pubescent, elytra yellowish.

Drylus flavescens. Oliv. Latr.

Cantharis serraticornis. Marsham.

Inhabits Europe. Is found in Darent Wood, Kent, amongst grass, in tolerable abundance.

67. Lycus. Genus LXVII. Lycus. Fabr. Oliv. Lam.

Cantharis. Linn.

Lampylis. Geoff. Marsh.

Mandibles with their entire end pointed. Antennæ compressed, more or less serrate, inserted near each other. Palpi of the maxillæ, with the last joint somewhat triangular, having their points broader. Head, with the mouth produced into a kind of rostrum. Maxillæ with one process. Elytra nearly of equal breadth. Thorax somewhat quadrate, the anterior margin transverse, strait.

Minutus. *Sp.* 1. *Minutus.* Elytra with four elevated lines; thorax black, with the margins much elevated; last joint of the antennæ reddish.

Lycus minutus. Gyllenhall.

Lampyris pucilla. Marsham.

Inhabits Sweden, Germany, and England in oak trunks. It is certainly De Geer's *Lampyre rouge à corselet tout noir.* Vol. iv. p. 46.

68. Omalisus. Genus LXVIII. Omalisus. Geoff. Oliv. Fabr. Lam.

Mandibles with their apex pointed and entire. Antennæ approximate, the joints cylindric-conic; the second and third smallest. Maxillary palpi with the last joint cylindric-ovate, apex truncate. Head exserted. Maxillæ with one process. Thorax nearly quadrate, a little narrower before, the hinder angles produced and sharp. Body hard. Metabolia.

Suturalis. *Sp.* 1. *Suturalis,* black; thorax with a double excavation or fossula behind; elytra blood-red, with the suture black, deeply punctate-striate.

Omalisus suturalis. Oliv. Fabr. Latr.

Inhabits Germany.

69. Lampyris. Genus LXIX. Lampyris. Linn. Geoff. De Geer, Fabr. Oliv. Lam.

Mandibles pointed at their tips, sharp, and entire. Antennæ approximate, the joints cylindric and compressed, the third of the same length as the following joints, the second small. Head concealed by the thorax. Mouth small. Maxillæ with a double process. Maxillary palpi with the last joint triangular-ovate, compressed, the apex acute. Eyes very large. Body soft, of the male, with elytra and wings; of the female, apterous. Thorax semicircular.

Spendidula. *Sp.* 1. *Spendidula.* Oblong-brown; margin of the thorax livid-yellow, anteriorly with a transparent spot on each side; abdomen with the margins of the segments, anus and feet yellowish; breast reddish.

Lampyris spendidula. Linn. Latr.

Inhabits Europe; has *never* been found in Britain.

70. Telephorus. Genus LXX. Telephorus. Schæf. De Geer, Oliv. Lam. Latr.

Cantharis, Linn. Fabr. Marsh. Gyll.

Mandibles, with their apex acute and entire. Antennæ distant. Joints cylindric, elongate. Maxillæ bifid. Body soft. Palpi, with their last joint securiform. Elytra, the length of the abdomen.

Fuscus. *Sp.* 1. *Fuscus.* Cinereous-black, mouth, base of antennæ, thorax, back of the abdomen, sides of the belly and anus, red; thorax with a black spot.

Cantharis fusca. Linn. Fabr.

Telephorus fuscus. Latr.

Inhabits Europe in the spring and beginning of the summer.

71. Malthinus. Genus LXXI. Malthinus. Latreille.

Cantharis. Linn. Fabr. Marsh.

Telephorus. Oliv. De Geer.

Antennæ distant, joints elongate, cylindric. Maxillæ bifid. Mandibles with their points entire, and very sharp. Body soft. Palpi with their last joint ovate, acute. Elytra shorter than the abdomen. Head attenuated behind more or less.

Ruficollis. *Sp.* 1. *Ruficollis.* Head not very much attenuated behind; thorax not broader than long, distinctly margined behind; body blackish; head black; the two first joints of the antennæ and thorax red; elytra with some obsolete striæ towards the suture, the apex and two pectoral spots yellow; base of the feet, anterior thighs, and tibiæ, and knees of the middle feet, fuscous; middle of the anus reddish.

Malthinus ruficollis. Latr.

Inhabits France.

Marginatus. *Sp.* 2. *Marginatus.* Head but little attenuated behind; thorax broader than long, margined all round; body blackish; base of the antennæ, whole margin of the thorax, and two pectoral spots, red-yellow; elytra somewhat smooth, yellow at their points; base of the feet and knees pale; abdomen with the sides and margins of the segments red-yellowish.

Cantharis biguttata. Panzer.

Inhabits France and Germany.

Flavus. *Sp.* 3. *Flavus.* Head much attenuated behind; thorax not broader than long, margined nearly all round, the middle longitudinally impressed; body yellowish;

Metabolia.

antennæ (base excepted,) vertex, and dorsal mark of the thorax, blackish; elytra with punctured striæ, yellow at their points.

Telephorus minimus. Olivier.

Mallhinus flavus. Latr.

Inhabits France and England, in the oak.

Collaris. *Sp.* 4. *Collaris.* Head much attenuated behind; thorax not broader than long, distinctly margined behind, and with a short impression; body yellowish; antennæ (base excepted,) head behind, middle of the thorax, blackish; elytra smooth, somewhat fuscous, base darker, apex yellow.

Inhabits France.

Tribe VIII. Melyrides.

Tarsi with the last joint but one not bifid. Mandibles notched. Maxillæ bifid. Antennæ filiform, composed of ten joints. Elytra soft, flexible. Thorax quadrate, or semicircular.

72. Melyris. Genus LXXII. Melyris. Fabr. Oliv. Lam. Latr.

Head ovate, much inflected under the thorax. Antennæ with the second and third joints nearly cylindric, the former elongate; the fourth and following joints turbinated or conic. Tarsi with the outer nails beyond the middle beneath distinctly unidentate. Body oval. Thorax somewhat trapeziform, plain, narrower before.

Viridis. *Sp.* 1. *Viridis.* Green, with three elevated lines on each elytron.

Melyris viridis. Fabr. Latr. Oliv.

Inhabits the Cape of Good Hope.

73. Zygia. Genus LXXIII. Zygia. Fabr. Oliv.

Head ovate, much inflexed under the thorax. Antennæ with the second and third joints somewhat cylindric, more slender, the former elongate; the fourth and following joints dentate-serrated, compressed, somewhat transverse. Tarsi with the outer nails beneath under the apex obsoletely unidentate. Body oval. Thorax somewhat trapeziform, anteriorly narrower, the middle elevated.

Oblonga. *Sp.* 1. *Oblonga.* Red; head and elytra blue or blue-green.

Zigia Oblonga. Fabr. Latr. *Gen. Crust. et Ins.* 1. 264. tab. 8. fig. 3.

Inhabits Syria and the kingdom of Murcia in Spain.

74. Dasytes. Genus LXXIV. Dasytes. Payk. Fabr. Latr.

Melyris. Oliv. Lam. Illig.

Head somewhat transverse, retracted within the thorax even to the eyes. Tarsi with nails apparently bifid. Antennæ with short turbinated joints, nearly as broad as long. Lip with the apex deeply notched, almost bifid. Body without papillæ.

Ater. *Sp.* 1. *Ater.* Oblong, black, widely punctate, hairy, the hairs black and cinereous. Head with a double impression in front, which is ovate and roughish.

Dasytes ater. Latr. Fabr.

Melyris ater. Olivier.

Inhabits Europe, amongst grass.

75. Malachius. Genus LXXV. Malachius. Fabr. Oliv. Lam. Latr.

Cantharis. Linn. Marsh.

Telephorus. Schæffer, De Geer.

Head somewhat transverse, retractile even to the eyes within the thorax. Tarsi with apparently bifid nails. Antennæ with conic or cylindric-conic joints, longer than broad, in some few pectinated. Labium with apex entire, or scarcely notched. Body with two papillæ on each side, one under the anterior angle of the thorax, the other at the base of the abdomen.

Metabolia.

Sp. 1. *Æneus.* Brassy-green; head anteriorly red-yellowish; elytra blood-red, with the base and half the suture brassy-green. Æneus.

Malachius æneus. Fabr. Latr. Oliv. Gyll.

Cantharis ænea. Linn. Marsham.

Inhabits Europe.

76. Hylecætus. Genus LXXVI. Hylecætus. Latr.

Cantharis. Linnæus.

Lymexylon. Fabr. Oliv. Paykull.

Antennæ serrated, the fourth, fifth, and following joints nearly equal. Elytra covering the back of the abdomen. Thorax broader than long. Head vertical. Body linear cylindric.

Dermestoides. *Sp.* 1. *Dermestoides.* Pale red; eyes and breast black; or black elytra brown-black or testaceous with a black apex; antennæ, feet, and apex of the abdomen testaceous reddish.

Hylæcatus dermestoides. Latr.

Inhabits Germany.

The sexes of this insect seem to have been considered as distinct species. See Latr. *Gen. Crust. et Ins.* 1. 266.

77. Lymexylon. Genus LXXVII. Lymexylon. Fabr. Oliv. Payk. Latr.

Cantharis. Linn.

Elateroides. Schæff.

Head vertical. Body linear cylindric. Thorax longer than broad, nearly cylindric. Elytra nearly covering the whole elytra. Antennæ simple, somewhat fusiform, the middle joints rather largest.

Navale. *Sp.* 1. *Navale.* Head black; thorax entirely or partly, elytra or their base testaceous; under part of the body and the feet yellowish.

Lymexylon navale. Fabr. Oliv. Latr.

Cantharis navalis of Linnæus, who (as we have already mentioned in our history of entomological writers) wrote a dissertation on this destructive insect. The male, Fabricius has considered as distinct, under the title of *Lymexylon flavipes.*

Inhabits in the oak of Europe, which it destroys.

78. Atractocerus. Genus LXXVIII. Atractocerus. Palissot-Beauvois, Latr.

Necydalis. Linn.

Lymexylon. Fabr.

Head vertical. Body linear, cylindric. Thorax nearly quadrate. Elytra very short. Antennæ simple, somewhat fusiform, the middle joints somewhat largest.

Necydaloides. *Sp.* 1. *Necydaloides.* Head and thorax fuscous, with a longitudinal yellowish line.

Atractocerus necydaloides. Palissot-Beauvois, Latr.

Necydalis brevicornis. Linn.

Lymexylon abbreviatum. Fabr.

Inhabits Guinea.

Tribe IX. Tillides.

Antennæ thicker at their extremities, serrated in some, solid in others. Elytra covering the whole abdomen. Body cylindric. Thorax narrow behind.

Family I. *Tillida.*

Tarsi, with the first joint very apparent, longer than the one before it.

79. Enoplium. Genus LXXIX. Enoplium. Latreille.

Tillus. Oliv. Panz. Fabr.

Dermestes. Rossi.

Palpi filiform. Antennæ, with the three last joints much dilated, serrated. Thorax nearly quadrate.

Serraticorne. *Sp.* 1. *Serraticorne.* Black. Elytra testaceous.

Metabolia. *Dermestes dentatus.* Rossi.
Tillus serraticornis. Olivier.
Enoplium serraticorne. Latreille.
Inhabits Italy.
Sp. 2. *Weberi.* Black. Thorax red. Elytra blue.
Tillus Weberi. Fabr.
Enoplium Weberi. Latreille.
Inhabits Germany.

80. Tillus. Genus LXXX. Tillus. Oliv. Fabr. Marsh. Latr.
Chrysomela. Linnæus.
Clerus. Fabricius, Olivier.
Maxillary palpi filiform. Labial palpi securiform. Antennæ nearly completely serrated. Thorax cylindric, or somewhat cordate.

* Thorax cylindric.

Elongatus. *Sp.* 1. *Elongatus.* Black, villous. Thorax red, black before.
Tillus elongatus. Fabr. Marsh. Oliv. Latr.
Chrysomela elongata. Linnæus.
Inhabit rotten trees.
T. ambulans is a mere variety of this species.

** Thorax subcordate.

Unifasciatus. *Sp.* 2. *Unifasciatus.* Black, pubescent. Elytra red at their base, with a white transverse band in the middle.
Clerus unifasciatus. Fabr. Oliv.
Tillus unifasciatus. Latr.
Inhabits France, Germany, and England.

81. Thanasimus. Genus LXXXI. Thanasimus. Latreille.
Clerus. Geoff. De Geer, Fabr. Oliv.
Attelabus. Linnæus.
Cleroides. Schæffer.
Maxillary palpi filiform. Labial palpi securiform. Antennæ with their extremities thick, and not serrated. Thorax somewhat cordate.

Formicarius. *Sp.* 1. *Formicarius.* Black. Thorax and base of the elytra red. Elytra, with two white transverse bands.
Attelabus formicarius. Linnæus.
Clerus formicarius. Fabricius, Olivier, Marsham.
Clerus fasciatus. Fourcroy.
Inhabits Europe in trees.

Family II. *Clerida.*

Tarsi, with the first joint very short, the upper part concealed by the base of the second articulation.

82. Opilus. Genus LXXXII. Opilus. Latreille.
Attelabus. Linnæus.
Clerus. Geoffroy, De Geer, Olivier.
Notoxus. Fabricius.
Eupocus. Illiger.
Palpi securiform. Antennæ with the ninth and tenth joints obconic, the last oval, obliquely truncate. Eyes not notched. Thorax conic-cylindric, narrower behind.

Mollis. *Sp.* 1. *Mollis.* Fuscous, villous. Base and apex of the elytra, and a middle transverse band, with the under part of the thighs yellowish gray. Abdomen red.
Notoxus mollis. Fabricius.
Clerus mollis. Oliv. Marsh.
Eupocus mollis. Illiger.
Attelabus mollis. Linnæus.
Opilus mollis. Latreille.
Inhabits Europe, under the bark of trees, especially of willows, eating the larvæ of other insects.

83. Clerus. Genus LXXXIII. Clerus. Geoff. Oliv. Lam. Latr.
Attelabus. Linnæus.
Trichodes. Herbst, Fabricius.
Maxillary palpi terminated by an obconic joint. Labial palpi, with the last joint securiform. Antennæ, with the three last joints forming an oblong triangular mass, externally rounded, internally accuminate. Eyes notched. Thorax conic-cylindric.

Metabolia. Apiarius. *Sp.* 1. *Apiarius.* Blue, hairy. Elytra red, with three transverse black blue bands.
Attelabus apiarius. Linnæus.
Trichodes apiarius. Fabricius.
Clarion apivore. De Geer, Geoff.
Inhabits the nest of bees. Mr Marsham has introduced this into the British *Fauna*, apparently without the least authority.

84. Necrobia. Genus LXXXIV. Necrobia. Latreille, Olivier.
Dermestes. Linnæus.
Clerus. Geoffroy, De Geer, Marsham.
Corynetes. Paykull, Fabricius.
Palpi terminated with an obconic joint. Antennæ, with the three last joints forming an oblong triangulate mass, obtuse both externally and internally.

Sp. 1. *Ruficollis.* Blue-black; thorax and base of elytra red.
Dermestes ruficollis. Linn.
Corynetes ruficollis. Fabr.
Inhabits Europe.

Tribe X. Silphides.

Antennæ gradually thickening towards their extremities, or terminated by a solid or perfoliated club. Elytra covering the greater portion of the abdomen. Body oval, or parallelopiped.

Family I. *Silphida.*

Palpi very distinct. Mandibles, with their apex entire.

85. Necrophagus. Genus LXXXV. Necrophagus. Fabr. Oliv. Lam.
Silpha. Linn. De Geer, Marsh.
Dermestes. Geoffroy.
Antennæ not much longer than the head, terminated abruptly in a perfoliated knob. Elytra truncated in a strait line, the external margin not canalled or keeled. Body long, quadrate.

Spinipes. *Sp.* 1. *Spinipes.* Black. Antennæ ferruginous at their points. Elytra with their external margin, and a double transverse undulated band of orange. Trochanters of hinder thighs produced into a spine.
Inhabits France and England.
Necrophorus vespillo is readily distinguished from this species, by not having the trochanters produced into a spine.

86. Silpha. Genus LXXXVI. Silpha. Linn. Fabr. De Geer, Oliv. Lam. Latr. Marsh.
Peltis. Geoffroy.
Silpha, Necrodes, Oiceoptoma, Thanatophilus. Leach.
Antennæ a little longer than the thorax. Elytra with an external margin. Body more or less oval. Maxillary palpi terminated by a joint, thinner than the one before it.

* Body elongate, oval. Thorax orbicular. Apex of elytra obliquely truncate. Hinder thighs of the male thicker than the rest.
Genus Necrodes. Wilkin's MSS. Leach.
Obs. Kirby, Spence, Leach, and Wilkin, about the same time, considered this section as constituting a peculiar genus. We have adopted that name proposed by Mr Wilkin, as preferable to any other proposed by the above gentlemen.

Litteralis. *Sp.* 1. *Littoralis.* Black. Antennæ, with the three last joints ferruginous. Elytra with three elevated lines, the two external ones connected by a tubercle. Hinder tibiæ of the male arcuate; thighs of the same sex toothed.
Silpha littoralis. Linn. Fabr. Latr. Oliv. Marsh.

Metabolia.

Necrodes littoralis. Leach.

Inhabits dead bodies, especially on the borders of lakes, or on the shores of the sea.

Curtisi. *Sp.* 2. *Curtisi.* Black. Antennæ, with the three last joints ferruginous. Elytra with three elevated lines, the two external ones connected by a tubercle. Hinder tibiæ of the male straight; thighs of the same sex not dentate.

Necrodes curtisi. Leach.

Inhabits Britain with the other species, but is more abundant, and is not so large by one half.

** Body oval. Thorax nearly semicircular, transverse, emarginate before. (Elytra of the female entire.†) Antennæ with the club abrupt, distinct.

GENUS OICEOPTOMA. Leach.

Thoracica. *Sp.* 3. *Thoracica.* Black. Thorax unequal, ferruginous, somewhat silky. Each elytron with three elevated lines.

Silpha thoracica. Linn. Fabr. Latr. Marsh.

Inhabits Europe, in dead animals and putrid fungi.

*** Body oval. Thorax nearly semicircular, truncate in front. Antennæ with a gradually formed club.

Obscura. *Sp.* 4. *Obscura.* Black, dull above, finely punctate, shining beneath. Thorax smoothly punctate, the punctures small and close. Each elytron with three elevated straight lines.

Silpha obscura. Linn. Latr. Marsh.

Inhabits Europe. Is very common on path ways in the spring and summer.

87. AGYRTES. GENUS LXXXVII. AGYRTES. Frölich, Latreille.

MYCETOPHAGUS. Fabricius, Paykull, Panzer.

Antennæ a little longer than the thorax. Palpi maxillary, with the last joint thicker than the preceding joint.

Castaneus. *Sp.* 1. *Castaneus.* Shining, smooth, mouth and soles of the feet villose. Head and thorax black, smooth, widely and minutely punctulated. Mouth, antennæ, elytra, and feet, deep castaneous. Scutellum triangular, punctulated at the base, smooth at the apex, sides equal. Elytra striated, the striæ punctated, ten in each. Body beneath brown black, apex of the abdomen paler. Feet villose. Tibiæ with little spines and ciliæ. Length two lines and a quarter.

Agyrtes castaneus. Frölich, Latreille.

Mycetophagus castaneus. Fabricius, Paykull.

Mycetophagus spinipes. Panzer.

Inhabits France, Germany, England, and Sweden.

FAMILY II. *Nitidulida.*

Palpi very distinct. Mandibles notched at their extremities.

88. SCAPHIDIUM. GENUS LXXXVIII. SCAPHIDIUM. Oliv. Payk. Fabr. Latr. Marsh.

Antennæ, with an abrupt club composed of five somewhat hemispheric joints. Body acuminated at each extremity. Elytra truncated. Palpi filiform. Scutellum distinct.

Quadrimaculatum. *Sp.* 1. *Quadrimaculatum.* Body black, shining. Thorax somewhat coarctate on each side behind. Elytra widely punctured, with two blood red spots on each. Tibiæ striated.

Scaphidium quadrimaculatum. Fabr. Oliv. Paykull, Marsh. Latr.

Inhabits fungi and rotten wood, in Germany, France, and England.

GENUS LXXXIX. SCAPHISOMA. Leach. Metabolia.

SCAPHIDIUM. Fabricius, Latreille, Olivier. 89. SCAPHISOMA.

Antennæ, with a club composed of five somewhat oval joints. Body acuminate at each extremity. Elytra truncated. Palpi filiform. Scutellum none.

Obs. The hinder margin of the thorax at the middle produced into an angle.

Agaricinum. *Sp.* 1. *Agaricinum.* Body black, shining, very smooth. Antennæ, apex of the elytra, and feet, pale brown.

Schaphidium agaricinum. Fabr. Latr. Oliv. Panzer.

Scaphisoma agaricina. Leach's MSS.

Inhabits the *Boletus versicolor*, and other fungi.

GENUS XC. CHOLERA. Latreille, Spence. 90. CHOLERA.

CATOPS. Fabricius, Paykull, Gyllenhall.

PTOMOPHAGUS. Illiger.

MORDELLA. Forster, Marsham.

HELOPS. Panzer.

CISTELA. Olivier, Fabricius.

LUPERUS. Frölich.

DERMESTES. Rossi.

Antennæ straight, with a five-jointed club. Maxillary palpi with the last joint subulate, conic. Labial palpi with last joint obtuse.

Obs. This genus has afforded the subject of a learned and interesting monogragh, by W. Spence, Esq. published by the Linnæan Society in the eleventh volume of their Transactions, to which we refer the reader for descriptions of the species.

Oblonga. *Sp.* 1. *Oblonga.* Narrow, oblong. Thorax narrower behind, the hinder angles obtuse, the middle slightly foveolated. Antennæ somewhat filiform.

Cistela augustata. Fabricius.

Choleva oblonga. Latreille, Spence.

Catopes elongatus. Paykull, Gyllenhall.

Ptomophagus rufescens. Illiger.

Mordella picea. Marsham.

Laperus cisteloides. Frölich,

Inhabits moss, and under stones.

GENUS XCI. MYLÆCHUS. Latreille. 91. MYLÆCHUS.

CATOPS. Paykull.

CHOLEVA. Spence.

Antennæ incurved, shorter than the thorax, the basal joints distinctly thicker than the rest; club five-jointed, the joints transverse. Palpi of the maxilla, with the last joint subulate. Labial palpi, with the last joint obtuse.

Brunneus. *Sp.* 1. *Brunneus.* Oblong-ovate, black-brown, finely but widely punctate, slightly pubescent.

Catops brevicornis. Paykull.

Mylæchus Brunneus. Latreille, *Gen. Crust. et Ins.* vol. ii. p. 30. tab. 8. fig. 11.

Choleva brunnea. Spence.

Inhabits France, Sweden, and England, in which latter country it has occurred but twice.

GENUS XCII. CRYPTOPHAGUS. Herbst, Paykull, Gyllenhall. 92. CRYPTOPHAGUS.

IPS. Olivier, Latreille.

DERMESTES. Fabricius, Scopoli, Panzer.

Body depressed, back plain. Tarsi with elongate slender joints. Antennæ with a compact three-jointed club.

Cellaris. *Sp.* 1. *Cellaris.* Testaceous ferrugineous, widely punctate, pubescent. Thorax finely denticulated, on each side distinctly unidentate, anterior angles dilated, rounded, ending behind in an obsolete tooth.

Ips cellaris. Olivier, Latreille.

† The genus THANATOPHILUS of Leach, which contains *Silpha sinuata* of Fabricius, differs from this division merely in having the apex of the elytra of the female deeply notched; we have therefore not adopted it.

Metabolia.

Dermestes cellaris. Scopoli.
Cryptophagus cellaris. Paykull, Gyllenhall.
Cryptophagus crenatus. Herbst.
Dermestes fungorum. Panzer.
Inhabits houses. It varies with black elytra, having the shoulders ferruginous.

93. Engis.

Genus XCIII. Engis, Paykull, Fabricius, Gyllenhall.
Ips. Herbst.
Erotylus. Olivier.
Dacne. Latreille.
Body depressed, back plain. Antennæ with a three-jointed, much perfoliated club. Tarsi with the three first joints short.

Humeralis.

Sp. 1. *Humeralis.* Elliptic, black, shining, punctate; antennæ, head, thorax, humeral spot on the elytra and feet red, approaching to blood-red.
Engis humeralis. Paykull, Fabricius, Gyllenhall.
Ips humeralis. Herbst.
Dacne humeralis. Latreille.
Inhabits Europe, under the bark of trees and in Boleti. *Nitidula rufifrons* of Marsham is scarcely distinct.

94. Calobicus.

Genus XCIV. Calobicus. Latreille.
Nitidula. Rossi.
Dermestes. Fabricius, Paykull.
Body depressed; back plain. Antennæ with a two-jointed club. Mouth covered as with a hood.

Marginatus.

Sp. 1. *Marginatus.* Elongate-oval, obscure blackish; antennæ, margins of the head, thorax, and elytra, fuscous-ferruginous; elytra with punctured striæ.
Nitidula hirta. Rossi.
Colobicus marginatus. Latreille.
Inhabits the south of France, under the bark of trees. Length two lines.

95. Thymalus.

Genus XCV. Thymalus. Latreille.
Peltis. Kugellan, Illiger, Paykull, Fabricius.
Ostoma. Laicharting.
Body depressed; back plain. Tarsi with the third joint neither bifid nor dilated. Palpi terminated by a thick joint. Mandibles prominent. Antennæ with a three-jointed club.

Ferrugineus.

Sp. 1. *Ferrugineus.* Fuscous-castaneous, with a paler border; thorax with impressed punctures; elytra with six elevated lines on each, three of which are punctulated; the interstices with a double series of excavated punctures.
Peltis ferruginea. Kugellan, Fabricius, Illiger.
Thymalus ferrugineus. Latreille.
Inhabits northern Europe, under the bark of trees.

96. Nitidula.

Genus XCVI. Nitidula. Linn. Fabr. Payk. Oliv. Latr.
Mandibles prominent. Body short, depressed; back plain. Thorax generally broad. Antennæ with the third joint twice as long as the second; club abrupt and orbicular, composed of three joints.

Bipustulata.

Sp. 1. *Bipustulata.* Body elliptic, brown-blackish; thorax emarginate; elytra with a red spot on each.
Nitidula bipustulata. Linn. Latr. Fabr.
Inhabits dead carcasses and Boleti.

97. Ips.

Genus XCVII. Ips. Fabricius, Herbst, Gyllenhall.
Nitidula. Latreille.
Mandibles prominent, strong, and much bent at their points. Body elongate-quadrate; back plain. Thorax transverse-quadrate. Antennæ with the third joint twice as long as the second; club abrupt and orbicular, composed of three joints.

Metabolia.

Sp. 1. *Ferruginea.* Red-castaneous punctate; the punctures of the elytra running together at the suture; mandibles black at their points.
Ips ferruginea. Fabr. Payk. Panz.
Nitidula linearis. Latreille.
Inhabits Europe.

Ferruginea.

98. Biturus.

Genus XCVIII. Biturus. Latr.
Ips. Olivier.
Dermestes. Geoffroy, De Geer, Fabricius.
Antennæ with the third joint not twice as long as the following joint; club composed of three joints. Mandibles prominent. Body oval or oblong; back plain. Thorax broad behind, with the angles pointed. Elytra covering the abdomen.

Tomentosus.

Sp. 1. *Tomentosus.* Antennæ shorter than the thorax; thorax short, the posterior angles broadly depressed, reflected; body oval, black, with a reddish-yellow down; antennæ and feet yellow-red.
Dermestes tomentosus. Fabr. Illig. Payk.
Dermestes fumatus. Herbst.
Byturus tomentosus. Latreille.
Inhabits Europe, on the flowers of the ranunculus, rose, &c.

99. Cateretes.

Genus XCIX. Cateretes. Herbst, Illiger.
Brachypterus. Kugellan.
Dermestes. Linn. Fabr.
Strongylus. Herbst.
Nitidula. Olivier.
Antennæ with the third and following joint scarcely different in length; club compressed, perfoliate, obconic, composed of three joints. Thorax rounded, without angles behind. Elytra very short. Body depressed back plain. Mandibles prominent.

Family III. *Micropeplida.*

Labial palpi scarcely distinct. Antennæ placed in an excavation of the thorax. Mandibles with their apex arcuate and acute.

100. Micropeplus.

Genus C. Micropeplus.
Antennæ with the club composed of but one joint. Maxillary palpi with the last joint subulate.

Porcatus.

Sp. 1. *Porcatus.* Black; elytra cancellated.
Staphylinus porcatus. Paykull.
Inhabits sandy ground.

Tribe XI. Staphylinides.*

Antennæ gradually thickening towards their extremities, or terminated by a perfoliated mass. Elytra covering about half the abdomen, or less, but very rarely more. Body long, and more or less narrow.

Division I.

Anterior margin of the head (bearing the mandibles) immediately behind the eyes, terminated by a transverse straight line, (or with a line slightly bent in the middle,) not rounded or crooked at their sides. Antennæ inserted below the middle part of the above-mentioned line. Thorax long. Neck distinct. Body very long and narrow. Elytra covering a very small portion of the abdomen.

101. Astrapæus.

Genus CI. Astrapæus. Gravenherst, Latreille.
Staphylinus. Fabricius, Olivier, Rossi.
Palpi terminated with a joint nearly securiform. Antennæ nearly filiform, distinctly longer than the head,

* Gravenherst has written an admirable monograph on this tribe, entitled, *Monographia Coleopterorum Micropterorum.* Kirby, the illustrious author of *Monographia Apum Angliæ*, is about to publish a paper on this interesting tribe of insects.

Metabolia. with somewhat globose-conic joints. Lip slightly emarginate.

Ulmi. *Sp.* 1. *Ulmi.* Black, shining; mouth, two basal joints of the antennæ, nearly the whole of the last joint but one of the abdomen, the elytra (the suture excepted,) reddish-brownish; thorax very smooth, with one or two impressions; elytra with four dots arranged longitudinally in their middle.

Astrapæus ulmi. Gravenherst, Latreille.
Staphylinus ulmi. Rossi.
Staphylinus ulmineus. Fabricius.
Inhabits Italy and the south of France under the bark of the elm.

10. STAPHYLINUS. GENUS CII. STAPHYLINUS. Linn. Fabr. Latr. Oliv. Lam. Graven.

Palpi filiform. Antennæ towards their extremities distinctly thicker, moniliform, the last joint obliquely truncate or emarginate. Lip deeply emarginate.

Erythropterus. *Sp.* 1. *Erythropterus.* Black; the greater part of the antennæ, elytra, and feet, red; hinder margins of the head and thorax, the breast and a double series of spots on each side of the abdomen, golden yellow tomentose.

Staphylinus erythropterus. Linn. Latr. Fabr. Grav.
Inhabits Europe in dung.

Politus. *Sp.* 2. *Politus.* Black; head and thorax brassy-black; head ovate, narrower than the thorax, impressed with some distant dots: thorax with six or eight impressed dots, placed in a double longitudinal series; elytra darker, nearly smooth.

Staphylinus politus. Gravenherst, Latreille.
Inhabits dung.

103. LATHROBIUM. GENUS CIII. LATHROBIUM. Gravenherst, Latreille.
PÆDERUS. Gravenherst, Fabricius, Olivier.
STAPHYLINUS. Linnæus, Geoffroy.

Palpi subulate, with the last joint acicular and minute. Antennæ nearly filiform, joints nearly conic, those towards the extremities more rounded, and somewhat globose. Lip deeply notched, nearly bilobate.

Elongatum. *Sp.* 1. *Elongatum.* Pubescent, minutely but widely punctated, black, shining; with the mouth, antennæ, and apex of the elytra and feet, red-brown; head ovate; antennæ about the length of the thorax, with the outermost joints nearly globose; thorax elongate-quadrate, with obtuse angles, the breasts equal, the middle dorsal line smooth.

Lathrobium elongatum. Gravenherst, Latreille.
Staphylinus elongatus. Linnæus.
Pæderus elongatus. Fabricius.
Inhabits putrid vegetables, and under stones.

Ruficorne. *Sp.* 2. *Ruficorne.* Black-fuscous, pubescent, widely but finely punctate; mouth, antennæ and thorax, red; elytra and feet yellow-red; antennæ moniliform; thorax quadrate; dorsal line smooth.

Pæderus bicolor. Gravenherst, Olivier.
Lathrobium ruficorne. Latreille.
Inhabits France under stones.

DIVISION II.

Anterior margin of the head circumscribed by a curved line, the antennæ inserted on this side of the level of the line. Elytra covering half the abdomen or more. Thorax generally longer than broad, or with equal diameters.

Subdivision 1.

Maxillary palpi longer than the labial one, with their extremities thickest; the last joint obscure. Body linear. Head with a distinct neck. Thorax orbicular or cylindric. Metabolia.

104. PÆDERUS. GENUS CIV. PÆDERUS. Fabr. Oliv. Latr. Payk. Lam. Graven.

STAPHYLINUS. Linnæus, Geoffroy, De Geer.

Antennæ inserted before the eyes, insensibly thickening towards their extremities; the third joint very long. Eyes moderately large.

Riparius. *Sp.* 1. *Riparius.* Body red, shining; head, antennæ (four basal joints excepted,) apex of the abdomen, and knees, black; elytra blue, with wide impressed dots.

Pæderus riparius. Fabr. Latr. Oliv. Graven.
Staphylinus riparius. Linnæus.
Inhabits banks and beneath stones.

105. STENUS. GENUS CV. STENUS. Latr. Cuv. Lam. Fabr. Payk. Grav.

STAPHYLINUS. Linn. Marsh.
PÆDERUS. Olivier.

Antennæ inserted at the interior margin of the eyes, abruptly thicker at their extremities, the inferior joints cylindric, the outer ones conic-globose. Eyes nearly globose, large.

Biguttatus. *Sp.* 1. *Biguttatus.* Black, with grey down, minutely punctate, somewhat rugulose; vertex of the head with an elevated line; thorax behind with an impressed little line; each elytron with a reddish round spot.

Staphylinus guttatus. Linnæus, Marsham.
Stenus Biguttatus. Fabr. Payk. Grav. Latr.
Inhabits Europe in moist places near water, as on the banks of streams or ponds.

Subdivision 2.

Maxillary palpi not much longer than the labial, not thicker at their extremities; the last joint distinct.

A. Mandibles strong, with their internal edge with one or more teeth. Head free.

a. The second, third, and fourth joints of the tarsi very short; the last joint as long as the others united.

106. OXYPORUS. GENUS CVI. OXYPORUS. Fab. Oliv. Lam. Grav. Latr.

STAPHYLINUS. Linn. Geoff. De Geer.

Antennæ scarcely longer than the head, terminated by a perfoliated mass. Maxillary palpi filiform; the labial ones terminated by a very large lunate joint. Thorax semicircular. Head broader than the thorax.

Rufus. *Sp.* 1. *Rufus.* Red; suture and apex of the elytra, anus and breast, black.

Oxyporus rufus. Fabr. Latr. Grav. Oliv.
Staphylinus rufus. Linn.
Inhabits boleti and other fungi.

107. OXYTELUS. GENUS CVII. OXYTELUS. Grav. Latreille.

Antennæ somewhat broken, incurved, thicker externally, with the last joints foliate above; the extreme joint globose ovate; the basal joint very long conic. Palpi subulate. Anterior tibiæ very spiny, with their extremities notched or narrowed externally, with their tarsi capable of being reflected from their sides.

Carinatus. *Sp.* 1. *Carinatus.* Black, shining, distinctly and widely impresso-punctate, front unequal, somewhat inclined to be rugulose, the anterior space between the eyes rather smooth; thorax impressed on each side; the middle with three grooves and four carinæ; the two middle ones joining together; feet blackish; tibiæ with very short little spines.

Oxytelus carinatus. Gravenherst, Latreille.
Inhabits the dung of men and other mammalia.

108. OMALIUM. GENUS CVIII. OMALIUM. Gravenherst, Latreille.
STAPHYLINUS. Geoffroy, Fabricius, Olivier.

Metabolia. Palpi filiform. Antennæ thicker towards their extremities, the last joints rounded, somewhat perfoliate. Thorax transverse quadrate, the anterior angles rounded.

Rivulare. *Sp.* 1. *Rivulare.* Blackish, punctate; base of the antennæ and feet pale brown; head with two impressions between the eyes; thorax marginated, impressed at the hinder angles, back with two grooves; elytra twice as long as the thorax; obscure brown.

Omalium rivulare. Graven. Latr.

Staphylinus rivularis. Paykull.

Inhabits France and England.

b. Tarsi with elongate joints, the last joint shorter than the others united.

108. Anthophagus. Genus CIX. Anthophagus. Graven.

Staphylinus. Fabr. Paykull, Olivier.

Carabus. Panzer, Marsham.

Antennæ nearly filiform, the second and following joints obconic. Palpi filiform. Thorax elongate, somewhat cordiform, narrow and truncate behind.

Punctulatus. *Sp.* 1. *Punctulatus.* Black fuscous, somewhat smooth, minutely and finely punctate; antennæ and feet obscure rufous.

Carabus dimidiatus. Panzer.

Carabus staphylinoides. Marsham.

Lestiva punctulata. Latreille, *Gen. Crust et Ins.* i. p. 297, tab. 9. fig. 1.

Inhabits France and England; in the last country it must be considered as of very rare occurrence.

110. Proteinus. Genus CX. Proteinus. Latreille.

Antennæ evidently thicker towards their extremities. Palpi subulate. Thorax transverse.

Brachypterus. *Sp.* 1. *Brachypterus.* Depressed, flat, black, shining, smooth, silky above; mandibles, basal joint of the antennæ, and feet, brown red; head a little narrower than the thorax, triangular; thorax short, smooth, anteriorly a little narrower, the sides somewhat rounded, very slightly margined, the hinder margin twice as broad as long, the angles slightly prominent and somewhat reddish; scutellum very small; elytra elongate quadrate, externally marginate; the hinder and external margins rounded; abdomen with the four last joints naked.

Proteinus brachypterus. Latr.

Inhabits France and England.

B. Mandibles without denticulations on their internal edge. Head inserted into the thorax more or less.

a Antennæ wide apart, inserted before the eyes the fifth and following joints, longer than broad. Tibiæ spinose.

111. Tachinus. Genus CXI. Tachinus. Graven. Latr.

Oxyporus. Fabricius.

Staphylinus. Linné, Geoffroy, Olivier, Paykull.

Palpi filiform.

Rufipes. *Sp.* 1. *Rufipes.* Black, shining, smooth; antennæ fuscous; elytra and feet generally brown; external apex of the elytra paler.

Staphylinus rufipes. Paykull.

Tachinus rufipes. Grav. Latr.

Oxyporus rufipes. Fabricius?

Inhabits the dung of oxen and horses.

112. Tachyporus. Genus CXII. Tachyporus. Grav. Latr.

Staphylinus. Linn. Oliv. Geoff. Marsh.

Oxyporus. Fabricius.

Palpi subulate.

Chrysomelinus. *Sp.* 1. *Chrysomelinus.* Black, shining, smooth; thorax, elytra (base excepted), and feet, red yellow; thorax somewhat transverse; abdomen with the extremity truncate.

Tachyporus chrysomelinus. Grav. Latr.

Oxyporus chrysomelinus. Fabr.

Staphylinus chrysomelinus. Linn. Marsh.

Inhabits flowers, the roots of grass, and moss.

b. Antennæ more or less approximate, inserted at the anterior internal margin of the eye, fifth and following joints broader than long. Tibiæ not spiny.

113. Aleochara. Genus CXIII. Aleochara. Knoch, Graven. Latreille.

Staphylinus. Linn. Fabr. Geoff. De Geer, Oliv. Marsh

Head with the hinder part received into the thorax.

Obs. This genus certainly should be divided into three or more genera.

* Head about as broad as the thorax, somewhat triangular; neck distinct, but not very slender; thorax quadrate, with rounded angles in some; somewhat orbiculate, as broad as the elytra behind in others.

Canaliculata. *Sp.* 1. *Canaliculata.* Red fuscous, feet paler; head and the two last joints, save one of the abdomen, black; elytra together transverse quadrate; back of the thorax excavated with an impressed longitudinal line in the middle.

Aleochara canaliculata. Grav. Latr.

Staphylinus canaliculatus. Fabr.

Inhabits sandy banks and under stones.

** Head globose, behind removed from the thorax with a very distinct slender neck; thorax somewhat globose, or somewhat cordate, rounded before, narrow, truncated behind, and narrower than the elytra.

Impressa. *Sp.* 2. *Impressa.* Reddish, head black, thorax with three lines, and with two impressions behind; base of the elytra with two little impressed lines.

Aleochara impressa. Grav. Latr.

Inhabits Agarics and Boleti.

114. Lomechusa. Genus CXIV. Lomechusa. Grav. Latr.

Head disengaged from the thorax behind, with an inconspicuous neck or none. Thorax transverse, the sides rounded. Antennæ distinctly perfoliated.

Bipunctata. *Sp.* 1 *Bipunctata.* Black, somewhat silky, thorax convex; elytra conjoined transverse quadrate, with a blood red spot in each; feet, hinder margin of the posterior segments of the abdomen, and anus, red brown.

Aleochara bipunctata. Latreille.

Inhabits horse dung.

Obs. In a natural arrangement of the genera, Pselaphus should probably be placed after *Lomechusa*, but in the present infant state of our knowledge, we must keep that genus in the section Dimera.

Tribe XII. Scydmænides.

Body ovoid, rounded at each extremity. Palpi very long. Tarsi short. Elytra hard, covering the abdomen. Antennæ gradually thicker towards their extremities.

115. Mastagus. Genus CXV. Mastagus. Hoffmansegg, Latreille, Hellwigg.

Ptinus. Fabricius, Olivier.

Antennæ filiform, (or nearly so), composed of long joints, geniculated. Maxillary palpi with the two last joints forming an oval mass.

Palpalis. *Sp.* 1. *Palpalis.* black.

Inhabits Portugal; was discovered by Count Hoffmansegg. In Dr Leach's possession there are two specimens which were said to have been taken in Britain.

116. Scydmænus. Genus CXVI. Scydmænus. Latreille.

Metabolia.

PSELAPHUS. Illiger, Paykull.
ANTHICUS. Fabricius.
Antennæ gradually thickening towards their extremities. Maxillary palpi terminated by an acicular obscure joint.

Hellwigii. *Sp.* 1. *Hellwigii.* Last joint of the maxillary palpi obsolete; three last joints of the antennæ forming a club. Thorax ovate. Body fuscous-red-brown, pubescent. Head, thorax, and abdomen, darker. Elytra smooth.
Pselaphus hellwigii. Herbst, Paykull, Illiger.
Anthicus hellwigii. Fabr.
Scydmænus hellwigii. Latr.
Inhabits the roots of trees, and under moss.

Godarti. *Sp.* 2. *Godarti.* Last joint of the maxillary palpi conspicuous, dentiform, the joints at the apex of the antennæ not abruptly larger than the preceding ones. Thorax somewhat elongate-quadrate, a little narrower behind. Body deep castaneous, pubescent.
Scydmænus Godarti. Latr. *Gen. Crust. et Ins.* 1. 282. tab. 8. fig. 6.
Inhabits France.

TRIBE XIII. PTINIDES.

Antennæ much longer than the head, filiform, or terminated by three large joints, not united into a mass.

DIVISION I.

Antennæ uniform, not terminated, with three joints larger than the rest.

117. PTINUS. GENUS CXVII. PTINUS. Linn. Fabr. Latr. Lam. Oliv.
BRUCHUS. Geoffroy.
Antennæ approximate, inserted between the eyes. Eyes projecting. Thorax hood-like. Abdomen nearly oval. Elytra united in the male.

Fur. *Sp.* 1. *Fur.* Red-fuscous. Thorax with four tubercles transversely striated, the two middle ones highest, with tufts of hair, contracted and margined behind. Abdomen ovate, rounded at the base. Elytra villose, with two yellow-grey bands. The second joint of the antennæ shorter than the third. Under part of the body with short grey-yellow hairs.
Ptinus Fur. Linn. Fabr. Latr. Oliv.
Inhabits houses, committing horrid devastations in museums.
Ptinus testaceus of Marsham, is merely the male of this species.

Germanus. *Sp.* 2. *Germanus.* Fuscous. Thorax with four tubercles transversely seriated; with short, obscure-red hairs, hinder part contracted and marginated. Abdomen quadrate ovate, base straight, transverse, (not narrower. Elytra blackish, with two bands and a spot at the apex, whitish; the shoulders prominent. Antennæ with the second joint of the same magnitude with the third. Under part of the body with grey hairs. Thighs with a naked or brown band.
Ptinus Germanus. Fabr. Latr.
Ptinus elegans. Illig. Fabr.
Inhabits houses, with the other.

118. GIBIUM. GENUS CXVIII. GIBIUM. Scopoli, Latr.
BRUCHUS. Geoff.
PTINUS. Fabr. Oliv.
SCOTIAS. Czenpinski.
Antennæ inserted before the eyes, simple, and setaceous. Eyes not projecting. Thorax not hoodlike. Abdomen nearly globular. Elytra united.

Scotias. *Sp.* 1. *Scotias.* Castaneous, shining, smooth, antennæ and feet pubescent.
Ptinus Scotias. Fabr. Oliv.
Gibbium Scotias. Latr.
Inhabits the museums of southern Europe.

Metabolia.

119. PTILINUS. GENUS CXIX. PTILINUS. Geoff. Oliv. Lam. Fabr. Latr.
ANOBIUM. Illiger.
SERROCERUS. Kugellan.
PTINUS. Linn. Marsh.
Antennæ inserted before the eyes, very much pectinated in the males, serrated in the females.
Body long ovoid, nearly cylindric. Thorax somewhat globose.

Pectinicornis. *Sp.* 1. *Pectinicornis.* Body blackish. Elytra obscure brown. Antennæ and feet reddish. Thorax rough. Elytra punctate.
Ptilinus pectinicornis Fabr. Oliv. Latr.
Ptinus pectinicornis. Linn. Marsh.
Dermestes pectinicornis. Linn. ?
Inhabits old trees and houses, perforating them to destruction. *Ptinus serraticornis,* Marsham, is the female of this insect.

120. XYLETINUS. GENUS CXX. XYLETINUS. Latr.
PTILINUS. Illiger.
Antennæ inserted before the eyes, serrated in both sexes. Body short ovoid.

Lævis. *Sp.* 1. *Lævis.*
Ptilinus lævis. Illiger.
Xyletinus lævis. Latr.
Inhabits Europe.

DIVISION II.

Antennæ terminated by three joints different from the rest in size.

121. ANOBIUM. GENUS CXXI. ANOBIUM. Fabr. Oliv. Delamark, Latr.
PTINUS. Linn. De Geer, Marsham.
BRUCHUS. Geoff.
Antennæ eleven-jointed, with the three last joints abruptly thicker than the others; the ninth and tenth joints obconic; the tenth oval.

* Thorax short transverse.

Tessalatum. *Sp.* 1. *Tessalatum.* Thorax bilobate behind the lateral margins reflexed. Body fuscous, sprinkled with villose, obscure luteous spots. Elytra not striated.
Anobium tessalatum. Fabr. Latr.
Ptinus tessalatus. Marsham.
Inhabits Europe.

Molle. *Sp.* 2. *Molle.* Thorax with the lateral margins not marginated, acute. Body rufous-fuscous, smooth. Eyes black.
Amobium molle. Fabr. Oliv. Latr.
Ptinus mollis. Linn.
Inhabits Europe.

** Thorax not much broader than long.

Striatum. *Sp.* 3. *Striatum.* Fuscous, with greyish down. Thorax with a gibbous protuberance, unisulcate above, with the angles compressed. Hinder margins somewhat marginated. Elytra longitudinally punctate.
Anobium striatum. Latr. Oliv. Illig.
Anobium pertinax. Fabr. Paykull.
Inhabits Europe.

122. DORCATOMA. GENUS CXXII. DORCATOMA. Payk. Latr. Fabr.
Antennæ nine-jointed; the three last joints very large, the seventh and eighth triangular, and much dilated on their internal side.

Dresdense. *Sp.* 1. *Dresdense.*
Dorcatoma Dresdense. Fabr. Latr.
Inhabits Europe.

Metabolia.

Tribe XIV. Dermestides.

Antennæ slender, longer than the head, and terminated by a large ovoid mass.

Family I. *Dermistida.*

Sternum not produced to the mouth, or over it like a neckcloth. Tibiæ spinose.

123. Dermestes. Genus CXXIII. Dermestes. Linn. Fabr. Latr. Marsh. Herbst, Oliv.

Antennæ with an ovate club, the last joint short, not (or but little) longer than the preceding joint. Body narrow oval. Thorax with the hinder margin straight, or obtusely lobed. Palpi very short; maxillary palpi shorter than the maxillæ, or scarcely as long.

Lardarius. *Sp.* 1. *Lardarius.* Black; base of the elytra with a cinereous-band, with black points.

Dermestes lardarius. Linn. Fabr. Latr. Marsh.

Inhabits Europe.

Dermestes, 2. *Vulpinus*, 3. *Murinus*, 4. *Tesselatus* are the other indigenous species of this genus.

124. Attagenus. Genus CXXIV. Attagenus. Latr.* Leach.

Megatoma. Herbst.

Dermestes. Fabr. Linn. Latr. Marsh.

Antennæ with an elongate-ovate club, the last joint longer than the preceding, (especially in the male,) triangular or conic. Body broad-oval. Thorax with the posterior margin narrowly and acutely lobed. Maxillary palpi exserted, longer than the maxillæ; the last joint elongate-cylindric, very long in some.

Pellio. *Sp.* 1. *Pellio.* Black; middle of the antennæ and of the tarsi obscure red; hinder margin of the thorax with three spots, and the elytra with a spot on each side of the suture vellose-white; antennæ of the male with the last joint ensiform, very long.

Dermestes pellio. Linn. Fabr. Marsh. Latr.

Megatoma nigra. Herbst. (Variety of the male.)

Inhabits skins in houses, and is found sometimes on flowers.

Trifasciatus. *Sp.* 2. *Trifasciatus.* Black; hinder margin of the thorax, three bands on the elytra, and the breast grey-villose.

Dermestes trifasciatus. Fabr. Latr.

Inhabits Europe; is found in the south of France, in Sweden, and in Scotland.

Family II. *Megatomida.*

Sternum produced over the mouth, like a neckcloth. Tibiæ not or but slightly spined.

125. Megatoma. Genus CXXV. Megatoma.† Herbst, Latr.

Dermestes. Linn. De Geer, Fabr.

Body narrow-oval. Antennæ with an oval or oblong club, with the internal edge simple.

Undatum. *Sp.* 1. *Undatum.* Black; sides of the thorax and two undulated bands on the elytra, white-villose. Tarsi obscure red.

Megatoma undulata. Herbst.

Megatoma undatum. Latr.

Dermestes undatus. Linn. Fabr. Oliv. Panz.

Tribe XV. Byrrhides.‡

Body ovoid. Feet entirely or semicontractile. Sternum anteriorly produced to the mouth in the form of a neckcloth. Antennæ thicker towards their extremities.

Metabolia.

Division I.

Tarsi with five very distinct articulations.

Subdivision 1.

Antennæ straight, not inserted in the cavity of the eyes. Feet perfectly contractile. Mandibles but little, or not at all, prominent.

126. Anthrenus. Genus CXXVI. Anthrenus. Geoff. Fabr. Oliv. Lam. Latr.

Byrrhus. Linn. Marsham.

Dermestes. De Geer.

Antennæ shorter than the thorax, with the club solid. Palpi filiform, short. Body orbiculate ovate. Scutellum very minute

Scrophulariæ. *Sp.* 1. *Scrophulariæ.* Black; sides of the thorax, and three transverse bands on the elytra, grey; suture and external margin of the elytra, and hinder margin of the thorax, red-lutescent.

Anthrenus Scrophulariæ. Fabr. Latr.

Byrrhus Scrophulariæ. Linn. Marsh.

Inhabits plants in Europe.

127. Throscus. Genus CXXVII. Throscus. Latr.

Elater. Linn. Olivier, Geoffroy.

Dermestes. Fabr. Paykull, Illiger.

Antennæ as long as the thorax, with the three last joints large, forming an oval club. Palpi short, with the last joint securiform. Body elliptic, narrow, depressed.

Obs. This genus probably belongs to the tribe Elateride, from which it differs but in the structure of its antennæ.

Dermestoides. *Sp.* 1. *Dermestoides.* Brown, with grey-yellowish down; elytra, with punctated striæ.

Elater dermestoides. Linn. Oliv.

Dermestes adstrictor. Paykull, Illiger, Fabr.

Thoscus dermestoides. Latr.

Inhabits European plants; is rare in Britain.

128. Byrrhus. Genus CXXVIII. Byrrhus. Linn. Fabr. Oliv. Lam. Latr. Illig. Gyll.

Cistela. Geoffroy, Marsham.

Dermestes. De Geer.

Antennæ a little shorter than the thorax, with the four or five terminal joints gradually thicker, compressed. Palpi short, the last joint longest, thick, somewhat ovate. Body somewhat ovate, very convex above. Scutellum minute.

Pilula. *Sp.* 1. *Pilula.*

Byrrhus pilula. Linn. Fabr. &c.

Cistela undulata of Marsham is merely a variety of this species.

129. Chelonarium. Genus CXXIX. Chelonarium. Fabr. Latr.

Antennæ seven-jointed, the two last somewhat largest. Palpi with the last joint securiform. Body ovate, more convex below.

Beauvoisi. *Sp.* 1. *Beauvoisi.*

Chelonarium beauvoisi. Latr.

Chelonarium atrum. Fabricius?

Inhabits the Island of St Domingo.

Subdivision 2.

Antennæ elbowed or geniculated, not inserted in the

* Dermestes of his last work.

† *Megatoma serra* of Latreille, probably constitutes a distinct genus.

‡ An artificial tribe, containing many divisions.

Metabolia.

cavity of the eye. Feet perfectly contractile. Mandibles very prominent.

130. Hister. Genus CXXX. Hister.* Linn. Fabr. &c.

Attelabus. Geoffroy.

Body somewhat quadrate. Thorax transverse. Scutellum small. Elytra shorter than the abdomen. Breast very large. Head intruded into a concavity in the anterior part of the thorax. Palpi filiform, short, unequal, the last joint somewhat cylindric, obtuse.

* Body depressed, the breadth exceeding the height. Tibiæ broad, somewhat triangular. Tarsi short.

a. Body not very much depressed.

Unicolor. *Sp.* 1. *Unicolor.*

Hister unicolor. Linn. Fabr. &c.

Inhabits dung.

b. Body very much depressed.

Planus. *Sp.* 2. *Planus.*

Hister planus. Fabr.

Inhabits beneath the bark of trees.

** Body very thick and high. Tibiæ narrow, elongate. Tarsi slender.

Sulcatus. *Sp.* 3. *Sulcatus.*

Hister sulcatus. Rossi, Latr.

Hister striatus. Fabr. Herbst.

Inhabits the dung of oxen and horses.

Subdivision 3.

Antennæ strait, not inserted in the cavity of the eyes. Feet semicontractile.

131. Nosodendron. Genus CXXXI. Nosodendron. Latreille.

Byrrhus. Olivier.

Sphæridium. Fabr. Panzer.

Antennæ terminated abruptly by a three-jointed perfoliated club, composed of three joints.

Fasciculare. *Sp.* 1. *Fasciculare.* Black, shining, distantly punctured; thorax linear, transverse; elytra with elevated, hairy, brownish smoke-coloured dots.

Sphæridium fasciculare. Fabr.

Byrrhus fascicularis. Olivier.

Nosodendron fasciculare. Latr.

Inhabits France and Germany, under the bark of elms.

132. Limnius. Genus CXXXII. Limnius. Müller, Gyllenhall, Megerlei.

Dytiscus. Panzer.

Chrysomela. Marsham.

Elmis. Latr.

Antennæ nearly filiform, the last joint largest, somewhat oval.

Volckmari. *Sp.* 1. *Volckmari.*

Dytiscus Volckmari. Panzer, *Faun. Ins. Germ.* fas. 7. fig. 4.

Limnius Volckmari. Müller.

Elmis Volckmari. Latr.

Chrysomela buprestoides. Marsh.

Subdivision 4.

Antennæ inserted in the anterior canthus of the eye.

133. Parnus. Genus CXXXIII. Parnus. Fabr. Illiger, Marsh.

Dermestes. Geoffroy.

Elater. Rossi.

Dryops. Olivier, Lamarck, Latr.

Auriculatus. *Sp.* 1. *Auriculatus.*

Dryops Auriculatus. Latr. Olivier.

Metabolia.

Division II.

Tarsi with four distinct joints.

134. Heterocerus. Genus CXXXIV. Heterocerus. Bosc, Fabr. Illig. Latr. Marsham.

Antennæ composed of eleven joints, the seven last forming a dentate or serrated mass.

Marginatus. *Sp.* 1. *Marginatus.* Blackish, villose; sides of the thorax and abdomen, with spots on the elytra, margins of the abdomen, and feet, pale luteous.

Heterocerus marginatus. Fabr. Bosc, Illiger, Panzer, Marsham.

Inhabits marshy places, burrowing in the muddy banks of ponds.

135. Georissus. Genus CXXXV. Georissus.† Latr.

Pimelia. Paykull, Fabr.

Antennæ nine-jointed, the three last joints forming a rounded nearly solid mass.

Pygmæa. *Sp.* 1. *Pygmæa.*

Pimelia pygmæa. Paykull, Fabr.

Georissus pygmæus. Latr.

Tribe XVI. Hydrophilides.

Antennæ terminated by a club. Maxillary palpi very long. Chin or mentum large, clypeiform. Head with the front rounded, cowl-shaped. Feet formed for swiming. Tarsi with the first joint shorter than the second.

Family I. *Helopherida.*

Mandibles without teeth at their extremities. Maxillary palpi generally much shorter than the antennæ. Body oblong. Thorax somewhat quadrate, or nearly semi-orbiculate, or somewhat cordate-truncate. Tibiæ slightly shines. Tarsi filiform, not ciliated, with two strong, acute, entire nails.

136. Helophorus. Genus CXXXVI. Helophorus. Leach.

Elophorus. Illiger, Fabr. Latr. Olivier.

Hydrophilus. De Geer, Marsham.

Clypeus entire. Palpi with the last joint oval, thick; maxillary palpi much shorter than the antennæ.

* Body elliptic, or somewhat ovate. Thorax broader than long.

Aquaticus. *Sp.* 1. *Aquaticus.*

Elophorus grandis. Illiger.

Elophorus aquaticus. Fabr. Olivier, Latr.

Inhabits ditches and stagnant pools of water.

** Body nearly linear; thorax elongate-quadrate.

Elongatus. *Sp.* 2. *Elongatus.*

Elophorus elongatus. Fabr. Latr.

Inhabits stagnant waters in England, France and Germany.

137. Ochthebius. Genus CXXXVII. Ochthebius. Leach.

Hydræna. Latr. Illiger.

Hydrophilus. Marsham.

Elophorus. Paykull.

Clypeus entire. Palpi with the last joint slender, acuminate; maxillary ones shorter than the antennæ.

Riparia. *Sp.* 1. *Riparia.*

Hydræna riparia. Illiger, Latr.

Elopherus prygmæus. Paykull.

Elopherus minimus. Fabr.

Hydrophilus impressus. Marsham.

Inhabits the waters of Europe.

Marinus. *Sp.* 2. *Marinus.*

* This genus seems to constitute a peculiar family, and might be divided into some very natural genera.

† This singular genus has the lip and maxillæ of *Helophorus*; the general habit of *Byrrhus*; and the tarsi of *Heterocerus*.

Metabolia. *Hydræna Margipalleus.* Latr.
Hydrophilus margipalleus. Marsh.
Elophorus marinus. Paykull.
Inhabits Europe.

138. Hydræna. Genus CXXXVIII. Hydræna. Kugellan, Leach.
Elopherus. Gyllenhall.
Hydrophilus. Marsh.
Palpi with the last joint acuminate at each extremity; maxillary palpi longer than the antennæ. Clypeus emarginate.

Longipalpis. *Sp.* 1. *Longipalpis.*
Hydrophilus longipalpis. Marsh.
Inhabits running water.

Family II. *Hydrophilida.*

Mandibles with their points bidentate. Thorax transverse, short. Body hæmispheric-oval. Tibiæ simple or spined. Tarsi ciliated or simple. Maxillary palpi very long.

139. Spercheus. Genus CXXXIX. Spercheus. Fabr. Latr. Schön.
Hydrophilus. Illiger, Marsh.
Sternum simple. Clypeus emarginate. Antennæ six-jointed. Tibiæ simple, or scarcely spined.

140. Hydrobius. Genus CXL. Hydrobius. Leach.
Hydrophilus. Latr. Fabr. Marsh. De Geer.
Dytiscus. Linn.
Sternum simple. Clypeus entire. Antennæ nine-jointed. Tibiæ terminated by strong spines. Elytra entire.

Luridus. *Sp.* 1. *Luridus.*
Hydrophilus luridus. Latr. Fabr.
Dytiscus luridus. Linn.
Inhabits stagnant waters.

141. Limnebius. Genus CXLI. Limnebius. Leach.
Hydrophilus. Marsh. Gyllen.
Sternum simple. Clypeus entire. Antennæ nine-jointed. Elytra truncate at their extremities.

Piscinus. *Sp.* 1. *Piscinus.*
Hydrophilus piscinus. Marsh.
Inhabits drains and springs.

142. Hydrophilus. Genus CXLII. Hydrophilus. De Geer, Latr. Fabr. Marsh.
Dytiscus. Linn.
Sternum produced into a spine. Clypeus entire. Antennæ nine-jointed. Anterior tarsi of the male simple, filiform.

Caraboides. *Sp.* 1. *Caraboides.*
Hydrophilus caraboides. Fabr. Latr. Marsh.
Inhabits stagnant waters.

143. Hydrous. Genus CXLIII. Hydrous. Leach, from the Linnean MSS.
Hydrophilus. Marsh. Latr. Fabr.
Sternum produced into a spine. Clypeus entire. Anterior tarsi of the male patelliform. Antennæ nine-jointed.

Piceus. *Sp.* 1. *Piceus.*
Hydrophilus piceus. Fabricius, Marsham.
Inhabits Europe in ditches.

Tribe XVII. Sphæridides.

Antennæ terminated by a club. Maxillary palpi very long. Mentum large, clypeiform. Head with the front rounded, cowl-shaped. Feet formed for walking. Tarsi with the basal joint as long or longer than the second joint.

Genus CXLIV. Sphæridium. Fabricius, Olivier, Lamarck. Metabolia.
Dermestes. Linn. De Geer, Marsham.
Body somewhat hemispheric. Eyes immersed. Thorax transverse. Tibiæ spinose, armed with heels. Sternum behind produced into a conic spine. 144. Sphæridium.

Scarabæoides. *Sp.* 1. *Scarabæoides.* Black, shining, smooth; scutellum long-triangle; feet very spiny; each elytron at the base with a blood-red spot, and a livid reddish spot at the apex.
Sphæridium scarabæoides. Fabricius.
Sphæridium scarabæoides. var. A. Latreille.
Dermestes scarabæoides. Marsham, Linn.
Inhabits dung.

Tribe XVIII. Coprides.

Antennæ eight or nine jointed, terminated by an abrupt lamellated mass. Anterior tibiæ large and dentated. Mentum not very large. Mandibles membranaceous. Maxillæ membranaceous. Clypeus semicircular.

Family I. *Coprida.*

Labial palpi very hairy, the last joint smaller than the preceding. Scutellum none, or very obscure. Wing-cases taken together, not longer than broad. Posterior feet situated near the anus.

Division I.

The posterior, and sometimes the intermediate, tibiæ elongate, slender, little or not at all dilated at their extremities, nearly cylindric.

Genus CXLV. Ateuchus.* Web. Fabr. Illig. Latr. 145. Ateuchus.
Copris. Geoffroy.
Actinophorus. Sturm.
Scarabæus. Linn. De Geer.
Antennæ nine-jointed. Body depressed. Elytra taken together square, not abruptly or deeply sinuated behind the shoulder. Hinder feet not much longer than the body. Labial palpi, with the basal joint quadrate oval. Anterior tibiæ with four strong teeth externally.

Sacer. *Sp.* 1. *Sacer.*
Ateuchus sacer. Fabricius.
Scarabæus sacer. Linn. Oliv.
Inhabits the southern parts of Europe and Africa.

Genus CXLVI. Gymnopleurus. Illiger. 146. Gymnopleurus.
Ateuchus. Latreille, Fabricius.
Antennæ nine-jointed. Body depressed. Coleoptra quadrate; their external margin behind the shoulders abruptly and deeply sinuated. Hinder feet not much longer than the body. Labial palpi with their basal joint somewhat quadrate. Anterior tibiæ with three strong teeth externally.

Flagellatus. *Sp.* 1. *Flagellatus.*
Ateuchus flagellatus. Fabricius, Latreille.
Gymnopleurus flagellatus. Illiger.
Inhabits southern Europe and Africa.

Genus CXLVII. Sisyphus. Latreille. 147. Sisyphus.
Ateuchus. Illiger, Fabricius.
Copris. Geoffroy.
Scarabæus. Linn. Olivier.
Antennæ eight-jointed. Coleoptra forming a triangle. Feet elongate; hinder ones much longer than the body,

* Insects of this genus are sculptured on the Egyptian monuments of antiquity, several specimens of which may be seen in the gallery of the British Museum.

Metabolia.

with clavate thighs. Body with the transverse and perpendicular diameters nearly equal.

Schæfferi. *Sp.* 1. *Schæfferi.*
Sisyphus schæfferi. Latreille.
Ateuchus schæfferi. Fabricius.
Scarabæus schæfferi. Linn. Olivier.
Inhabits southern Europe, being extremely fond of human excrement.

Division II.

The four hinder tibiæ short, or but little lengthened; much dilated at their extremities.

Subdivision 1.

Labial palpi, with the last joint, very distinct. Thorax much shorter than the elytra; much broader than long. Anterior tibiæ long, arcuate.

148. Copris. Genus CXLVIII. Copris. Geoffroy, Illiger, Fabricius, Lamarck, Latreille.
Scarabæus. Linn. De Geer, Olivier.
Scutellum none. Abdomen elevated, convex. Anterior tibiæ longer than the others; externally with three strong teeth, terminated by a tarsus. Antennæ nine-jointed.

Lunaris. *Sp.* 1. *Lunaris.*
Copris lunaris. Fabricius, Latreille.
Scarabæus lunaris. Linn. Marsham.
Inhabits Europe. *Scarabæus emarginatus* of Marsham is merely the female of this species.

149. Onitis. Genus CXLIX. Onitis.* Fabricius, Illiger, Latreille.
Scarabæus. Linn. Olivier.
Abdomen depressed. Anterior tibiæ very long. Scutellum none.

Sphinx. *Sp.* 1. *Sphinx.*
Scarabæus sphinx. Olivier.
Onitis sphinx. Latreille, Fabricius.
Inhabits Africa and the southern parts of Europe.

Subdivision 2.

Labial palpi with the last joint not distinct. Thorax longer than the elytra. Tibiæ all terminated by a tarsus.

150. Onthophagus. Genus CL. Onthophagus. Latreille.
Copris. Geoffroy, Illiger, Fabricius.

Vacca. *Sp.* 1. *Vacca.*
Scarabæus vacca. Herbst, Linn. Olivier, Marsham.
Copris vacca. Fabricius, Illiger.
Onthophagus vacca. Latreille.
Inhabits dung; is very common near London.

Family II. *Aphodida.*

Labial palpi nearly smooth, filiform, the joints nearly equal, cylindric. Feet all separated by equal distances; hinder ones distant from the anus. Scutellum distinct.

151. Aphodius. Genus CLI. Aphodius. † Illiger, Fabricius, Latreille.
Scarabæus. Olivier, Marsham, Linn.

Rufipes. *Sp.* 1. *Rufipes.*
Aphodius rufipes. Fabricius.
Scarabæus rufipes. Linn. Marsham.
Inhabits dung.

Tribe XIX. Scarabæides.

Metabolia.

Antennæ eleven-jointed, terminated by a lamellated club. Anterior tibiæ large, dentate. Mentum not large. Mandibles corneous, porrect. Labrum prominent. Clypeus rhomboidal.

152. Lethrus. Genus CLII. Lethrus. Fabricius, Scopoli, Olivier, Illiger, Lamarck, Latreille.
Lucanus. Pallas.
Antennæ terminated by a conic club, obliquely truncate, the ninth joint infundibuliform, including the tenth and eleventh joints. Head produced behind the eyes. Abdomen very short. Hinder feet inserted at the anus. Scutellum very small. Coleoptra united, forming a triangle with the apex rounded; their sides involute inflected.

Cephalotes. *Sp.* 1. *Cephalotes.* Black, elytra smooth.
Lethrus Cephalotes. Fabricius, Olivier, Latreille.
Lucanus apterus. Pallas.
Clunipes scarabæoides. Act. Soc. Berol. vi. 347. tab. 8. fig. 7, 8.
Bulbocerus cephalotes. Archav. *Act. Suec.* 1781, p. 246. tab. 5. fig. 3—12.
Inhabits eastern and southern Europe.

153. Scarabæus. Genus CLIII. Scarabæus. Linn. Geoffroy, Fabricius, Olivier, De Geer.
Geotrupes. Latreille, Dumeril, Lamarck.
Antennæ terminated by an oval lamellated club. Thorax shorter than the abdomen, not horned. Hinder feet distant from the anus. Head not produced behind the eyes. Scutellum obvious.

Stercorarius. *Sp.* 1. *Stercorarius.*
Scarabæus stercorarius. Linn. Fabricius, Olivier.
Geotrupes stercorarius. Latreille.
Inhabits Europe, boring cylindric holes beneath dung, and flying about in the evening after dusk.

154. Typhæus. Genus CLIV. Typhæus. Leach's MSS.
Scarabæus. Fabricius, Gyllenhall, Marsham.
Antennæ terminated by an oval lamellated club. Thorax shorter than the abdomen; one each side in front with a long process, which extends along the sides of the head. Hinder feet distant from the anus. Head not produced behind the eyes. Scutellum obvious.

Vulgaris. *Sp.* 1. *Vulgaris.*
Scarabæus typhæus. Fabricius, Gyllenhall, Marsham.
Inhabits dung of horses on heaths; is found in spring and autumn in great plenty in many parts of Britain.
Scarabæus pumilus of Marsham, is merely a stunted or accidental variety of this species.

Tribe XX. Geotrupides.

Scarabæides. Latreille.
Antennæ ten-jointed, (in some nine), terminated by a lamellated club. Mandibles corneous in part. Clypeus triangular or quadrate. Anterior tibiæ large and dentate. Mentum not large.

Family I. *Geotrupida.*

No scale between the posterior angles of the thorax and the exterior base of the elytra.

Division I.

Thorax almost quadrate, more or less transverse. Mandibles entirely corneous.

* *Onitis meris*, Latreille; and *Onitis clinias*, Fabricius; have a scutellum, and should constitute a peculiar genus.'

† *Aphodius* may be divided, for the sake of convenience, from the clypeus; 1. Clypeus smooth, emarginate; 2. Clypeus smooth, entire; 3. Clypeus tuberculate.

Metabolia.

Subdivison 1.

Labrum prominent even beyond the clypeus. Maxillæ interiorly armed with a horny hook, simple or bifid. Body nearly globular or ovoid. Elytra tumid, embracing the sides of the abdomen.

185. Ægialia. Genus CLV. Ægialia. Latreille.

Aphodius. Panzer, Illiger.

Psammodius. Gyllenhall.

Antennæ distinctly longer than the head; composed of nine joints, the first of which is cylindric and a little hairy. Body nearly globular. Maxillæ with a bifid hook.

Globosa. *Sp.* 1. *Globosa.* Black, shining; head granulated; elytra striated, impunctate.

Aphodius globosus. Illiger.

Psammodius globosus. Gyllenhall.

Ægialia globosa. Latreille.

Inhabits the sandy shores of the sea.

156. Trox. Genus CLVI. Trox. Fabricius, Olivier, Lamarck, Latreille.

Scarabæus. Linn. Marsham, Geoffroy, De Geer.

Antennæ scarcely longer than the head; composed of ten joints, the first obconic and very hairy. Body ovoid. Maxillæ with a simple hook.

Sabulosus. *Sp.* 1. *Sabulosus.*

Trox sabulosus. Fabricius, Latreille.

Scarabæus sabulosus. Linn.

Inhabits sandy places.

Subdivision 2.

Labrum not projecting beyond the clypeus. Body not globose. Elytra not embracing the sides of the abdomen.

a. Labrum entirely hidden. Clypeus triangular. Maxillæ coriaceous, or horny; conic, or triangular. Mouth very hairy. Scutellum very small. (Colours dark.)

157. Sinodendron. Genus CLVII. Sinodendron. Fabr. Latr. Don.

Scarabæus. Linn. De Geer, Olivier.

Lucanus. Marsham.

Antennæ with the laminated club not capable of being folded; the lamellæ very short, resembling the teeth of a saw. Body cylindric. Maxillæ coriaceous, bilobate.

Cylindricum. *Sp.* 1. *Cylindricum.* Black, shining, impressed-punctate, cicatriculose; the punctures umbilicated, the umbilici perforate. (Male with a conic-compressed horn; the female with a short horn on the head.)

Sinodendron cylindricum. Fabr. Latr. Donovan.

Scarabæus cylindricus. Linn. De Geer, Olivier.

Lucanus cylindricus. Marsham.

Inhabits old trees, especially the ash. Is very abundant near Cheltenham, and near Plymouth, in decaying ash trees.

158. Oryctes. Genus CLVIII. Oryctes. Illiger, Latreille.

Scarabæus. Linn. Geoffroy, De Geer, Olivier.

Geotrupes. Fabricius.

Antennæ with the lamellæ of the club long and platatile. Body ovoid, convex. Mandibles with their external edge without teeth or folds. Maxillæ coriaceous, one-lobed. Thorax with the sides dilated, and a little rounded.

Nasicornis. *Sp.* 1. *Nasicornis.* Fuscous-castaneous, shining; head with one horn; elytra polished finely, and distantly punctured.

Oryctes nasicornis. Illiger, Latreille.

Scarabæus nasicornis. Linn.

Geotrupes nasicornis. Fabr.

Inhabits Europe in old wood.

Metabolia.

159. Phileurus. Genus CLIX. Phileurus. Latr.

Scarabæus. Linn. Olivier.

Geotrupes. Fabr.

Antennæ with the lamellæ of the club long and plicatile. Body ovoid, depressed. Mandibles with their external edge without teeth or folds. Maxillæ corneous, dentated. Thorax with its sides dilated and rounded.

Dydimus. *Sp.* 1. *Dydimus.*

Geotrupes dydimus. Fabr.

Phileurus dydimus. Latr.

160. Geotrupes. Genus CLX. Geotrupes. Fabr.

Scarabæus. Linn. Oliv. Latr. Lam.

Antennæ with the club composed of long, plicatile lamellæ. Body ovoid, convex. Mandibles with their external edge crenulated or toothed. Maxillæ corneous, dentated.

Punctatus. *Sp.* 1. *Punctatus.*

Geotrupes punctatus. Fabr.

Scarabæus punctatus. Latr.

Inhabits southern Europe.

b. Labrum with the anterior edge apparent. Clypeus quadrate. Scutellum large. (Colours various and gay.)

* External edge of the mandibles prominent, depressed, with the sides cutting, crenulated, or sinuated. (Body short, ovoid, or somewhat orbicular: Scutellum generally large: Thorax short, broad: Sternum produced into a point anteriorly.)

161. Hexodon. Genus CLXI. Hexodon. Oliv. Fabr. Lam. Lat.

Mandibles with their points strongly three-toothed. Body nearly orbicular. Elytra with their exterior side dilated and channelled. Antennæ ten-jointed, with a small oval club composed of three lamellæ. Feet slender. Tarsi with very small nails.

Reticulatum. *Sp.* 1. *Reticulatum.*

Hexodon reticulatum. Latr.

Inhabits Madagascar.

162. Rutela. Genus CLXII. Rutela. Latr.

Scarabæus. Linn. De Geer.

Cetonia. Fabr.

Melolontha. Fabr.

Body more or less ovoid. Elytra with their exterior side not dilated or channelled. Antennæ with their club large and oblong, composed of three lamellæ. Mandibles with their points having three little teeth. Feet strong. Tarsi with strong nails.

* Tarsi with undivided nails; the nails of unequal size.

Punctata. *Sp.* 1. *Punctata.*

Melolantha punctata. Fabr.

Rutela punctata. Latr.

Inhabits America.

** Tarsi with undivided, equal-sized nails.

Lineola. *Sp.* 2. *Lineola.*

Cetonia lineola. Fabr.

Rutela lineola. Latr.

Inhabits America.

*** Tarsi with one nail divided, and another bifid. (Scutellum very large.)

Chrysis. *Sp.* 3. *Chrysis.*

Cetonia chrysis. Fabr.

Rutela chrysis. Latr.

Inhabits America.

** Mandibles not, or but little, prominent, without any crenatures or sinuosities remarkable in their outer edge. (Body ovoid-oblong: Scutellum small or moderately sized.)

Metabolia.

GENUS CLXIII. MELOLONTHA. Fabricius, Olivier, Lamarck, Latreille.

163. MELOLONTHA.

SCARABÆUS. De Geer, Linn. Marsham.

Elytra with their external edge not sinuated, very slightly narrower at their base than at their points. Tibiæ armed with very distinct heels.

Vulgaris.

Sp. 1. *Vulgaris.* (Common cockchaffer.)
Melolontha vulgaris. Latreille, Fabricius.
Scarabæus melolontha. Linn.

Solstitialis.

Sp. 2. *Solstitialis.* (Summer cockchaffer.)
Melolontha solstitialis. Fabricius, Latreille.
Scarabæus solstitialis. Linn.

Vitis.

Sp. 3. *Vitis.*
Melolontha vitis. Fabricius, Latreille.

Horticola.

Sp. 4. *Horticola.* (Fernweb.)
Melolontha horticola. Fabricius.
Scarabæus horticola. Linn. Marsham.

Agricola.

Sp. 5. *Agricola.*
Melolontha agricola. Fabricius.

Obs. The genus *Melolontha* should be divided into a vast number of genera, of which the species are the types of those inhabiting Great Britain.

164. HOPLIA.

GENUS CLXIV. HOPLIA. Illiger, Latreille.
SCARABÆUS. Linn. Geoff. De Geer.
MELOLONTHA. Fabricius, Olivier.

Elytra with their external edge sinuated. Tibiæ with very obscure spurs or heels.

Pulverulenta.

Sp. 1. *Pulverulenta.*
Melolontha pulverulenta. Fabricius.
Inhabits France, England, and Germany.

DIVISION II.

Thorax as long as broad, nearly orbicular, or almost ovoid and truncate at the two extremities. Mandibles partly membranaceous, sometimes entirely corneous. Maxillæ terminated by a membranaceous, or coriaceous lobe.

Subdivision 1.

Labrum prominent. Mandibles entirely corneous. Elytra dehiscent at the extremity of the suture. Abdomen elongate-quadrate.

165. GLAPHYRUS.

GENUS CLXV. GLAPHYRUS. Latreille.
SCARABÆUS. Linn.
MELONTHA. Fabr. Oliv.

Antennæ terminated by a rounded knob, the two last joints received by the ninth joint.

Maurus.

Sp. 1. *Maurus.*
Scarabæus maurus. Linn.
Melolontha cardui. Fabr.
Melolontha maurus. Oliv.
Glaphyrus maurus. Latr.
Inhabits Barbary.

166. AMPHICOMA.

GENUS CLXVI. AMPHICOMA. Latr.
SCARABÆUS. De Geer, Pallas.
MELOLONTHA. Fabr. Oliv.

Antennæ with an ovoid club, having all the lamellæ disengaged.

Melis.

Sp. 1. *Melis.*
Melolontha melis. Fabr.
Amphicoma melis. Latr.
Inhabits Barbary.

Subdivision 2.

Labrum not prominent. Mandibles entirely or partly membranaceous.

167. ANISONYX.

GENUS CLXVII. ANISONYX. Latr.
SCARABÆUS. Linn.
MELOLONTHA. Fabr. Oliv.

Antennæ with the first joint not very large. Clypeus porrect, a little narrower in front. Palpi very slender, long, terminated by a cylindric joint. Tarsi with unequal nails. Hinder feet large.

Metabolia.

Crinitum.

Sp. 1. *Crinitum.*
Scarabæus longipes. Linn.
Melolontha crinita. Fabr.
Anisonyx crinitum. Latr.
Inhabits the Cape of Good Hope.

168. TRICHIUS.

GENUS CLXVIII. TRICHIUS. Fabr. Latr.
SCARABÆUS. Linn. Geoff. De Geer, Marsham.
CETONIA. Olivier.

Antennæ with the first joint very large. Clypeus quadrate. Palpi short, with their last joints oval. Tarsi with equal nails.

* Body almost entirely (above at least) smooth. Hinder feet, with the tibiæ and tarsi, of almost equal lengths.

Nobilis.

Sp. 1. *Nobilis.*
Trichius nobilis. Fabr. Latr.
Cetonia nobilis. Oliv.
Scarabæus nobilis. Linnæus, Marsham.

** Body tomentose. Hinder feet, with the tarsi most distinctly longer than the tibiæ.

Fasciatus.

Sp. 2. *Fasciatus.*
Trichius fasciatus. Latreille, Fabr.
Cetonia fasciata. Olivier.
Scarabæus fasciatus. Linnæus.
Inhabits Europe on umbelliferous flowers.

169. CASTOCHEILUS.

GENUS CLXIX. CREMASTOCHEILUS. Knoch, Latreille.

Antennæ with the first joint very large. Clypeus transverse, the anterior margin replected, arcuate, entire. Palpi short, with the last joint very long, cylindric, the apex obtuse. Thorax with the anterior angles dilated, tuberculiform. Tarsi with equal nails.

Castaneus.

Sp. 1. *Castaneus.*
Cremastocheilus castaneus. Latreille, Knoch.
Inhabits America.

FAMILY II. *Cetonida.*

A triangular scale interposed between the posterior angles of the thorax, and the exterior of the base of the elytra.

170. GOLIATHUS.

GENUS CLXX. GOLIATHUS.
GOLIATH. Latreille.
CETONIA. Fabr. Oliv.

Maxillæ corneous, or very hard. Mentum very large. Thorax orbicular. Elytra slightly or not at all situated at their external edge. Clypeus with two diverging lobes.

Polyphemus.

Sp. 1. *Polyphemus.*
Cetonia polyphemus. Fabr.
Goliath polyphemus. Latr.

171. CETONIA.

GENUS CLXXI. CETONIA. Fabr. Latr. Oliv. Lamarck.
SCARABÆUS. Linn. Geoff. De Geer, Marsh.

Maxillæ almost membranaceous, or coriaceous. Mentum moderately sized. Thorax triangular, with the anterior point truncate. Elytra abruptly sinuated at their external side, towards the base.

Aurata.

Sp. 1. *Aurata.*
Scarabæus auratus. Linn. Marsh.
Cetonia aurata. Fabr. Latr.
Inhabits the flowers of roses.

TRIBE XXI. LUCANIDES.

Antennæ with a pectinated club. Anterior tibiæ large and dentated. Palpi four. Labrum generally

Metabolia. wanting. Mandibles very strong, corneous, dentated, exserted. Mentum corneous.

Family I. *Lucanida.*

Antennæ geniculated. Labrum not discoverable.

* Body ovoid, elevated, convex.

172. Lamprima. Genus CLXXII. Lamprima. Latreille.

Lethrus. Fabricius.

Lucanus. Schreibers, Donovan.

Thorax and elytra marginated. Antennæ with the first joint straight. Mandibles very large. Sternum produced into a horn. Anterior tibiæ with but few teeth (four or five); and a scale of a triangular slope at the apex attached to the heel.

Æneа. *Sp.* 1. *Ænea.* Golden green, smooth.

Lethrus æneus. Fabricius.

Lucanus æneus. Schreibers.

Lamprima ænea. Latreille.

173. Æsalus. Genus CLXXIII. Æsalus. Fabricius, Latreille.

Lucanus. Panzer.

Thorax and elytra not bordered. Antennæ with the first joint bent. Mandibles moderately sized. Sternum simple. Anterior tibiæ with many teeth.

Scarabæoides. *Sp.* 1. *Scarabæoides.*

Æsalus scarabæoides. Latreille, Fabricius.

Lucanus scarabæoides. Panzer.

Inhabits Germany, Austria.

** Body parallelopiped, depressed.

174. Platycerus. Genus CLXXIV. Platycerus. Geoffroy, Latreille.

Lucanus. Linn. De Geer, Fabricius, Olivier.

Palpi short. Lip smooth.

Caraboides. *Sp.* 1. *Caraboides.*

Lucanus caraboides. Fabricius.

Inhabits rotten trees.

175. Lucanus. Genus CLXXV. Lucanus of authors.

Platycerus. Geoffroy.

Palpi long. Lip bifid, very hairy, the laciniæ resembling pencils.

Cervus. *Sp.* 1. *Cervus.* (Common stag beetle.)

Lucanus cervus. Linn. Fabr. Latr.

Inhabits Europe. *Lucanus inermis* of Marsham is merely the female of this species.

Family II. *Passalida.*

Antennæ not geniculated, simply bent, very hairy. Labrum prominent, and very distinct.

176. Passalus. Genus CLXXVI. Passalus. Fabr. Lam.

Lucanus. Linn. De Geer, Olivier.

Maxillæ corneous, very much toothed. Lip crustaceous. Abdomen separated from the thorax by a wide space. Elytra embracing the sides of the abdomen. Feet short.

Interruptus. *Sp.* 1. *Interruptus.*

Passalus interruptus. Fabr. Latr.

Lucanus interruptus. Linn. Oliv.

Inhabits America.

Sect. II. Heteromera.

Four anterior tarsi five-jointed, hinder pair four-jointed.

Observations. Antennæ eleven-jointed,* never lamellated or furnished with a pectinated head. Labrum in all distinct. Palpi four. Mandibles always horny or corneous, their internal edge armed with one or two teeth. Maxillæ crustaceous at the base, often with two laciniæ, the external one largest, trigonate, or somewhat ovate. Mentum crustaceous, distinct from the lip. Lip coriaceous, hairy. Metabolia.

Division I.

Wings generally wanting. Antennæ inserted under the prominent margin of the head, partly or entirely moniliform. Elytra generally united, embracing the sides of the abdomen. Maxillæ unguiculated on their internal edge. Mentum large, transverse.

Tribe I. Pimeliades.

Family 1. *Pimeliada.*

Mentum large, more or less cordiform.

Division I.

Antennæ abruptly terminated by a globose head. Anterior tibiæ palmated or dentated externally.

177. Chiroscelis. Genus CLXXVII. Chiroscelis. Lamarck, Latr.

Body parallelopiped, depressed, marginated. Scutellum distinct.

Bifenestra. *Sp.* 1. *Bifenestra.*

Chiroscelis bifenestra. Latreille, Lamarck.

Inhabits New Holland.

178. Erodius. Genus CLXXVIII. Erodius. Fabricius, Olivier, Lamarck.

Tenebrio. Linn.

Body nearly orbicular, gibbous. Scutellum none.

Gibbus. *Sp.* 1. *Gibbus.*

Erodius gibbus. Fabricius, Latreille.

Inhabits southern Europe.

Division II.

Antennæ not terminated by a club. Anterior tibiæ simple.

Subdivision 1.

Body nearly orbicular.

179. Zophosis. Genus CLXXIX. Zophosis. Latreille.

Erodius. Fabricius, Olivier.

Scutellum none.

Testudinaria. *Sp.* 1. *Testudinaria.*

Erodius testudinarius. Fabricius.

Zophosis testudinarius. Latreille.

Subdivision 2.

Body oblong. Thorax convex, nearly semilunar, or almost orbicular. Elytra convex.

180. Pimelia. Genus CLXXX. Pimelia. Fabricius, Olivier, Lamarck, Latreille.

Tenebrio. Linn. Geoffroy.

Thorax much narrower than the abdomen, transverse. Abdomen nearly orbicular.

Bipunctata. *Sp.* 1. *Bipunctata.*

Pimelia bipunctata. Fabricius.

Inhabits southern Europe.

181. Moluris. Genus CLXXXI. Moluris. Latreille.

Tenebrio. De Geer.

Pimelia. Fabricius, Olivier.

Thorax narrower than the abdomen, almost orbicular. Abdomen oval. Antennæ gradually enlarging externally, the last joint almost ovoid.

Striata. *Sp.* 1. *Striata.*

Pimelia striata. Fabricius.

Moluris striata. Latreille.

Inhabits Africa.

182. Tentyria. Genus CLXXXII. Tentyria. Latreille.

* In one ademera they exhibit the appearance of twelve true joints; many species have the semblance of a twelfth articulation.

Metabolia.

Akis. Fabricius.
Pimelia. Olivier.
Thorax almost orbicular, narrower than the abdomen. Abdomen oval. Antennæ filiform, terminated by two or three nearly globose joints.

Interrupta.

Sp. 1. *Interrupta.*
Tentyria interrupta. Latreille.
Pimelia glabra. Olivier.
Inhabits the western parts of France.

Subdivision 3.

Body oblong. Thorax flat above, more or less truncate-cordate. Elytra plain, or but little convex. Antennæ with the third joint very long.

183. Akis.

Genus CLXXXIII. Akis. Herbst, Fabricius.
Tenebrio. Linn.
Pimelia. Olivier.
Elytra united. Thorax with equal diameters, truncate behind. Abdomen oval, the external basal angles rounded. Scutellum very small but distinct.

Reflexa.

Sp. 1. *Reflexa.*
Akis reflexa. Fabr. Herbst, Latr.
Pimelia reflexa. Olivier.
Inhabits Africa and southern Europe.

184. Eurychora.

Genus CLXXXIV. Eurychora. Herbst, Fabricius, Latreille.
Pimelia. Olivier.
Thorax wider behind, transverse, emarginate before; lateral margins elevated. Abdomen triangular, the base truncated. Scutellum none. Elytra united.

Ciliata.

Sp. 1. *Ciliata.*
Eurychora ciliata. Latreille, Fabricius, Herbst.
Pimelia ciliata. Herbst.

Subdivision 4.

Body oblong. Thorax flat above, more or less quadrate.

185. Asida.

Genus CLXXXV. Asida. Latreille.
Machla. Herbst.
Tenebrio. Geoffroy.
Opatrum. Fabr. Oliv.
Pimelia. Panzer.
Thorax with the sides arched, reflexed, anterior margin concave. Antennæ thicker towards their extremities.

Grisea.

Sp. 1. *Grisea.*
Opatrum griseum. Fabricius.
Machla rugosa. Herbst.
Pimelia variolosa. Panzer.
Asida grisea. Latreille.
Inhabits France, Germany, and Italy.

186. Hegeter.

Genus CLXXXVI. Hegeter. Latreille.
Blaps. Olivier.
Thorax quadrate, the sides straight, not reflexed. Antennæ filiform.

Striatus.

Sp. 1. *Striatus.*
Blaps elongatus. Olivier.
Hegeter striatus. Latreille.
Inhabits Teneriffe.

Family II. *Blapsida.*

Mentum small, or moderately large, quadrate or orbicular.

Division I.

Palpi filiform.

187. Tegenia.

Genus CLXXXVII. Tegenia. Latreille.
Stenosis. Herbst.
Akis. Fabricius.
Body elongate, depressed. Thorax nearly cylindric. Antennæ somewhat perfoliated. Scutellum very small, conspicuous.

Metabolia.

Filiformis.

Sp. 1. *Filiformis.*
Stenosis augustata. Herbst.
Rhinomacer brentoides. Rossi.
Akis filiformis. Fabricius.
Tegenia filiformis. Latreille.
Inhabits Africa and the south of France.

188. Scaurus.

Genus CLXXXVIII. Scaurus. Fabricius, Olivier, Latreille.
Pimelia. Rossi.
Thorax almost quadrate. Abdomen oval, with the base truncate. Antennæ with the third joint slender, nearly cylindric; the eighth, ninth, and tenth, nearly globose; the eleventh conic. Anterior feet thick. Scutellum very small.

Striatus.

Sp. 1. *Striatus.*
Pimelia carinata. Rossi.
Scaurus striatus. Latreille, Fabricius, Olivier.
Inhabits the south of France.

189. Sepidium.

Genus CLXXXIX. Sepidium. Fabricius, Olivier, Herbst, Latreille.
Thorax truncated before and behind, the sides prominent. Scutellum indistinct. Abdomen oval; the base and apex truncated. Antennæ with the third joint long, the tenth obconic, and the eleventh short ovoid. Body elongate ovate.

Tricuspidatum.

Sp. 1. *Tricuspidatum.*
Sepidium tricuspidatum. Olivier, Latreille, Herbst, Fabricius.
Inhabits Africa and southern Europe.

Division II.

Palpi terminated by a thick joint; the last joint of the maxillary ones securiform.

190. Misolampus.

Genus CXC. Misolampus. Latreille.
Pimelia. Herbst.
Body convex. Thorax almost globose. Antennæ with the third and fourth joints of equal length. Scutellum very minute.

Hoffmanseggii.

Sp. 1. *Hoffmanseggii.*
Pimelia gibbula. Herbst.
Misolampus Hoffmanseggii. Latr. *Gen. Crust. et Ins.* tab. 10. fig. 8.
Inhabits Portugal. Discovered by Count Hoffmansegg.

191. Blaps.

Genus CXCI. Blaps. Fabricius, Olivier, Lamarck, Marsham, Latreille.
Tenebris. Linn. Geoffroy.
Back flat. Thorax almost quadrate. Antennæ with the third joint much longer than the fourth. Elytra with their extremities pointed.

Mortisaga.

Sp. 1. *Mortisaga.*
Blaps mortisaga. Fabricius, Marsham, Latreille.
Tenebrio mortisagus? Linn.
Inhabits cellars and churches.

Division II.

Wings occasionally wanting. Antennæ partly or entirely moniliform; inserted under the margin of the head. Elytra sometimes united, (in all) embracing the abdomen. Mentum small, not broader than long.

Subdivision 1.

Antennæ generally serrated or pectinated. Head not produced into a rostrum bearing antennæ. Maxillary palpi terminated by a large obtrigonate joint. Tarsi

Metabolia. with the last joint but one bilobate. Nails simple, entire, or bifid.

Tribe II. Tenebrionides.

Mandibles bifid at their extremities. Head more or less triangular, without a contraction behind, at its junction with the thorax.

Family I. *Tenebrionida.*

Tarsi with entire joints. Antennæ moniliform, not perfoliated or serrated. Maxillæ unguiculated.

492. Pedinus. Genus CXCII. Pedinus. Latr.
Tenebrio. Linn. Geof. Marsh.
Blaps. Fabr. Herbst.
Helops. Olivier.
Opatrum. Illiger.

Body oval. Maxillary palpi terminated by a thick joint. Antennæ filiform; the last joints globose or turbinated.

Femoralis. *Sp.* 1. *Femoralis.*
Pedinus femoralis. Latr.
Male.—*Blaps femoralis.* Fabr. Herbst.
Opatrum femoratum. Illig. *Coleop. Bor.* i. 109.
Female.—*Tenebrio femoralis.* Linn.
Opatrum femorale. Illig. *Coleop. Bor.* i. 110.
Blaps laticollis. Herbst.
Inhabits Europe in sandy places.

193. Opatrum. Genus CXCIII. Opatrum. Fabr. Oliv. Lam.
Silpha. Linn.
Tenebrio. Geoff.

Body oval; Maxillary palpi, with their last joint obtrigonate; antennæ gradually thicker towards their extremities; the last joints transverse, compressed.

Sabulosum. *Sp.* 1. *Sabulosum.*
Opatrum sabulosum. Fabr. Latr.
Silpha sabulosa. Linn.
Inhabits Europe in sandy places.

194. Tenebrio. Genus CXCIV. Tenebrio.* Linn. Geoff. De Geer, Fabr. Latr.

Thorax behind as broad as the elytra, or scarcely narrower. Body elongate. Antennæ scarcely gradually thicker towards their extremities, the eighth, ninth, and tenth joints transverse; the last subglobose. Mentum somewhat quadrate. Maxillary palpi with their last joint thick.

Obscurus. *Sp.* 1. *Obscurus.*
Tenebrio obscurus. Fabr. Latr. Panzer.
Inhabits Europe.

Molitor. *Sp.* 2. *Molitor.* (Meal beetle.)
Tenebrio molitor. Linn. Fabr. Latr.
Inhabits houses; the larvæ in meal and flour; it is called *meal worm.*

195. Upis. Genus CXCV. Upis. Fabr. Paykull.
Tenebrio. Latr.
Atelabus. Linn.

Thorax behind narrower than the elytra. Body elongate. Antennæ thicker towards their extremities. Mentum ovate-quadrate; the upper margin rounded. Maxillary palpi with their last joint thick.

Ceramboides. *Sp.* 1. *Ceramboides.*
Attelabus ceramboides. Linn.
Upis ceramboides. Fabr. Payk.
Tenebrio ceramboides. Latr.
Inhabits Sweden, in the *Boletus fomentarius.*

Metabolia.

Family 2. *Diaperida.*†

Tarsi with entire joints. Antennæ not moniliform, their extremities perfoliated or serrated.

Division I.

Body linear, or nearly so. Thorax almost quadrate. Antennæ terminated by a club. Maxillæ unguiculated.

Genus CXCVI. Toxicum. Latr. 196. Toxicum.

Antennæ terminated by an oval compressed club, composed of four joints.

Richesianum. *Sp.* 1. *Richesianum.*
Toxicum Richesianum. Latr. *Gen. Crust. et Ins.* 2. Tab. 9. fig. 9.
Inhabits the East Indies.

Genus CXCVII. Sarrotrium. Illig. Fabr. 197. Sarrotrium.
Hispa. Linn. Marsh.
Tenebrio. De Geer.
Orthocerus. Latr.

Antennæ with the last six joints forming a thick, fusiform, downy mass.

Muticum. *Sp.* 1. *Muticum.*
Sarrotrium muticum. Payk. Fabr.
Hispa mutica. Linn. Marsh.
Orthocerus hirticornis. Latr.
Inhabits sandy places. In Britain it is rare, or at least very local. It has been found in gravel pits near Norwich, by Mr Joseph Hooker; in a similar situation near Hampstead, by Mr Stephens; and in the sandy shores near Swansea, in South Wales, it is very abundant in the months of June and July.

Division II.

Body linear. Thorax longer than broad. Antennæ not moniliform, gradually thickening from the third joint; the extremity more or less perfoliated. Maxillæ simple, not unguiculated.

Genus CXCVIII. Hypophlæus. Fabr. Latr. 198. Hypophlæus.
Ips. Rossi, Olivier.

Antennæ from the fifth joint perfoliated. Labrum exserted. Mentum short, almost transverse-linear. Thorax elongate-quadrate, marginated.

Bicolor. *Sp.* 1. *Bicolor.*
Hypophæus bicolor. Fabr. Latr.
Ips bicolor. Olivier.
Inhabits under the bark of the elm.

Division III.

Antennæ not moniliform. Body oval, or nearly orbicular; a little longer than broad.

Subdivision 1.

Antennæ not serrated at their extremities.

Genus CXCIX. Phaleria. Latr. 199. Phaleria.
Tenebrio. Fabr.

Anterior tibiæ elongate-trigonate. Tarsi short. Antennæ gradually thickening towards their extremities, where they are perfoliated. Body oval.

Cadaverina. *Sp.* 1. *Cadaverina.*
Tenebrio cadaverina. Fabr.
Inhabits sandy places.

Genus CC. Diaperis. Geoff. Fabr. Oliv. Lam. 200. Diaperis.
Chrysomela. Linn. Marsh.
Tenebrio. De Geer.

Antennæ gradually enlarging towards their extremi-

* The Genus Boros of Herbst, the type of which is *Hypophæus boros* of Fabricius, is unknown to us.
† An artificial family.

Metabolia.

ties, from the fourth joint perfoliated. Body nearly hemispheric, very convex above.

Boleti. *Sp.* 1. *Boleti.*
Diaperis boleti of authors.
Chrysomela boleti. Linn. Marsh.
Inhabits the boleti of trees.

201. Eustrophus. Genus CCI. Eustrophus. Latr.
Mycetophagus. Fabr.
Antennæ gradually enlarging towards their extremities. Thorax large, almost semicircular. Head much deflexed.

Dermestoides. *Sp.* 1. *Dermestoides.*
Mycetophagus dermestoides. Fabr.
Eustrophus dermestoides. Latr.

202. Tetratoma. Genus CCII. Tetratoma. Herbst, Fabr. Payk.
Antennæ terminated by a club of four joints, the other joints very small. Body oval. Tibiæ not spiny.

Fungorum. *Sp.* 1. *Fungorum.*
Tetratoma fungorum. Fabr. Payk. Latr.
Inhabits Europe.

203. Leioides. Genus CCIII. Leioides. Latr.
Anisotoma. Illig. Fabr.
Sphæridium. Olivier.
Tetratoma. Herbst.
Antennæ abruptly terminated by a five-jointed club, the eight joint (the second of the club) very small. Thorax almost hemispheric. Tibiæ spinose.

Picea. *Sp.* 1. *Picea.*
Anisotoma piceum. Illiger.
Anisotoma picea. Panzer.
Leioides picea. Latr.
Inhabits Europe.

204. Trachyscelis. Genus CCIV. Trachyscelis. Latr.
Mycetophagus. Fabr.
Antennæ abruptly terminated by a much perfoliated six-jointed club. Body rounded, elevated. Feet formed for digging. Tibiæ very spiny.

Aphodioides. *Sp.* 1. *Aphodioides.*
Trachyscelis aphodioides. Latr.
Inhabits Egypt.

205. Cossyphus. Genus CCV. Cossyphus. Oliv. Fabr. Herbst, Latr.
Head concealed under the thorax. Scutellum distinct. Abdomen included in a canal formed by the elytra. Feet compressed. Labium naked. Mentum transverse cordate-quadrate. Maxillary palpi, elongate; the last joint securiform. Mandibles abruptly attenuated.

Depressus. *Sp.* 1. *Depressus.*
Cossyphus depressus. Fabr. Oliv. Herbst, Latr.
Inhabits the East Indies.

Hoffmanseggii. *Sp.* 2. *Hoffmanseggii.*
Cossyphus Hoffmanseggii. Latr.
Inhabits Barbary and Portugal.

Subdivision 2.

Antennæ terminated by joints resembling in their form the teeth of a saw.

206. Eledona. Genus CCVI. Eledona. Latr.
Bolitophagus. Illig. Fabr.
Opatrum. Oliv. Marsh.
Diaperis. Olivier.
Palpi filiform; maxillary ones with their last joint almost cylindric. Antennæ arcuate. Body oval, convex, generally rough. Thorax transverse, emarginate before; the side often with acute margins.

Agaricola. *Sp.* 1. *Agaricola.*
Eledona agaricola. Latr.
Opatrum agaricola. Oliv. Marsh.
Bolitophagus agaricola. Illig. Fabr.
Inhabits Boleti and other Fungi.

Metabolia.

207. Epitragus. Genus CCVII. Epitragus. Latr.
Maxillary palpi with the last joint large obtrigonate. Antennæ with the four last joints dentiform. Mentum very large. Body elliptic or oblong. Thorax quadrate, or trapeziform.

Fuscus. *Sp.* 1. *Fuscus.*
Epitragus fuscus. Latr.
Inhabits Cayenne.

208. Cnodalon. Genus CCVIII. Cnodalon. Fabr. Latr.
Maxillary palpi with the last joint very large, securiform. Antennæ with the six last joints dentiform. Mentum not very large. Body oval, very convex. Thorax transverse.

Viride. *Sp.* 1. *Viride.*
Cnodalon viride. Latr. *Gen. Crust. et Ins.* 2 tab. 10. fig. 1.
Inhabits the West Indies.

Division IV.

Antennæ nearly or quite filiform, with their extremities simple.

Subdivision 1.

Mandibles with their extremities bifid.

209. Helops. Genus CCIX. Helops. Fabr. Oliv. Lam. Illig. Latr. Rossi.
Tenebrio. Linn.
Maxillary palpi terminated by a securiform joint. Antennæ as long or longer than the thorax. Thorax quadrate or semicircular. Body convex.
Obs. This genus is artificial; it comprehends the genera *Helops*, *Platynotus*, and part of *Melandrya* of Fabricius, and part of the genus *Serropalpus* of Illiger, and the rejected genus *Helæa* of Latreille.

Lanipes. *Sp.* 1. *Lanipes.*
Helops Lanipes. Fabr. Latr. Oliv.
Tenebrio Lanipes. Linn.
Inhabits Europe.

210. Pytho. Genus CCX. Pytho. Latr. Fabr.
Tenebrio. Linn.
Cucujus. Paykull.
Maxillary palpi terminated by a large almost obtrigonate joint. Antennæ shorter than the thorax. Body depressed. Thorax almost orbicular.

Cæruleus. *Sp.* 1. *Cæruleus.*
Pytho cæruleus. Latr. Fabr.
Cucujus cæruleus. Paykull.
Tenebrio depressus. Linn.
Inhabits the mountains of France, Germany and Sweden, under the bark of trees.

211. Hallomenus. Genus CCXI. Hallomenus. Hellwig, Paykull, Latreille.
Dircæa. Fabr.
Serropalpus. Illiger.
Dinophorus. Illiger.
Palpi almost filiform; the last joint of the maxillary ones almost cylindric.

Humeralis. *Sp.* 1. *Humeralis.*
Hallomenus humeralis. Panzer.
Hallomenus Bipunctatus. Paykull.
Serropalpus humeralis. Illiger, *Col. Bor.* 1. 134.
Dircæa humeralis. Fabr.
Inhabits Boleti, and under the bark of trees.

Subdivision 2.

Mandibles with their points entire. Tarsi with denticulated nails.

Metabolia.

212. Cistela.

Genus CCXII. Cistela. Fabr. Latr. Lam. Oliv.
Chrysomela. Linn.
Mordella. Geoffroy.
Body ovate. Antennæ serrated. Feet rather long.

Ceramboides.

Sp. 1. *Ceramboides.*
Cistela ceramboides. Fabr. Latr. Oliv.
Chrysomela ceramboides. Linn.
Inhabits Europe.

Family 3. *Melyandrida.*

Four anterior tarsi with the last joint but one bilobate. Maxillary palpi with the last joint large, securiform, or obtrigonate.

Division I.

Hinder tarsi with entire joints.

213. Serropalpus.

Genus CCXIII. Serropalpus. Oliv. Paykull, Illig. Latr.
Dircæa. Fabr.
Antennæ filiform. Body almost cylindric, and very long.

Striatus.

Sp. 1. *Striatus.*
Serropalpus striatus. Paykull, Illig. Latr.
Dircæa barbata. Fabr.
Inhabits Europe.

214. Dircæa.

Genus CCXIV. Dircæa. Fabr.
Orchesia. Latr.
Hallomenus. Illig. Paykull, Hellwigg.
Megatoma. Herbst.
Mordella. Marsham.
Hinder feet formed for leaping. Antennæ clavate. Body elliptic.

Micans.

Sp. 1. *Micans.*
Dircæa micans. Fabr.
Hallomenus micans. Paykull.
Serropalpus micans. Illiger, *Col. Bor.* 1. 185.
Megatoma picea. Herbst.
Mordella boleti. Marsh.
Orchesia micans. Latr.
Inhabits Boleti.

Division II.

Tarsi altogether with their last joint but one bilobate.

215. Melandrya.

Genus CCXV. Melandrya.* Fabr. Latr.
Chrysomela. Linn.
Serropalpus. Illiger, Bosc.
Antennæ simple, filiform. Maxillary palpi terminated by an elongate securiform joint. Body nearly elliptic. Thorax trapezoid, broad behind.

Caraboides.

Sp. 1. *Caraboides.*
Chrysomela caraboides. Linn.
Serropalpus caraboides. Olivier, Illiger.
Melandra serrata. Fabr. Latr.
Criocertis caraboides. Marsh.
Inhabits rotten trees.

216. Lagria.

Genus CCXXVI. Lagria. Fabr. Oliv. Lam.
Chrysomela. Linn.
Cantharus. Geoff.
Tenebrio. De Geer.
Antennæ simple, insensibly growing thicker towards their extremity. Maxillary palpi double the size of the labial palpi, with the last joint large, securiform; labial palpi with the last joint ovate. Body oblong, (generally villose.)

Hirta.

Sp. 1. *Hirta.*
Lagria hirta. Fabr. Latr.
Chrysomela hirta. Linn.
Inhabits Europe.

Metabolia.

217. Nilio.

Genus CCXVII. Nilio. Latr.
Ægithus. Fabr.
Coccinella. Fabr.
Antennæ filiform, simple. Maxillary palpi terminated by an obtrigonate joint. Body hemispheric.

Villosus.

Sp. 1. *Villosus.*
Ægithus marginatus. Fabr.
Nilio villosus. Latr.
Inhabits Cayenne.

218. Calopus.

Genus CCXVIII. Calopus. Fabr. Oliv. Paykull, Latr.
Cerambyx. Linn. De Geer.
Antennæ filiform, serrated. Body narrow, very much elongated, almost linear. Maxillary palpi terminated by a securiform joint.

Serraticornis.

Sp. 1. *Serraticornis.*
Calopus serraticornis. Fabr. Oliv. Latr.
Cerambyx serraticornis. Linn.
Inhabits northern Europe.

Tribe III. Pyrochroides.

Head cordiform, abruptly strangulated at its junction with the thorax. Tarsi with their penultimate joints all bilobate. Body elongate, depressed, or convex and cylindric. Thorax almost cordate.

Division I.

Antennæ pectinated, serrated, or branched.

219. Dendroides.

Genus CCXIX. Dendroides. Latr.
Antennæ branched. Thorax conic.

Canadensis.

Sp. 1. *Canadensis.*
Dendroides canadensis. Latr.
Inhabits Canada.

220. Pyrochroa.

Genus CCXX. Pyrochroa. Fabr. Geoff. De Geer, Oliv. Latr.
Canthaeris. Linn.
Antennæ pectinated or serrated. Thorax orbicular.
The prevailing colour in this genus is red and black.

Rubens.

Sp. 1. *Rubens.*
Pyrochroa rubens. Fabr. Lat. Oliv.
Inhabits Europe.

Coccinea.

Sp. 2. *Coccinea.*
Cantharis coccinea. Linn.
Pyrochroa coccinea. Fabr. Latr.
Inhabits France, Germany, and England.

Division II.

Antennæ simple.

221. Scraptia.

Genus CCXXI. Scraptia. Latr.
Labial palpi terminated by a semilunar, or large triangular joint. Thorax almost semicircular.

Fusca.

Sp. 1. *Fusca.*
Scraptia fusca. Latr.
Inhabits France.

222. Notoxus.

Genus CCXXII. Notoxus. Geoff. Oliv. Illiger, Latr.
Melöe. Linn. Donovan.
Anthicus. Paykull, Fabr.
Labial palpi terminated by a small truncate joint. Thorax almost cordiform, produced into a porrected horn in front.

Monoceros.

Sp. 1. *Monoceros.*
Melöe monoceros. Linné, Donovan.
Notoxus monoceros. Olivier, Illiger, Latr.
Anthicus monoceros. Fabr. Payk.
Inhabits Europe.

* *Hypulus quercinus* of Paykull is possibly referable to this genus.

Metabolia.

GENUS CCXXIII. ANTHICUS. Payk. Fabr. Leach. NOTOXUS. Illiger, Latr. LYTTA. Marsham.

223. ANTHICUS.

Labial palpi terminated by a small truncate joint. Thorax almost cordiform, not anteriorly produced.

Fusca.

Sp. 1. ***Fusca.***
Lytta fusca. Marsham.
Inhabits Europe.

Antherinus.

Sp. 2. *Antherinus.*
Anthicus antherinus. Payk. Fabr.
Notoxus antherinus. Latr. Illiger.
Lytta antherina. Marsham.
Inhabits Europe.

TRIBE IV. MORDELLIDES.

Head cordiform, abruptly strangulated at its junction with the thorax. Hinder tarsi (sometimes the others) with their penultimate joint entire. Body elevated, arcuate, laterally compressed, and terminated by a point. Head very large. Elytra very short, or very narrow and pointed behind. Hinder feet large. Tibiæ with spurs.

224. RHIPIPHORUS.

GENUS CCXXIV. RHIPIPHORUS. Bosc, Fabr. Payk. Oliv. Latr.
MORDELLA. Linn. Marsh.

Tarsi with all the joints simple. Palpi almost filiform. Antennæ pectinated or flabellate. Scutellum none, or concealed.

Paradoxus.

Sp. 1. *Paradoxus.*
Mordella paradoxa. Linn.
Rhipiphorus paradoxus. Latr.
Inhabits Europe. It is extremely rare. The larvæ inhabit the nests of *Vespa crabro, (the hornet).*
Mordella paradoxa of Marsham, which is distinct from the Linnean species, has been found in the nest of a wasp, perhaps in that of *Vespa vulgaris.*

225. MORDELLA.

GENUS CCXXV. MORDELLA. Linn. Geoff. Fabr. Latr. Marsh.

Tarsi with all their joints simple. Maxillary palpi terminated by a securiform joint. Antennæ simple, or very slightly serrated. Scutellum distinct.

Aculeata.

Sp. 1. *Aculeata.*
Mordella aculeata. Linn. Fabr. Latr. Oliv.
Inhabits Europe.

226. ANASPIS.

GENUS CCXXVI. ANASPIS. Latr. Geoff.
MORDELLA. Linn. Fabr. Oliv. Marsh.

Penultimate joint of the four anterior tarsi bilobate. Maxillary palpi with the last joint securiform. Scutellum none.

Frontalis.

Sp. 1. *Frontalis.*
Mordella frontalis. Fabr. Oliv. Payk. Marsham.
Anaspis frontalis. Latr.
Inhabits flowers in Europe, especially of umbellate plants.

Subdivision 2.

Head not produced into a rostrum, bearing antennæ. Antennæ simple. Tarsi with bifid nails.

TRIBE V. CANTHARIDES.

Head large, cordiform. Neck distinct. Mandibles not notched at their points. Thorax almost quadrate, or cordiform. Elytra flexible. Tarsi generally with entire joints.

FAMILY I. *Cerocomatida.*

Antennæ clavate, or gradually thickening towards their extremity.

GENUS CCXXVII. CEROCOMA. Geoff. Schæff. Fabr. Oliv. Latr. Metabolia.

MELÖE. Linn. 227. CEROCOMA.

Antennæ (of the males) irregular, nine-jointed, the last joint very large. Elytra horizontal.

Sp. 1. *Schæfferi.* Schæfferi.
Meloë schæfferi. Linn.
Cerocoma schæfferi. Latr. Fabr. Oliv.
Inhabits the south of Europe.

GENUS CCXXVIII. MYLABRIS. Fabr. Oliv. Lamarck, Latr. 228. MYLABRIS.

Antennæ eleven-jointed, terminated by an arcuate mass, ending in a point. Elytra deflexed-subrounded.

Sp. 1. *Decempunctata.* Decempunctata.
Mylabris decempunctata. Fabr. Oliv. Latr.
Inhabits southern France.

FAMILY II. *Meloïda.*

Antennæ of equal thickness, tapering towards their points, or subclavate, as long or longer than the thorax, composed of globular or obconic joints.

DIVISION I.

Penultimate joint of all the tarsi bifid.

GENUS CCXXIX. TETRAONYX. Latr. 229. TETRAONYX.

Antennæ subfiliform, scarcely gradually somewhat thicker. Thorax short, transverse, quadrate.

Sp. 1. *Octomaculatus.* Octomaculatus.
Tetraonyx octomaculatus. Latreille, *Voyage de M. Alex. de Humboldt,* &c. p. 237.

DIVISION II.

Tarsi with all their joints entire.

Subdivision 1.

Elytra covering the whole abdomen; their suture straight. Wings in all.

GENUS CCXXX. HORIA. Fabr. Oliv. Latr. 230. HORIA.

Head as broad as the thorax. Antennæ straight, compressed, inserted before the eyes. Palpi with their last joint oval. Tarsi with their nail denticulate beneath. Body thick.

Sp. 1. *Maculata.* Maculata.
Horia maculata. Fabr. Oliv. Latr.
Inhabits American islands.

GENUS CCXXXI. CISSITES. Latr. (rejected by this author), Leach. 231. CISSITES.

HORIA. Latr. Fabr. Oliv.

Head narrower than the thorax. Antennæ straight, compressed, inserted before the eyes. Palpi with their last joint oval. Tarsi with their nails denticulated beneath. Body thick.

Sp. 1. *Testacea.* Testacea.
Horia testacea. Latr. Fabr. Oliv.
Inhabits Tranquebar.

GENUS CCXXXII. ŒNAS. Latr. 232. ŒNAS.

MELÖE. Linn.
LYTTA. Fabr.
CANTHARIS. Olivier.

Antennæ crooked, inserted between the eyes. Palpi with the last joint cylindric. Body elongate, rounded.

Sp. 1. *Afer.* Afer.
Meloë afer. Linn.
Lytta afer. Fabr.
Œnas afer. Latr.
Inhabits Barbary.

Subdivision 2.

Elytra covering only a part of the abdomen; short, oval, diverging at the suture. Wings none.

Metabolia.

233. Melöe.

Genus CCXXXIII. Melöe. Linn. Geoff. De Geer, Fabr. Pallas, Olivier, Lamarck, Mayer, Latr. Leach.

Abdomen very large, generally soft. Antennæ various.

In the 11th volume of the *Transactions of the Linnean Society of London*, two papers by Dr Leach, on the species of this genus, may be found, in which the species are arranged, from the structure of their antennæ, into the following Sections.

* Antennæ filiform.

A. Longer than the thorax and head.

B. Shorter than the thorax and head.

a. The terminal joint emarginate.

b. The terminal joint entire.

** Antennæ thicker externally.

A. Thorax elongate.

B. Thorax transverse.

*** Antennæ thicker, and curved in the middle.

Family III. *Cantharida*.

Antennæ composed of cylindric or obconic joints, longer than the thorax.

234. Cantharis.

Genus CCXXXIV. Cantharis. Geoff. De Geer, Olivier, Lamarck, Latreille.

Melöe. Linn.

Lytta. Fabr. Marsh.

Elytra soft, elongate, linear, with the sides somewhat inflexed, the back convex, rounded. Maxillæ with two membranaceous laciniæ, the external one acute within, subuncinate. Antennæ with the first joint larger than the others; the second very short, transverse; the rest obconic; the last ovoid.

Vesicatoria.

Sp. 1. *Vesicatoria, (Spanish fly).*

Melöe vesicatorius. Linn.

Cantharis vesicatoria. De Geer, Geoff. Oliv. Latr.

Lytta vesicatoria. Marsh. Fabr.

Inhabits Europe; is found on the ash, but is rare in England; it is the common *blister-fly* of our shops.

235. Zonitis.

Genus CCXXXV. Zonitis. Fabr. Latr.

Apalus. Oliv.

Elytra elongate, linear, soft, covering the whole of the abdomen, the sides a little inflected. Maxillæ not produced. Antennæ with the first joint of the same length with the third; the second a little shorter, obconic; the third and following cylindric; the last fusiform, abruptly terminated by a short point.

Præusta.

Sp. 1. *Præusta.*

Zonitis præusta. Fabr. Latr.

Inhabits southern Europe.

236. Nemognatha.

Genus CCXXXVI. Nemognatha. Illiger, Latr.

Zonitis. Fabr.

Elytra elongate, linear. Maxillæ very much produced, filiform, and curved.

Vittata.

Sp. 1. *Vittata.*

Zonitis vittata. Fabr.

Nemognatha vittata. Latr. Illiger.

237. Apalus.

Genus CCXXXVII. Apalus. Oliv. Latr. Fabr.

Elytra abruptly attenuated towards their extremity. Antennæ with the two first joints shorter than the third.

Apicalis.

Sp. 1. *Apicalis.*

Sitaris apicalis. Latr. *Gen. Crust. et Ins.* ii. 222.

Apalus apicalis. Latr. *Consid.*

Inhabits southern France.

Subdivision 3.

Head produced into a rostrum bearing antennæ. Body nearly linear. Thorax cylindric. Antennæ setaceous or filiform, composed of elongate, cylindric joints. Maxillary palpi terminated by a large obtrigonate joint. Tarsi with the penultimate joints bilobate. Nails simple.

Metabolia.

Tribe VI. Œdemedides.

Antennæ filiform or setaceous. Rostrum not very flat, and dilated at its extremity.

238. Œdemera.

Genus CCXXXVIII. Œdemera. Latr. Oliv.

Necydalis. Linn. Fabr.

Antennæ inserted at the anterior internal margin of the eyes. Rostrum not elongate. Eyes prominent. Elytra subulate. Palpi with the last joint broader than the penultimate joint.

Cærulea.

Sp. 1. *Cærulea.*

Necydalis cærulea. Linnæus, Fabricius.

Œdemera cærulea. Latreille, Olivier.

Inhabits Europe.

239. Stenostoma.

Genus CCXXXIX. Stenostoma. Latreille.

Leptura. Fabricius.

Antennæ inserted on the rostrum beyond the eyes. Rostrum elongate, acute. Eyes not prominent. Elytra long, flexible, not subulate. Palpi with the last joint cylindric.

Rostrata.

Sp. 1. *Rostrata.*

Leptura rostrata. Fabricius.

Œdemera rostrata. Latreille, *Gen. Crust. et Ins.*

Stenostoma rostrata. Latr. *Considerat.* 217.

240. Mycterus.

Genus CCXL. Mycterus. Clairville, Olivier.

Rhinomacer. Fabr. Latr.

Mylabris. Schæffer.

Antennæ inserted before the eyes on the rostrum. Rostrum elongate, narrow. Eyes globose, prominent. Elytra hard. Palpi with the last joint compressed.

Curculionides.

Sp. 1. *Curculionides.*

Rhinomacer curculionides. Fabricius, Latreille.

Mycterus griseus. Clairville.

Inhabits Europe; and has been taken in South Devon by Mr J. Cranch of Kingsbridge.

Tribe VII. Salpingides.

Antennæ thicker at their extremities. Rostrum very flat, and dilated at its extremity.

241. Salpingus.

Genus CCXLI. Salpingus. Illiger.

Curculio. Linn. De Geer, Marsh.

Anthribus. Fabricius, Paykull, Panzer, Clairville.

Rhinosimus. Latreille.

Antennæ inserted before the eyes. Elytra rigid.

Roboris.

Sp. 1. *Roboris.*

Anthribus roboris. Paykull, Fabricius, Clairville.

Rhinosimus roboris. Latreille.

Curculio ruficollis? Linnæus.

Inhabits Europe, beneath the bark of trees.

Section III. Tetramera.

Tarsi with four joints.

Division I.

Rynchophori. Latreille.

Head anteriorly rostrated; the mouth at the apex of the rostrum.

Tribe I. Bruchides.

Palpi obvious, filiform, not very minute. Rostrum broad. Labrum exserted. Antennæ eleven-jointed; subclavate, with the club formed of distinct joints, in some; filiform, or gradually thicker towards their points, in others; serrated, or pectinated.

242. Platyrhinus.

Genus CCXLII. Platyrhinus. Clairville.

Anthribus. Fabricius, Geoffroy, Paykull, Latr.

Macrocephalus. Olivier.

Metabolia.

Antennæ clavate, the club elongate. Eyes not emarginate. Elytra covering the anus above. Body ovate-oblong. Abdomen somewhat elongate-quadrate, rounded behind. Thorax somewhat quadrate, a little narrower before. Rostrum broad. Head scarcely narrower at the base.

Latirostris.

Sp. 1. *Latirostris.*

Anthribus latirostris. Fabricius, Latreille, Paykull.

Platyrhinus latirostris Clairville.

Macrocephalus latirostris. Olivier.

Inhabits woods in Europe.

243. Anthribus.

Genus CCXLIII. Anthribus. Paykull, Fabricius, Latreille, Geoffroy.

Macrocephalus. Olivier.

Antennæ clavate, the club ovate, abrupt, incressated. Eyes not emarginate. Elytra covering the anus above. Body short, oval, thick. Thorax transverse, broader behind, lobated. Rostrum short.

Scabrosus.

Sp. 1. *Scabrosus.*

Anthribus scabrosus. Paykull, Fabricius, Latreille.

Macrocephalus scabrosus. Olivier.

Inhabits the elm.

244. Rhinomacer.

Genus CCXLIV. Rhinomacer. Olivier, Fabricius. Anthribus. Paykull, Latreille.

Antennæ clavate. Eyes not emarginate. Elytra covering the anus above. Abdomen elongate, narrow. Thorax roundish, nearly equally broad. Rostrum at the base much narrower than the head, the longitudinal diameter many times exceeding the breadth. Tarsi, with the second joint not including the third.

Attelaboides.

Sp. 1. *Attelaboides.*

Anthribus rhinomacer. Paykull, Latreille.

Rhinomacer attelaboides. Fabricius.

Inhabits pine trees.

245. Bruchus.

Genus CCXLV. Bruchus. Linn. De Geer, Olivier, Fabricius, Latreille, Marsham.

Mylabris. Geoffroy.

Antennæ nearly filiform. Eyes emarginate, for the insertion of the antennæ. Body short, oval, thick. Elytra not covering the anus above.

Pisi.

Sp. 1. *Pisi.*

Bruchus pisi. Linn. Fabr. Oliv. Latr.

Inhabits southern Europe and northern America.

Tribe II. Curculionides.

Palpi very small, conic-subulate, scarcely discernible. Rostrum rounded, thick, often proboscis shaped. Labrum none. Antennæ with distinct joints, the eighth or ninth generally clavate, the club regular, the joints coriaceous. Head from the eyes more or less narrowed, distinctly produced into a rostrum. Mandibles small or minute. Mentum not cylindric-cordate. Body very rarely cylindric. Anterior tibiæ never triangular.

Division I.

(Recticornes; straight horns.)

Antennæ straight, not geniculated at the second joint. Body of all, from the base of the thorax, narrower, not cylindric.

246. Brentus.

Genus CCXLVI. Brentus. Fabricius, Olivier, Herbst, Latreille, Lamarck.

Curculio. Linnæus, De Geer.

Mandibles generally prominulous, the apex generally bidendate. Body very long, somewhat cylindric, narrower before, straight, porrect. Thorax elongate-ovate, truncate before and behind. Elytra rigid, elongate, linear, with the apex often spinose. Feet elongate, strong, the anterior ones longest. Mentum corneous, cordate-subovate, apex emarginate, base rounded, concave in front.

Metabolia.

Anchorago.

Sp. 1. *Anchorago.*

Brentus anchorago. Fabricius, Latreille.

Inhabits America.

247. Cylas.

Genus CCXLVII. Cylas. Fabr.

Brentus. Olivier, Fabricius.

Mandibles short, the apex bidentate. Mentum suborbiculate. Body elongate, narrow before. Thorax articulated, dilated in front, and ovate-subglobose, strangulated behind. Elytra with prominent shoulders. Tarsi with the last joint but one bifid.

Brunneus.

Sp. 1. *Brunneus.*

Cyclus brunneus. Latreille.

Brentus brunneus. Herbst, Fabr.

Inhabits Senegal.

248. Attelabus.

Genus CCXLVIII. Attelabus. Linn. Fabr. Oliv. Latr.

Curculio. De Geer.

Head behind simply elongate, produced with no neck. Tibiæ with their points furnished with a double hook. Body ovate. Abdomen quadrate, rounded behind. Labium corneous, quadrate, the middle of the upper margin emarginate, obtusely unidentate.

Curculionoides.

Sp. 1. *Curculionoides.*

Attelabus curculionoides. Linnæus, Latreille, Olivier.

Inhabits the nut tree and willow.

249. Apoderus.

Genus CCXLIX. Apoderus. Olivier, Latreille.

Attelabus. Linnæus, Fabricius, Paykull.

Head with a distinct neck. Tibiæ with one hook at their joints. Body ovate. Abdomen quadrate, rounded behind. Labium corneous, quadrate, the middle of the upper margin emarginate, obtusely unidentate.

Coryli.

Sp. 1. *Coryli.*

Attelabus coryli. Linn. Fabr. Payk. Latr.

Curculio coryli. Marsham.

Inhabits the nut tree.

250. Rynchites.

Genus CCL. Rynchites. Herbst, Latr.

Curculio. Linnæus, De Geer, Marsham.

Rhinomacer. Geoffroy, Clairville.

Attelabus. Fabricius, Olivier.

Head elongate behind the eyes, with no neck. Clypeus dentate. Tibiæ with very short heels. Abdomen quadrate, rounded behind. Body ovate, narrowly produced before. Thorax conic-cylindric, broader behind, (often with a spine on each side in the male). Labium membranaceous, small, the apex rounded, villose, entire.

Bacchus.

Sp. 1. *Bacchus.*

Curculio bacchus. Linnæus, Marsham.

Rynchites bacchus. Herbst, Latreille.

Attelabus bacchus. Fabricius.

Inhabits Europe, frequenting the nut and vine.

251. Apion.

Genus CCLI. Apion. Herbst, Latreille, Kirby.

Curculio. Linnæus, Marsham.

Rhinomacer. Geoffroy, Clairville.

Attelabus. Fabricius, Olivier.

Eyes prominulous. Head elongate behind. Abdomen subovate. Tibiæ with obsolete heels. Labium subquadrate, entire.

Obs. The Rev. William Kirby has given an admirable paper to the Linnæan Society of London on the species of this genus, which is published in the ninth volume of their Transactions. He has added a supplement, which is published in the tenth volume.

252. Rhamphus.

Genus CCLII. Rhamphus. Clairville.

Tarsi with the last joint but one bifid, cordiform. Head globose. Eyes approximate. Hinder feet formed for leaping. Tibiæ with obsolete heels. Body short, oval.

Metabolia. Flavicornis.

Sp. 1. *Flavicornis.*
Ramphus flavicornis. Latreille, Clairville.
Inhabits the sloe and aspen.

253. Brachycerus.

Genus CCLIII. Brachycerus. Olivier, Herbst, Fabricius, Latreille.
Curculio. Linnæus, De Geer.
Tarsi short, with entire joints. Lip crustaceous, suborbicular, the apex truncate, retuse, entire. Body ovate, thick, gibbous. Eyes lateral. Tibiæ with their two points produced, the internal spine bifid. Thorax transverse. Abdomen large, subglobose, ovate, or oval.

Algirus.

Sp. 1. *Algirus.*
Brachycerus algirus. Fabr. Latr.
Inhabits Africa.

Division II.

(Fracticornes; geniculated horns.)

Antennæ geniculated, the basal joint very much elongated, generally received in a lateral oblique groove, (at the base at least,) or the sides of the rostrum.

(Antennæ in all clavate, the club generally composed of firmly connected joints, the last acute. Tarsi with the last joint but one bifid, or emarginate above, cordate.)

Subdivision 1.

Antennæ inserted beyond the base of the rostrum, larger than the head, the club distinctly many-jointed, ovate. Mandibles generally obtuse. Tibiæ at the apex ciliated with spines, in a few terminated by a strong hook. Body ovate, or elliptic. Colour various.

254. Curculio.

Genus CCLIV. Curculio. Linnæus, Fabricius, Clairville, Olivier.
Brachyrhinus. Latreille.
Body ovate, convex, narrower before. Thorax round, or conic-cylindric, narrower than the base of the elytra. Scutellum extremely minute. Abdomen ovate-conic, subovate, or globose. Lip minute. Antennæ eleven-jointed. Hinder feet not formed for leaping.

Imperialis.

Sp. 1. *Imperialis,* (diamond beetle.)
Curculio imperialis. Linn. Fabr. Oliv.
Brachyrhinus imperialis. Latreille.
Inhabits Brasil.

Argentatus.

Sp. 2. *Argentatus.*
Curculio argentatus. Gmelin, Marsh. Fabr.
Brachyrhinus argentatus. Latreille.
Inhabits Europe.

255. Lixus.

Genus CCLV. Lixus. Latreille, Fabricius.
Curculio. Linnæus, Geoffroy, Marsham, Fabricius.
Body elongate-ovate. Rostrum as broad as the head. Lip small, entire, transverse-quadrate, corneous, narrower than the mentum.

Sulcirostris.

Sp. 1. *Sulcirostris.*
Curculio sulcirostris. Linnæus, Fabricius, Marsham.
Inhabits thistles.

Paraplecticus.

Sp. 2. *Paraplecticus.*
Curculio paraplecticus. Linn.
Lixus paraplecticus. Fabricius, Latreille.
Inhabits the *Phellandrium aquaticum.*

256. Rynchænus.

Genus CCLVI. Rynchænus. Fabricius, Olivier.
Curculio. Linn. Geoff. Lam. Latr.
Body oblong, ovate, twice as long as broad. Antennæ with the club three-jointed beginning at the ninth joint, or eight four-jointed beginning at the eighth joint. Wings in all.

Tortrix.

Sp. 1. *Tortrix.*
Curculio tortrix. Linnæus, Marsham, Latreille.
Rynchænus tortrix. Fabricius.
Inhabits Europe.

Abietis.

Sp. 2. *Abietis.*
Curculio abietis. Linnæus.
Inhabits Europe in the pine. It was discovered as a native of Britain by Dr Malden, who took it near Hameton, in Scotland.

Metabolia.

Pini.

Sp. 3. *Pini.*
Curculio pini. Linn. Marsham.
Inhabits the *Pinus sylvestris.*

257. Liparus.

Genus CCLVII. Liparus. Oliv.
Curculio. Linnæus, Latreille, Marsham.
Rynchænus. Fabricius.
Body oblong ovate, twice as long as broad. Antennæ with the club three-jointed beginning at the ninth joint, or four-jointed beginning at the eighth joint. Wings none.

Germanus.

Sp. 1. *Germanus.*
Curculio Germanus. Linnæus, Marsham.
Rynchænus fusco-maculatus. Fabricius.
Inhabits Europe. It occurs in Britain, near Dover and Hastings.

Trigutta-tus.

Sp. 2. *Triguttatus.*
Curculio triguttatus. Marsham, Latreille.
Curculio vau of Marsham, is merely a variety of this insect.
Inhabits Europe.

258. Cryptorynchus.

Genus CCLVIII. Cryptorynchus. Illiger.
Curculio. Linnæus, Marsham.
Rynchænus. Fabricius.
Body round-oval, half as long again as broad. Abdomen short, triangular-quadrate. Anus naked. Rostrum applied to the breast. Coleoptra subquadrate, the diameters nearly equal. Hinder feet not formed for leaping. Mentum corneous, subobtrigonate.

Erysimi.

Sp. 1. *Erysimi.*
Rynchænus erysimi. Fabr.
Crytorynchus erysimi. Illiger.
Inhabits Europe.

259. Cionus.

Genus CCLIX. Cionus. Clairville, Latreille.
Rynchænus. Fabr.
Curculio. Linn. Geoff. Oliv.
Body quadrate-ovate, thick, a little longer than broad. Abdomen large, subquadrate, a little narrower, and rounded behind. Anus not naked. Rostrum applied to the breast. Coleoptra convex, as broad as long, inflexed behind. Hinder feet not formed for leaping.

Scrophulariæ.

Sp. 1. *Scrophulariæ.*
Curculio scrophulariæ. Linnæus, Marsham.
Rynchænus scrophulariæ. Fabricius.
Cionus scrophulariæ. Clairville.
Inhabits the *Verbascum* and *Scrophularia.*
Latreille supposes *Rynchænus, Thapsus, Scrophulariæ,* and *Verbasci* of Fabricius, to be but varieties of one species.

260. Orchestes.

Genus CCLX. Orchestes. Olivier, Illiger.
Rynchænus. Clairville, Fabricius, Latreille.
Curculio. Linnæus, Marsham.
Body ovate. Abdomen elongate-quadrate, rounded behind. Elytra inflexed behind, covering, or at least touching the anus. Hinder feet formed for leaping.

Alni.

Sp. 1. *Alni.*
Curculio alni. Linnæus, Marsham.
Rynchænus alni. Fabricius.
Inhabits Europe.

Subdivision 2.

Antennæ inserted at the base of the rostrum. Tarsi reflected to the internal side of the tibiæ.

261. Rhina.

Genus CCLXI. Rhina. Latreille.
Lixus. Fabricius.
Curculio. Olivier.
Body oblong cylindric. Feet elongate, especially the

Metabolia.

anterior ones. Tibiæ slender. Rostrum elongate, porrect, cylindric, slender, often bearded.

Barbirostris.

Sp. 1. *Barbirostris.*
Lixas barbirostris. Fabricius.
Rhina barbirostris. Latreille.
Inhabits Africa and India.

262. CALANDRA.

Genus CCLXII. Calandra. Clairville, Fabricius.
Curculio. Linnæus, Geoffroy, Olivier.
Rynchophorus. Herbst.
Body elliptic-oval, flat above. Eyes immersed, oblong, encircling the head beneath. Rostrum thickened at the insertion of the antennæ. Elytra plain, not covering the anus above. Anus acutely prominent. Feet strong.

Granaria.

Sp. 1. *Granaria.*
Calandra granaria. Fabricius, Latreille.
Curculio granaria. Marsham.
Inhabits Europe.

263. COSSONUS.

Genus CCLXIII. Cossonus. Clairville, Fabricius, Latreille.
Curculio. Paykull, Herbst.
Body very much lengthened, sublinear, or subcylindric, narrow before. Elytra covering the anus above. Tibiæ terminated by a hook internally. Back flat, depressed.

Linearis.

Sp. 1. *Linearis.*
Cossonus linearis. Clairville, Fabricius, Latreille.
Curculio linearis. Paykull, Marsham.
Curculio parallelopipedus. Herbst.
Inhabits Europe.

Division II.

Head not gradually prolonged into a rostrum. Tarsi not spongy beneath.

Tribe III. Bostricides.

Body cylindric, or globose. Head globose. Tibiæ compressed, the anterior ones dentated. Antennæ eight or ten-jointed; the first joint elongate, the two or three last joints forming a large mass. Tarsi not spongy beneath. Palpi very small, generally conic, rarely filiform.

Division I.

Palpi very small, conic. Antennæ forming a solid mass, shorter, or not much longer than the head.

Subdivision 1.

Club of the antennæ commencing before the ninth joint.

264. HYLURGUS.

Genus CCLXIV. Hylurgus. Latreille.
Ips. De Geer, Marsham.
Scolytus. Olivier.
Tarsi with their penultimate joint bifid. Antennæ with the club commencing at the eighth joint, very little or not at all compressed.

Ligniperda.

Sp. 1. *Ligniperda.*
Scolytus Ligniperda. Olivier.
Hylurgus ligniperda. Latreille.
Inhabits beneath the bark of the pine.

Piniperda.

Sp. 2. *Piniperda.*
Ips piniperda. Marsham.
Hylurgus piniperda. Latreille.
Inhabits Britain, perforating the pine bark.

265. TOMICUS.

Genus CCLXV. Tomicus. Latreille.
Dermestes. Linnæus.
Ips. De Geer.
Bostricus. Fabricius, Paykull.
Scolytus. Olivier.
Tarsi with entire short joints. Antennæ with the club much compressed, beginning at the seventh joint, distinctly annulated. Body not linear.

Metabolia.

Typographus.

Sp. 1. *Typographus.*
Dermestes typographus. Linnæus.
Ips typographe. De Geer.
Bostricus typographus. Fabricius, Paykull.
Ips typographus. Marsham.
Scolytus typographus. Olivier.
Tomicus typographus. Latreille.
Inhabits Europe under the bark of trees, which it gnaws into various labyrinth-like passages.

266. PLATYPUS.

Genus CCLXVI. Platypus. Herbst, Latreille.
Bostricus. Hellwig, Fabricius.
Scolytus. Panzer.
Tarsi with entire long joints. Antennæ with the club much compressed, commencing at the sixth joint; annulations not or but slightly distinct. Body linear.

Cylindricus.

Sp. 1. *Cylindricus.*
Platypus cylindricus. Herbst, Lat.
Bostricus cylindricus. Fabricius.
Scolytus cylindricus. Olivier.
Inhabits France and Germany under the bark of trees.

Subdivision 2.

Antennæ with the club beginning at the ninth joint.

267. SCOLYTUS.

Genus CCLXVII. Scolytus. Geoffroy, Schæffer, Olivier, Latreille.
Hylesinus. Fabricius.
Ekkoptogaster. Herbst.
Coptogaster. Illiger.
Ips. Marsham.
Tarsi with their last joint but one bifid. Antennæ with the club compressed, obovoid, the apex rounded.

Destructor.

Sp. 1. *Destructor.*
Scolytus destructor. Oliv. Lat.
Ips scolytus. Marsham.
Hylesinus scolytus. Fabricius.
Inhabits beneath the bark of the elm.

268. HYLESINUS.

Genus CCLXVIII. Hylesinus. Fabricius, Lat.
Scolytus. Olivier.
Bostricus. Paykull.
Tarsi with their penultimate joint bifid. Antennæ with the club little or not compressed, ovoid, the extremity pointed.

Crenatus.

Sp. 1. *Crenatus.*
Hylesinus crenatus. Fabricius, Latreille.
Scolytus crenatus. Olivier.
Inhabits Europe.

Division II.

Palpi very small, conic. Antennæ with the club formed of three leaf-like very long laminæ.

269. PHLOITRIBUS.

Genus CCLXIX. Phloitribus. Latreille.
Hylesinus. Fabricius.
Scolytus. Fabricius.
Tarsi with the last joint but one bilobate.

Oleæ.

Sp. 1. *Oleæ.*
Hylesinus oleæ. Fabricius.
Scolytus oleæ. Olivier.
Phloitribus oleæ. Latreille.
Inhabits the olive tree in France.

Division III.

Palpi filiform. Antennæ with the club perfoliated or serrated. Tarsi with their joints entire.

270. BOSTRICUS.

Genus CCLXX. Bostricus. Latreille, Olivier.
Ligniperda. Herbst.
Apate. Fabricius, Paykull.
Dermestes. Linnæus.

Metabolia. Body convex. Thorax elevated, globular, or cubic. Maxillæ bilobate.

Capucinus. *Sp.* 1. *Capucinus.*
Ligniperda capucinus. Herbst.
Apate capucinus. Fabricius, Paykull.
Bostricus capucinus. Latreille, Olivier.
Dermestes capucinus. Linnæus.
Inhabits Europe.

271. Psoa. Genus CCLXXI. Psoa. Fabricius, Latreille, Herbst.
Dermestes. Rossi.
Body flattened above. Thorax almost quadrate. Maxillæ with one lobe.

Viennensis. *Sp.* 1. *Viennensis.*
Psoa viennensis. Fabricius, Latreille, Herbst.
Dermestes dubius. Rossi.

Tribe IV. Paussides.

Body oblong and much depressed. Palpi conic-subulate. Antennæ two, or ten-jointed. Elytra truncated. Tarsi with entire joints.

272. Pausus. Genus CCLXXII. Pausus. Linnæus, Fabricius, Thunberg, Herbst, Afzelius, Donovan, Latreille.
Antennæ two-jointed, the last very large and irregular.

Microcephalus. *Sp.* 1. *Microcephalus.*
Paussus microcephalus. Linnæus, Thunberg, Herbst, Latreille, Afzelius, Fabricius.
Inhabits Africa.

273. Cerapterus. Genus CCLXXIII. Cerapterus. Swederus, Donovan, Latreille.
Antennæ ten-jointed, perfoliated.

Macleaii. *Sp.* 1. *Macleaii.*
Cerapterus macleaii. Donovan, Latreille.
Inhabits New Holland.

Tribe V. Mycetophagides.

Body ovoid or oblong; in some depressed, in others linear. Palpi filiform or bent at their extremities. Antennæ ten or eleven jointed, thickening towards their extremities, or terminated by a perfoliated mass.

Family I. *Nemosomida.*

Antennæ ten-jointed.

Division I.

Antennæ with the club three-jointed, perfoliated.

274. Cis. Genus CCLXXIV. Cis. Latreille.
Anobium. Fabricius, Illiger, Herbst, Paykull.
Dermestes. Scopoli.
Hylesinus. Fabricius.
Ptinus. Marsham.
Antennæ twice as long as the head. Body oval, depressed.

Boleti. *Sp.* 1. *Boleti.*
Dermestes boleti. Scopoli.
Anobium boleti. Fabricius, Illiger, Paykull.
Anobium bidentatum. Olivier.
Ptinus boleti. Marsham.
Inhabits the *Boletus vesicolor.*

275. Nemosoma. Genus CCLXXV. Nemosoma. Latreille.
Dermestes. Linnæus.
Ips. Olivier.
Colydium. Hellwig, Herbst.
Antennæ not or scarcely longer than the head. Body linear. Head as long, or nearly as long, as the thorax.

Elongatum. *Sp.* 1. *Elongatum.*
Nemosoma elongatum. Latreille.
Ips elongatus. Olivier.
Colydium fasciatum. Hellwig, Herbst.
Inhabits Europe.

Division II.

Antennæ with a nearly globose two-jointed club.

276. Cerylon. Genus CCLXXVI. Cerylon. Latreille.
Ryzophagus. Herbst.
Lyctus. Fabricius, Panzer, Paykull.
Body elongate. Thorax quadrate, with the hinder margin straight, contiguous with the elytra. Abdomen not pedunculated.

Histeroides. *Sp.* 1. *Histeroides.*
Lyctus histeroides. Fabricius, Paykull, Panzer.
Ryzophagus histeroides. Herbst.
Cerylon histeroides. Latreille.
Inhabits Europe, beneath the bark of trees.

277. Monotoma. Genus CCLXXVII. Monotoma. Herbst.
Cerylon. Latreille.
Lyctus. Fabricius, Paykull, Panzer.
Body elongate, linear. Thorax quadrate, with the hinder margin distant from the base of the elytra. Abdomen somewhat pedunculated.

Terebrans. *Sp.* 1. *Terebrans.*
Cerylon tenebrans. Latreille.
Inhabits beneath the bark of trees.

Juglandis. *Sp.* 2. *Juglandis.*
Lyctus juglandis. Fabricius, Paykull, Panzer.
Corticaria taxicornis. Marsham.
Inhabits beneath the bark of trees.

Family II. *Mycetophagida.*

Antennæ eleven jointed. Mandibles little or not at all prominent.

Division I.

Antennæ with the club two-jointed.

278. Ditoma. Genus CCLXXVIII. Ditoma. Latr.
Bitoma. Herbst.
Lyctus. Fabr. Payk.
Ips. Olivier.

Crenata. *Sp.* 1. *Crenata.*
Bitoma crenata. Herbst.
Ditoma crenata. Latr.
Lyctus crenatus. Fabr. Payk.
Ips crenatus. Olivier.
Inhabits Europe under the bark of dead trees.

Division II.

Antennæ gradually thickening towards their extremities. Tarsi with the first joint longer than the following one.

279. Mycetophagus. Genus CCLXXIX. Mycetophagus. Fabricius, Paykull, Oliv. Panzer, Latr.
Tritoma. Geoff.
Dermestes. Thunberg.
Silphoides. Herbst.
Boletaria. Marsh.
Body oval. Antennæ with the last joint elongate, ovate. Maxillary palpi prominent.

Quadripustulatus. *Sp.* 1. *Quadripustulatus.*
Mycetophagus quadripustulatus. Fabricius, Latreille, Panzer, Paykull.
Boletaria quadripustulata. Marsham.
Inhabits fungi.

Division III.

Antennæ gradually thickening towards their extremities, or with a three-jointed club.

Metabolia.

Subdivision 1.

Tarsi with the first joint not longer than the following one. Palpi very short; the maxillary ones not, or but little, prominent. Antennæ with an abrupt club of three joints, not longer than the head. Body elongate, linear.

280. Colydium. Genus CCLXXX. Colydium. Latr. Fabr. Herbst, Paykull.

Tritoma. Thunberg.
Ips. Olivier, Rossi.

Elongatum. *Sp.* 1. *Elongatum.*
Colydium elongatum. Fabr. Herbst, Paykull, Latr.
Ips elongatus. Olivier.
Ips linearis. Rossi.
Inhabits Europe under the bark of trees.

Subdivision 2.

Tarsi with the first joint longer than the second. Palpi very short, the maxillary ones but little or not at all prominent. Antennæ as long as the thorax or less.

281. Latridius. Genus CCLXXXI. Latridius.* Herbst.
Ips. Olivier.
Corticaria. Marsham.
Dermestes. Fabricius, Paykull.
Antennæ with the second joint larger than the third.

Porcatus. *Sp.* 1. *Porcatus.*
Latridius porcatus. Herbst.
Latridius minutus. Latreille.
Dermestes marginatus. Paykull.
Inhabits houses in Europe.

282. Silvanus. Genus CCLXXXII. Silvanus. Latreille.
Tenebrio. De Geer.
Dermestes. Fabricius, Panzer.
Ips. Olivier.
Colydium. Paykull, Herbst.
Corticaria. Marsham.
Antennæ with the second and following joints to the eighth joint nearly equal.

Unidentatus. *Sp.* 1. *Unidentatus.*
Silvanus unidentatus. Latreille.
Dermestes unidentatus. Fabricius.
Ips unidentatus. Olivier.
Colydium unidentatum. Paykull.
Colydium planum. Herbst.
Inhabits Europe under the bark of trees.

Frumentarius. *Sp.* 2. *Frumentarius.*
Colydium frumentarium. Panzer.
Corticaria frumentaria. Marsham.
Silvanus frumentarius. Latreille.
Inhabits Europe.

Subdivision 2.

Tarsi with the first joint not longer than the following joint. Maxillary palpi prominent. Body elongate, narrow. Antennæ with the three last joints rather thicker.

283. Meryx. Genus CCLXXXIII. Meryx. Latreille.
Thorax almost cordiform. Eyes rather prominent. Palpi clavate, the last joint sub-obtrigonate, larger than the rest.

Rugosa. *Sp.* 1. *Rugosa.*
Meryx rugosa. Latr. *Gen. Crust. et Ins.* xi. fig. 1.
Inhabits the East Indies.

Division IV.

Antennæ cloven-jointed. Mandibles prominent or exserted.

Metabolia.

Subdivision 1.

Mandibles small. Body long and linear.

284. Lyctus. Genus CCLXXXIV. Lyctus. Fabricius, Paykull.
Ips. Olivier.
Bitoma. Herbst.
Corticaria. Marsham.
Antennæ with a two-jointed club. Thorax long and linear.

Oblongus. *Sp.* 1. *Oblongus.*
Lyctus oblongus. Latreille.
Lyctus canaliculatus. Fabricius.
Ips oblongus. Olivier.
Bitoma unipunctata. Herbst.
Corticaria oblonga. Marsham.
Inhabits Europe in old wood.

Subdivision 2.

Mandibles large. Body elongate, much depressed, nearly equally broad.

285. Trogosita. Genus CCLXXXV. Trogosita. Fabricius, Olivier, Illiger, Latreille, Lamarck.
Tenebrio. Linnæus, Marsham, Rossi.
Platycerus. Geoffroy.
Thorax almost quadrate, separated from the abdomen by a remarkable interval. Antennæ moniliform, shorter than the body, compressed towards the apex. Labrum excerted, coriaceous, small, hairy in front.

Mauritanica. *Sp.* 1. *Mauritanica.*
Tenebrio mauritanicus. Linnæus? Rossi, Marsham.
Trogosita caraboides. Fabricius, Illiger, Paykull, Herbst, Latreille.
Trogosita mauritanica. Olivier.
Inhabits Europe. Dr Leach has seen it alive in a box of insects brought from Pará in the Brasils.

Tribe VI. Cucujides.

Body oblong and much depressed. Head not globose. Palpi filiform or thicker towards their extremities. Antennæ of the same thickness throughout, all eleven-jointed. Thorax almost quadrate, generally dentated or angulated.

Division I.

286. Parandra. Antennæ moniliform, shorter than the body.
Genus CCLXXXVI. Parandra. Latreille.
Isocerus. Illiger.
Attelabus. De Geer.
Tenebrio. Fabricius, Herbst.
Labrum very small. Palpi terminated by an oval joint. Tarsi long. Thorax quadrate, marginate.

Lævis. *Sp.* 1. *Lævis.*
Parandra lævis. Latreille.
Attelabus lævus. De Geer.
Tenebrio brunneus. Fabricius.
Tenebrio purpurascens. Herbst.
Inhabits America.

287. Cucujus. Genus CCLXXXVII. Cucujus. Fabricius, Olivier, Paykull.
Cantharis. Linnæus?
Labrum porrect, very apparent. Palpi with their last joint obconic, truncate. Tarsi short. Lip bifid.

Depressus. *Sp.* 1. *Depressus.*
Cucujus depressus. Paykull, Olivier, Latreille, Fabricius.
Cantharis sanguinolenta. Linnæus?
Inhabits Sweden and Germany.

* The genus *Dacyerus* of Brongniart is akin to this genus.

Metabolia.

Division II.

Antennæ as long as the body, often longer, composed of elongate cylindric joints.

288. Uleiota. Genus CCLXXXVIII. Uleiota. Latreille.
Cerambyx. Linnæus.
Brontes. Fabricius.
Cucujus. Olivier, Herbst.
Labrum porrect, very apparent. Palpi terminated by an almost conic pointed joint. Tarsi short.

Flavipes. *Sp.* 1. *Flavipes.*
Cerambyx planatus. Linnæus.
Uleiota flavapes. Latreille.
Brontes flavipes. Fabricius.
Cucujus planatus. Herbst.
Cucujus flavipes. Olivier, Paykull.
Inhabits Europe, beneath the bark of dead trees.

Division III.

Head not gradually produced into a rostrum. Tarsi strong beneath.

Subdivision 1.

Antennæ filiform or setaceous, or slightly thickening towards their extremities. Maxillæ with no horny hook on their internal sides.

Tribe VII. Cerambycides.

Lip much widened at its extremity, cordiform. Body elongate. Antennæ long, generally inserted in a nitch in the eyes.

Family I. *Prionida.*

Labrum very small, or almost none.

Division I.

Antennæ moniliform, short.

289. Spondylis. Genus CCLXXXIX. Spondylis. Fabricius, Olivier, Latreille.
Attelabus. Linn.
Cerambyx. De Geer.
Palpi with the last joint nearly obconic. Body convex. Tarsi with the penultimate joint distinctly bifid. Thorax almost orbicular, without border or teeth.

Buprestoides. *Sp.* 1. *Buprestoides.*
Spondylus buprestoides. Fabr. Oliv. Latr.
Attelabus buprestoides. Linn.
Inhabits Europe, at the roots of the pine.

Division II.

Antennæ pectinated or serrated, in all longer than the thorax.

290. Prionus. Genus CCXC. Prionus. Geoffroy, Fabricius, Olivier, Latreille.
Cerambyx. Linn. Marsham.
Thorax with the sides gently sloping, dentated. Antennæ serrated, a little shorter than the body; of the male twelve, of the female eleven-jointed.

Coriarius. *Sp.* 1. *Coriarius.*
Cerambyx coriarius. Linn.
Prionus coriarius. Latreille, Fabricius, Olivier.
Inhabits Europe.

Family II. *Cerambycida.*

Labrum very apparent, of various sizes. Antennæ inserted in a nitch in the eyes.

Division I.

Head vertical. Palpi almost filiform.

Metabolia.

Genus CCXCI. Macropus. Thunberg. 291. Macropus.
Prionus. Olivier.
Cerambyx. Linn.
Lamia. Latreille.
Body much depressed. Thorax with a moveable spine on each side, placed on a tubercle. Anterior feet of the male very long.

Longimanus. *Sp.* 1. *Longimanus.*
Prionus longimanus. Olivier.
Lamia longimana. Latr.
Cerambyx longimanus. Linn.
Inhabits Brasil.

Genus CCXCII. Lamia. Leach. 292. Lamia.
Lamia. Latreille, Fabricius.
Cerambyx. Linn. Marsham, Fabricius.
Antennæ ten-jointed, longer than the body.
This genus is divided into sections.
A. Body depressed. (Lamia, Fabricius.)

Ædilis. *Sp.* 1. *Ædilis.*
Lamia ædilis. Fabricius, Latreille.
Cerambyx ædilis. Linn. Marsham.
Inhabits Europe.
B. Body not depressed. (Lamia, Cerambyx, Fabricius.)

Nebulosus. *Sp.* 2. *Nebulosus.*
Cerambyx nebulosus. Fabricius, Marsham.
Lamia nebulosa. Latreille.
Inhabits Europe.

Textor. *Sp.* 3. *Textor.*
Lamia textor. Fabricius, Latreille.
Inhabits Europe.
C. Body linear. Thorax not spined at the sides. (Saperda, Fabricius.)

Oculata. *Sp.* 4. *Oculata.*
Cerambyx oculatus. Marsham.
Saperda oculata. Fabricius.
Lamia oculata. Latreille.
Inhabits Europe.

Genus CCXCIII. Saperda. Leach. 293. Saperda.
Cerambyx. Marsham.
Antennæ eleven-jointed, longer than the body. Body linear. Thorax without spines.

Lineato-collis. *Sp.* 1. *Lineato-collis.*
Cerambyx lineato-collis. Marsham.
Saperda lineato-collis. Leach, *Zoolog. Mis.* vol. i.
Inhabits England.

Division II.

Head nutant. Palpi with the last joint thicker than the others.

Genus CCXCIV. Cerambyx. Linn. Fabricius, Latreille, &c. 294. Cerambyx.
Stenocorus. Fabricius.
Antennæ longer than the body. Palpi with the last joint obconic, compressed. Thorax with a spine on each side.

Moschatus. *Sp.* 1. *Moschatus.* (Musk cerambyx.)
Cerambyx moschatus. Lin. Fabricius, Latreille, &c.
Inhabits willows in Europe, emitting, whilst alive, a fine smell, resembling the flavour of roses.

Genus CCXCV. Stenocorus. Fabricius. 295. Stenocorus.
Cerambyx. Latreille.
Palpi with the last joint obtrigonate. Thorax without spines.

Spinicornis. *Sp.* 1. *Spinicornis.*
Stenocorus spinicornis. Fabricius.
Cerambyx spinicornis, Latreille.

Genus CCXCVI. Clytus. Fabricius. 296. Clytus.
Cerambyx. Linn.

Metabolia.

CALLIDIUM. Latreille.

Labial palpi with the last joint obtrigonate. Thorax without spines, globose. Antennæ shorter than the body. Hinder thighs clavate.

Arietis. *Sp.* 1. *Arietis.*

Cerambyx arietis. Linn.

Clytus arietis. Fabricius.

Callidium arietis. Latreille.

Inhabits Europe.

297. CALLIDIUM. GENUS CCXCVII. CALLIDIUM. Fabricius, Latreille.

CERAMBYX. Linn. Marsham.

Labial palpi with the last joint obtrigonate. Thorax orbicular, depressed, or but little convex. Antennæ setaceous, as long as the body. Hinder thighs abruptly clavate.

Violaceum. *Sp.* 1. *Violaceum.*

Cerambyx violaceus. Linn. Marsh.

Callidium violaceum. Fabricius, Latreille.

Inhabits Europe.

298. NECYDALIS. GENUS CCXCVIII. NECYDALIS. Linn. De Geer, Fabricius.

LEPTURA. Geoffroy.

MOLORCHUS. Fabricius.

Elytra subulated, not entirely covering the wings and abdomen.

Rufa. *Sp.* 1. *Rufa.*

Necydalis rufa. Fabr. Latr.

Inhabits Europe.

299. MOLORCHUS. GENUS CCXCIX. MOLORCHUS. Fabricius.

NECYDALIS. Linn. Marsham, Latreille.

Elytra abbreviated.

Major. *Sp.* 1. *Major.*

Necydalis major. Linn.

Molorchus umbellaturum. Fabr.

Inhabits Europe.

FAMILY III. *Lepturida.*

Labrum very apparent. Antennæ inserted between the eyes.

300. LEPTURA. GENUS CCC. LEPTURA, of authors.

Thorax not spined on each side.

Elongata. *Sp.* 1. *Elongata.*

Leptura elongata. Fabricius, Latreille, Marsham.

Inhabits Europe.

301. RHAGIUM. GENUS CCCI. RHAGIUM. Fabricius.

LEPTURA. Latreille, Marsham.

Thorax with a spine on each side.

Inquisitor. *Sp.* 1. *Inquisitor.*

Leptura inquisitor. Latr. Marsh.

Rhagium inquisitor. Fabricius.

Inhabits Europe.

TRIBE VIII. CRIOCERIDES.

Lip not cordiform. Maxillæ with their external division not resembling a two-jointed palpus. Body elongate. Thorax cylindric or quadrate.

FAMILY I. *Sagrida.*

Mandibles with their extremities not notched.

302. MEGALOPUS. GENUS CCCII. MEGALOPUS. Fabricius, Latreille.

ANTIPUS? De Geer.

Antennæ almost serrated, inserted at the internal margin of the eyes, shorter than the thorax. Palpi filiform, terminated by an elongate, very pointed, and conic joint. Thorax almost quadrate. Body little lengthened.

Nigricornis. *Sp.* 1. *Nigricornis.*

Megalopus nigricornis. Fabricius, Latreille. *Gen. Crust. et Ins.* 3. tab. 11. fig. 5.

Inhabits South America.

303. ORSODACHNA. GENUS CCCIII. ORSODACHNA. Latreille.

CRIOCERIS. Geoffroy, Fabricius, Paykull, Panzer.

Antennæ simple, inserted before the eyes, as long as the thorax or less. Maxillary palpi thick and truncate at their extremities. Body long. Thorax elongate. Eyes globose.

Cerasi. *Sp.* 1. *Cerasi.*

Crioceris cerasi. Fabricius.

Orsodachna chlorotica. Latreille.

Inhabits Sweden, Germany, and France.

304. SAGRA. GENUS CCCIV. SAGRA. Fabricius, Latreille, Herbst.

ALURNUS. Olivier.

TENEBRIO. Sulzer.

Antennæ simple, inserted before the eyes. Palpi filiform, the last joint somewhat ovate, the apex acute. Eyes lunate. Hinder feet, especially the thighs, very thick. Body elongate.

Femorata. *Sp.* 1. *Femorata.*

Sagra femorata. Herbst, Fabr. Latr.

Alurnus femoratus. Olivier.

Inhabits Africa.

FAMILY II. *Criocerida.*

Mandibles bifid or notched at their extremities.

305. DONACIA. GENUS CCCV. DONACIA. Fabr. Payk. Hoppe, Oliv. Latr.

LEPTURA. Linn. Marsh.

Antennæ with elongate cylindric joints, those of the base obconic. Eyes not notched. Abdomen elongate-triangular. Hinder thighs thick.

* Hinder thighs dentated.

Micans. *Sp.* 1. *Micans.*

Donacia micans. Hoppe.

Leptura micans. Marsh.

Inhabits Europe.

** Hinder thighs simple.

Simplex. *Sp.* 2. *Simplex.*

Leptura simplex. Marsham.

Inhabits Europe.

306. CRIOCERIS. GENUS CCCVI. CRIOCERIS. Geoff. Oliv. Lamarck.

CHRYSOMELA. Linn. De Geer.

LEMA. Fabricius.

AUCHENIA. Marsham.

Antennæ moniliform, with the exception of the basal joints which are globose. Eyes notched. Neck distinct. Abdomen quadrate.

Merdigera. *Sp.* 1. *Merdigera.*

Crioceris merdigera. Latreille.

Lema merdigera. Fabricius.

Auchenia merdigera. Marsham.

Chrysomela merdigera. Linn.

Inhabits the white lily.

TRIBE IX. CHRYSOMELIDES.

Lip not cordiform. Maxillæ with their external division resembling a biarticulate palpus. Body more or less ovoid or oval. Thorax transverse, or not longer than broad.

FAMILY I. *Cassidida.*

Palpi very small. Antennæ inserted near each other between the eyes, at a distance from the mouth.

DIVISION I.

Body elongate. Thorax almost quadrate.

307. ALURNUS. GENUS CCCVII. ALURNUS. Fabricius, Latreille.

Metabolia.

Hispa. Olivier.

Body not spinose. Mandibles terminated by a strong hook.

Grossus. *Sp.* 1. *Grossus.*

Alurnus grossus. Fabricius, Latreille.

308. Hispa. Genus CCCVIII. Hispa. Linn. Fabricius, Olivier.

Crioceris. Olivier.

Body spinose. Mandibles with their points bidentate.

Atra. *Sp.* 1. *Atra.*

Hispa atra. Linn. Fabricius, Olivier, Panzer.

Inhabits Europe. This species has been introduced into the British *Fauna* on dubious authority.

Division II.

Thorax semicircular. Body shield-shaped.

309. Himatidium. Genus CCCIX. Himatidium. Illiger.

Imatidium. Fabricius, Latreille.

Antennæ entirely exserted, cylindric. Body nearly quadrate.

Leayanum. *Sp.* 1. *Leayanum.*

Imatidium leayanum. Latreille.

310. Cassida. Genus CCCX. Cassida. Linn. Fabr. Latr. &c.

Antennæ thicker towards their extremities, their base concealed by the thorax. Body nearly orbiculate.

Equestris. *Sp.* 1. *Equestris.*

Cassida equestris. Fabr. Payk. Panz. Latr.

Cassida viridis. Marsham, Illiger.

Inhabits *Mentha sylvestris.*

Family II. *Galerucida.*

Maxillary palpi very apparent. Antennæ inserted very near to each other, between the eyes, towards the middle of the face.

Division I.

Feet not formed for leaping.

311. Adorium. Genus CCCXI. Adorium. Fabricius, Latreille.

Oides. Weber.

Palpi with the last joint but one dilated, the last short, nearly cylindric, truncate. Antennæ almost orbicular. Elytra with their exterior margin arcuated.

Bipunctatum. *Sp.* 1. *Bipunctatum.*

Adorium bipunctatum. Fabricius, Latreille.

Oides bipunctata. Weber.

Inhabits Eastern India.

312. Galeruca. Genus CCCXII. Galeruca. Geoff. Latr. Fabr. Oliv.

Chrysomela. Linn. De Geer, Marsham.

Palpi with the two last joints very slightly different in size, the last conic. Antennæ shorter than the body, the joints obconic, the second joint half the length of the third.

Tanaceti. *Sp.* 1. *Tanaceti.*

Chrysomela tanaceti. Marsham.

Galeruca tanaceti. Latreille, Fabricius.

Inhabits Europe.

313. Adimonia. Genus CCCXIII. Adimonia. Schrank.

Galeruca. Latreille, Fabricius.

Crioceris. Fabricius.

Palpi with the two last joints not very different in size, the last joint conic. Antennæ shorter than the body, the joint obconic, with the second and third joints shorter than the fourth joint.

Nigricornis. *Sp.* 1. *Nigricornis.*

Crioceris nigricornis. Fabricius.

Galeruca nigricornis. Latreille.

Inhabits Europe.

Alni. *Sp.* 2. *Alni.*

Chrysomela alni. Marsham.

Galeruca alni. Latreille, Fabricius.

Inhabits Europe.

314. Luperus. Genus CCCXIV. Luperus. Geoff. Oliv. Latr.

Crioceris. Fabricius.

Palpi with the two last joints nearly equal in size, the last conic. Antennæ as long as the body, the joint cylindric, elongate.

Flavipes. *Sp.* 1. *Flavipes.*

Luperus flavipes. Latreille.

Crioceris flavipes. Fabricius.

Inhabits Europe.

Rufipes. *Sp.* 2. *Rufipes.*

Crioceris rufipes. Fabricius.

Inhabits Europe.

Division II.

Hinder feet formed for leaping, the thighs being incrassated.

315. Haltica. Genus CCCXV. Haltica.

Altica. Geoffroy, Olivier, Panzer, Latreille.

Chrysomela. Linn. De Geer, Marsham.

Crioceris. Fabricius.

Lema. Fabricius.

Galeruca. Fabricius.

Antennæ with the second joint generally a little shorter than the second.

* Body ovate.

Oleracea. *Sp.* 1. *Oleracea.*

Altica oleracea. Latreille, Panzer.

Gallernea oleracea. Fabricius.

Inhabits Europe.

** Body nearly orbiculate.

Testacea. *Sp.* 2. *Testacea.*

Galeruca testacea. Fabricius.

Altica testacea. Latreille.

Inhabits Europe.

Family III. *Chrysomelida.*

Maxillary palpi very apparent. Antennæ inserted before the eyes, gradually thickening towards their points. Head nutant, forming an obtuse angle with the thorax.

Division I.

Mandibles short, obtuse, truncated, or terminated by a very short point. Antennæ with the four last joints globose or turbinated.

Subdivision 1.

Antennæ with the four last joints turbinated. Body hemispheric or oval. Thorax transverse.

316. Paropsis. Genus CCCXVI. Paropsis. Olivier, Latreille.

Notoclea. Marsham.

Maxillary palpi terminated by a securiform joint. Body hemispherical.

Australasiæ. *Sp.* 1. *Australasiæ.*

Paropsis Australasiæ. Olivier.

Inhabits New Holland.

317. Doryphora. Genus CCCXVII. Doryphora. Oliv. Latr. Illiger.

Chrysomela. Fabricius.

Maxillary palpi terminated by a transverse joint shorter than the one before it. Sternum with its middle produced into a horn.

Punctatissima. *Sp.* 1. *Punctatissima.*

Chrysomela punctatissima. Fabricius.

Doryphora punctatissima. Illiger, Latreille.

318. Chrysomele. Genus CCCXVIII. Chrysomele. Latr. Fabr. Oliv.

Metabolia. Palpi terminated by two joints of nearly an equal length, the last almost ovoid truncate, or nearly cylindric. Sternum not produced.

* Thorax with the sides incrassated, as if margined: Body ovate-quadrate.

Banksii. *Sp.* 1. *Banksii.*
Chrysomela Banksii. Fabricius, Latreille, Marsham.
Inhabits Europe.

** Thorax with the sides not incrassated. Body ovate quadrate.

Litura. *Sp.* 2. *Litura.*
Chrysomela litura. Fabricius, Latreille, Marsham.
Inhabits the broom.

** Body elongate-ovate-quadrate.

Marginella. *Sp.* 3. *Marginella.*
Chrysomela marginella. Fabricius, Latreille.
Inhabits Europe.

Subdivision 2.

Antennæ with the four last joints semi-globose almost forming a club. Body elongate-quadrate. Thorax as long as broad.

319. Helodes. Genus CCCXIX. Helodes. Paykull, Fabricius, Olivier.
Prasocuris. Latreille.
Chrysomela. Marsham, Hellwig.
Palpi short, thicker at their middle, the last joint short-obconic.

Phellandrii. *Sp.* 1. *Phellandrii.*
Helodes phellandrii. Paykull, Fabricius.
Prosocuris phellandrii. Latreille.
Inhabits Europe.

Violacea. *Sp.* 2. *Violacea.*
Helodes violacea. Fabricius.
Chrysomela beccabungæ. Hellwig, Marsham.
Inhabits Europe.

Division II.

Mandibles abruptly arcuated, terminated by a very strong point. Antennæ with the four last joints elongate, compressed, reversed-conic, the last long almost elliptic, and terminated by a point resembling an additional joint.

320. Colaspis. Genus CCCXX. Colaspis. Fabricius, Latreille.
Maxillary palpi terminated by a large joint, nearly ovoid.

Surinamensis. *Sp.* 1. *Surinamensis.*
Colaspis Surinamensis. Latreille.
Inhabits Surinam.

Family IV. *Cryptocephalida.*

Maxillary palpi very apparent. Antennæ inserted before the eyes. Head vertical.

Division I.

Palpi with the last joint thick, ovoid. Body nearly ovoid.

321. Eumolpus. Genus CCCXXI. Eumolpus. Kugellan, Weber, Fabricius, Latreille.
Cryptocephalus. Olivier, Geoffroy.
Thorax with a very convex back, which is gibbose.

Vitis. *Sp.* 1. *Vitis.*
Cryptocephalus vitis. Fabricius.
Eumpolus vitis. Fabricius, Latreille.
Inhabits Europe on the vine.

Division II.

* Palpi with the last joint conic-cylindric. Body short-cylindric.

Metabolia. Genus CCCXXII. Cryptocephalus. Geoffroy, Fabricius, Olivier, Latreille, Lamarck, Marsham. 322. Cryptocephalus.
Chrysomela. Linn. De Geer.
Antennæ simple, filiform, about the length of the body.

Sericeus. *Sp.* 1. *Sericeus.*
Chrysomela sericea. Linn.
Cryptocephalus sericeus. Fabricius, Olivier, Marsh.
Inhabits the flowers of the Dandelion.

Genus CCCXXIII. Clythra. Laicharting, Fabricius, Olivier, Latreille. 323. Clythra.
Chrysomela. Linn.
Melolontha. Geoffroy.
Cryptocephalus. Marsham.
Antennæ short, serrated, exserted. Palpi alike.

Quadripunctata. *Sp.* 1. *Quadripunctata.*
Clythra quadripunctata. Fabricius, Latreille.
Cryptocephalus quadripunctatus. Marsham.
Chrysomela quadripunctata. Linn.
Inhabits Europe.

Genus CCCXXIV. Clamys. Knoch, Latreille. 324. Clamys.
Clythra. Fabricius, Olivier.
Labial palpi furcate. Feet contractile. Antennæ short, serrated, lodged in a rim of the thorax.

Monstrosa. *Sp.* 1. *Monstrosa.*
Clythra monstrosa. Fabricius.
Chlamys monstrosa. Latreille.

Subdivision 1.

Antennæ a perfoliated club. Maxillæ with their internal side unguiculated.

Tribe X. Erotylides.

Family I. *Erotylida.*

Palpi all terminated by large, semilunar, or securiform joints.

Division I.

Antennæ with their intermediate joints elongate, nearly cylindric or obconic. Body much elevated. Thorax flat. Tibiæ slender, nearly cylindric.

Genus CCCXXV. Erotylus. Fabr. Oliv. Latr. 325. Erotylus.
Body ovate or oval.

Gibbosus. *Sp.* 1. *Gibbosus.*
Erotylus gibbosus. Fabricius, Latreille.

Genus CCCXXVI. Ægithus. Fabricius. 326. Ægithus.
Erotylus. Latreille.
Body hemispheric.

Division II.

Antennæ moniliform below, terminated by an ovoid club. Thorax elevated at the middle. Tibiæ elongate-triangular.

Genus CCCXXVII. Tritoma. Fabr. Oliv. Latr. 327. Tritoma.
Body short-ovate, the back elevated in the middle. Thorax with the middle of the hinder margin dilated into an angle.

Bipustulatum. *Sp.* 1. *Bipustulatum.*
Tritoma bipustulatum. Fabricius, Paykull, Latreille.
Inhabits Boleti.

Genus CCCXXVIII. Triplax. Payk. Fabr. Oliv. 328. Triplax.
Silpha. Linn. Marsham.
Body oval.

Russica. *Sp.* 1. *Russica.*
Silpha russica. Linn. Marsham.
Triplax russica. Paykull, Fabricius.
Tritoma russica. Latreille.
Inhabits dead trees and fungi.

Metabolia.

FAMILY II. *Phalacrurida.*

Maxillary palpi filiform, or thicker towards their extremities.

DIVISION I.

Tarsi with the penultimate joint, bilobate. Body not contractile into a ball.

Subdivision 1.

Body linear.

329. LANGURIA. GENUS CCCXXIX. LANGURIA. Latreille.
TROGOSITA. Fabricius.
Antennæ with a five-jointed club.

Bicolor. *Sp.* 1. *Bicolor.*
Languria bicolor. Latreille.
Trogosita bicolor. Fabricius.
Inhabits North America.

Subdivision 2.

Body hemispheric.

330. PHALACRUS. GENUS CCCXXX. PHALACRUS. Latreille, Paykull.
SPHÆRIDIUM. Fabricius.
DERMESTES. Scopoli, Marsham.
ANISOTOMA. Illiger, Fabricius.
VOLVOXIS. Kugellan.
Antennæ with a three-jointed club.

Bicolor. *Sp.* 1. *Bicolor.*
Phalacrus bicolor. Paykull, Latreille.
Dermestes calthæ. Scopoli.
Anisotoma bicolor. Illiger Fabricius.
Inhabits flowers in Europe.

DIVISION II. *

Tarsi with the joints entire. Body nearly globose, contractable into a ball.

331. AGATHIDIUM. GENUS CCCXXXI. AGATHIDIUM. Illiger, Latr.
ANISOTOMA. Fabricius.
SPHÆRIDIUM. Olivier.
VOLVOXIS. Kugellan.
Antennæ with a three-jointed club.

Nigripenne. *Sp.* 1. *Nigripenne.*
Agathidium nigripenne. Illiger, Latreille.
Sphæridium ruficolle. Olivier.
Anisotoma nigripennis. Fabricius.
Inhabits Europe.

SECTION IV. TRIMERA.

Tarsi all three-jointed.

TRIBE I. COCCINELLIDES.

Antennæ shorter than the thorax. Maxillary palpi terminated by a very large securiform joint. Body hemispheric. Thorax transverse, the hinder margin arcuated.

332. SCYMNUS. GENUS CCCXXXII. SCYMNUS. Herbst, Kugellan.
COCCINELLA. Latr. Fabr.
Thorax scarcely narrower than the elytra, the lateral and external margins meeting together. Body ovate, pubescent.

Biverrucata. *Sp.* 1. *Biverrucata.*
Coccinella biverrucata. Fabr.
Inhabits Europe.

333. COCCINELLA. GENUS CCCXXXIII. COCCINELLA.† Linn. Fabr. Latr. &c.
Thorax (even behind) narrower than the elytra. Body hemispheric, approaching to ovate. Metabolia.

Sp. 1. *Septempunctata,* (common *Lady-cow*). Septempunctata.
Coccinella septempunctata. Linn. Fabr. &c.
Inhabits Europe.

GENUS CCCXXXIV. CHILOCORUS. Leach's MSS. 334. CHILOCORUS.
COCCINELLA. Fabr. Latr. Marsh.
Thorax lunate, without hinder angles. Body entirely marginated.

Sp. 1. *Cacti.* Cacti.
Coccinella cacti. Fabr. Latr.
Chilocorus cacti. Leach's MSS.
Inhabits Europe.

TRIBE II. ENDOMYCHIDES.

Antennæ longer than the thorax. Maxillary palpi not terminated by a large joint. Body more or less ovoid. Thorax almost quadrate.

GENUS CCCXXXV. EUMORPHUS. Weber, Latr. Fabr. 335. EUMORPHUS.

Antennæ with the third joint very long. Maxillary palpi filiform. Labial palpi with the two last joints an obtrigonate head.

Sp. 1. *Kirbyanus.* Kirbyanus.
Eumorphus Kirbianus. Latr. *Gen. Crust. et Ins.* iii. 72.
Eumorphus immarginatus. Latr. *Gen. Crust. et Ins.* Tab. xi. fig. 12.
Inhabits eastern India.

GENUS CCXXXVI. ENDOMYCHUS. Payk. Fabr. 336. ENDOMYCHUS.
CHRYSOMELA. Linn. De Geer.
TENEBRIO. Marsh.
Antennæ with the greater portion of their joints very short, nearly cylindric; the ninth longer than the one before it; the last with the apex truncate or obtuse. Palpi with their extremities thicker. Thighs not abruptly clavate. Body ovate. Thorax short, with the base gradually enlarging from the apex, not narrowed behind. Mandibles with their points distinctly bifid or bidentate.

Sp. 1. *Coccineus.* Coccineus.
Chrysomela coccinea. Linn.
Endomychus coccineus. Payk. Latr. Fabr.
Tenebrio coccineus. Marsh.
Inhabits Europe.

GENUS CCCXXXVII. LYCOPERDINA. Latr. 337. LYCOPERDINA.
ENDOMYCHUS. Fabr. Payk. Oliv.
TENEBRIO. Marsh.
Antennæ moniliform, gradually thickening towards their extremities, the ninth joint scarcely longer than the one before it. Maxillary palpi filiform. Labial palpi with the last joint large, almost ovoid. Thighs abruptly clavate. Body elongate-ovate. Thorax with the anterior angles a little dilated, narrowed behind. Mandibles with their points very acute, undivided.

Sp. 1. *Bovistæ.* Bovistæ.
Endomychus bovistæ. Payk. Fabr.
Tenebrio bovistæ. Marsh.
Lycoperdina immaculata. Latr.
Inhabits Europe.

SECT. V. DIMERA.

Tarsi with two joints.

TRIBE I. PSELAPHIDES.

Elytra short. Antennæ eleven-jointed. Mandibles in all.

* The genus *Clypeaster* of Andersch has nine joints in its antennæ, and a clypeiform thorax shielding the head.
† The British species are to form the subject of a paper for the Linnæan Society, by Mr Stephens, an acute entomologist.

Metabolia.

338. Pselaphus.

Genus CCCXXXVIII. Pselaphus. Herbst, Paykull, Illiger, Latreille, Panzer.

Anthicus. Fabr.

Antennæ with the two or three last joints larger than the rest, the extreme joint ovoid. Labial palpi much shorter than the maxillary ones, the last joint very long, cylindric. Maxillary palpi much porrected. Tarsi with one nail.

Impressus.

Sp. 1. *Impressus.*

Pselaphus impressus. Panzer, Latr.

Inhabits Europe. It sometimes occurs in Battersea fields amongst the roots of grass.

339. Chennium.

Genus CCCXXXIX. Chennium. Latr.

Antennæ with the ten first joints nearly equal, lenticular; the last largest, semiglobose. Palpi very small, not exserted. Tarsi with two nails.

Bituberculatum.

Sp. 1. *Bituberculatum.*

Chennium bituberculatum. Latr.

Inhabits France.

Tribe II. Clavigerides.

Elytra short. Antennæ six-jointed. Mandibles none.

340. Claviger.

Genus CCCXL. Claviger. Preysler, Illiger, Latreille.

Antennæ with the middle joints semiglobose, the last larger, short-cylindric. Palpi very small. Tarsi with one nail.

Order IV. STREPSIPTERA.

Order Strepsiptera. Kirby.

Order Hymenoptera. Rossi.

We are indebted to Rossi for the discovery of the type of this highly interesting order of insects. The insect discovered by this author was denominated *Xenops Vesparum*, and was by him, without hesitation or comment, assigned a place among the hymenopterous insects, next to *Ichneumon*. The Rev. William Kirby, who first called the attention of entomologists to a British insect named *Stylops Melittæ*, was the first author who observed that it possessed characters different from those of any of the established orders of insects; and this opinion has been since confirmed by Mons. Latreille, who, in the end of his *Genera Crustaceorum et Insectorum*, thus expresses himself. "*Insectum prorsus singulare* (Stylops melittæ, *Dom. Kirby*), *a Dom. Brebisson accepi. Systemata Entomologica perturbare videtur, cum ex omnibus ordinibus repellatur.* Xenops Vesparum *Rossi animal præcedenti affine et animum pariter excrucians. Tempus ducamus et dies alteri lucem afferrent.*" The time he predicted has arrived; and it has been left to the lucid genius of Kirby to substantiate and to characterise this order, which he has done in a paper published in the 11th volume of the *Transactions of the Linnean Society*, from which we shall extract a brief history of the order, genera, and species.

"*Characters of the Order.*

"Body oblong or linear-oblong, somewhat cylindric, covered with a horny integument.

"Head sessile, broader than the trunk, transverse and large. Mouth with no visible labrum, labium, or maxillæ. Mandibles two, corneous, elongate, linear, very narrow; the apex acute, forficate, inserted under the head at the base of the palpi, which are two, biarticulate and very distant. Antennæ inserted in an excavation in the front; base with a two or three-jointed common peduncle, composed of very short joints, terminated by two elongate branches.

"Trunk oblong; wings with nerveures diverging like rays, folding longitudinally, somewhat membranaceous; elytra as if affixed to the base or coxæ of the anterior feet, linear, or somewhat spoon-shaped, at first diverging from the body, and then curving inwards again, lastly again recurving, and not in the slightest degree covering the wings. Legs equal or nearly so in length, compressed; the four anterior ones approximate, the hinder pair remote; all furnished with trochanters, of which the two hinder ones are shortest. Tarsi four-jointed, the first joint largest, the last unarmed."*

Metabolia.

341. Stylops.

Genus CCCXLI. Stylops. Kirby.

Antennæ bipartite; the branches compressed; the superior branch articulated. Palpi first obconic, large, compressed; second, semi-ovate acute, hollow beneath. Eyes pedunculated, composed of numerous hexagons, the septa but little elevated. Abdomen fleshy, retractile within a process of the trunk. Tarsi with the last joint notched. Mandibles thicker at their extremities.

Larva unknown; it resides within the bodies of the *Andrenides*.

Pupa with a fleshy body, bearing a corneous exserted head. It is found between the joints of the abdomen of certain *Andrenides*.

Melittæ.

Sp. 1. *Melittæ.*

342. Xenops.

Genus CCCXLII. Xenops. Rossi, Kirby.

Antennæ bipartite; the branches not jointed, semi-rounded. Palpi, first joint compressed, flexuous; second ovate, acute. Eyes pedunculated, composed of fewer hexagons than those of Stylops; the septa thicker, and more elevated. Abdomen exserted, horny; anus fleshy. Tarsi with last joint entire. Mandibles thicker towards their middle; apex acute.

Larva parasitical in the bodies of the *Vespides*; body lancionate, plicate, fleshy; head compressed.

Pupa parasitical under the joints of the abdomen of the *Vespides*. Body linear, fleshy; head horny and exserted; opercula of the eyes fenestrated; the windows hexagonal.

Peckii.

Sp. 1. *Peckii.* Sooty-black-brown; antennæ with the branches more dilute, dotted with white; anus pale; feet lurid; tarsi brown. Length 1½ line.

Xenos peckii. Kirby, *Lin. Trans.* xi. tab. 8. and 9.

The larva and papa inhabit the body of *Polistes fuscata* of Fabricius, which is found in America.

Body sooty-black-brown, covered with a velvet-down, which can only be seen by means of a very strong glass. Head between the antennæ longitudinally elevated. Palpi with first joint longest. Antennæ longer than the head; branches pale brown, almost diaphanous, sprinkled with minute dots of white. Thorax behind, in the middle, obtusely angulate. Scutellum longitudinally and broadly grooved or channelled. Postlumbium pale. Wings cinereous-whitish, the margin thicker, the nerves black. Legs cinereous, or rather lurid. Tarsi blackish. Abdomen darker than the rest of the body. Anus pale red.

The branches of the antennæ have their inner surface plain, and are probably, under certain circumstances, applied to each other, so as to form a single columnar branch. The white dots, Mr Kirby suspects, may

* We have considered it as unnecessary to give the detailed character; we must therefore refer to Mr Kirby's paper, *Linn. Trans.* vol. xi. p. 109—112.

Metabolia. emit a light (whilst the animal is living); but he gives this idea as a mere conjecture.

The discovery of this curious insect is due to the assiduous researches of William Dandridge Peck, Esq. professor of natural history in Harward University, Cambridge, New England, who sent specimens, with drawings made from the recent animal, to the celebrated author of the *Monographia Apum Angliæ*, with the following statement, which we have extracted from his letter to Mr Kirby.*

"Your having met with the remains of *Strepsiptera* in foreign *Vespides*, made me determine to look for them in those of this country; and I have the pleasure to find one in a species of *Polistes* that is here very abundant. The abdomen of this *Polistes* is so distorted by them, that I have no difficulty in knowing them when on the wing Taking them with the gauze forceps, bringing them into a close room, and permitting them to fly to the windows, I caught them again with a wine-glass and a card, fed them with sugar, and thus preserved them till their parasites were disclosed. I had not the pleasure to see them emerge, but I found them soon after. I obtained four in this way, and brought several nests of the *Polistes* into the house, taking them in the night, when all the inhabitants were at home, in the hopes of obtaining more; but I got no living ones.

"All that I know of this animal, was picked up in a few days that I passed at my little place at Newberry. In feeding, the head of the larva is near the base of the abdomen of the wasp, as I found by dissection. When the feeding state is passed, it is easy to conceive that it turns, and with its flattened head separates the membrane which connects the abdominal scuta, and protrudes itself a little way, accurately closing the aperture, which is just large enough to admit it. All this time the wasp is active, and associates with its companions. When just protruded, the head of the larva is of a pale brownish colour; by degrees it assumes a rounder form, and becomes almost black.

"The pupa state ensues; but I suspect that only the part exposed to the air, and that immediately under the pressure of the abdominal ring, becomes hard.

"The four I took were all alike, and I concluded that they were males, from the circumstance of their vibrating their wings, which several lepidopterous insects of that sex do likewise. Be assured, that this indicates eager desire. So my insect, which I confined under a watch-crystal, coursed round its prison, with surprising trepidation, as long as it lived, which was but a few hours."

Rossii. *Sp.* 2. *Rossii.* Deep-black; branches of the antennæ compressed; tarsi brown.

Xenops vesparum. Rossi.

Xenops rossii. Kirby.

Inhabits Polistes Gallica, in Italy.

Body black, smoky. Head small. Palpi with the first joint short, rounded; the second elongate, compressed. Antennæ scarcely longer than the head, though compressed, as if ensiform. Tarsi (four) brown, white beneath.

"Rossi, in his description, which, extraordinary as he deemed his insect, appears to have been drawn up from a very cursory and inaccurate survey of it, mistakes the mandibles for setæ, and seems not to have traced them to their point of insertion under the head, since he merely says, '*Labium breve, medio setigerum.*' He takes no notice of the eyes being placed in a footstalk or pillar. The elytra he regards as an appendage of the thorax, something similar to the haltares or poisers of the *Diptera*."

Metabolia.

Mr Kirby has never seen *Xenops Rossi*, but has merely copied Rossi's account. Upon comparing the descriptions of the two species, we find that they not only differ in colour, but also in the length of the first joint of the palpi compared with the second, and in the form of the branches of the antennæ. Rossi makes no mention of the minute white dots which render those of *Xenops Peckii* so very remarkable; we therefore think, that Mr Kirby is fully justified in considering them as distinct. Should the proportion of the joints of the palpi be found in nature to be the same as expressed in Rossi's figure, these animals cannot be referred even to the same genus, but must constitute a new one.

Order V. DERMAPTERA.

Order Dermaptera. Kirby.
Order Coleoptera. Linn. Marsh.
Order Orthoptera. Latr. Lam.

Characters of the Order.

Elytra somewhat crustaceous and abbreviated, of a square form; the suture straight. Wings membranaceous, externally coriaceous, large, folded transversely and longitudinally. Anus armed with a forceps, which is horny and moveable. Body linear depressed. Antennæ inserted before the eyes, composed of from twelve to thirty joints; the first articulation largest, the second very small, the others short, obconic, or nearly globose. Mandibles with their points bidentate. Palpi filiform, terminated with a very obscure tuberculiform little body or spine. Tarsi three-jointed, villose beneath. Eyes triangular-orbicular, and but little prominent.

Observation. The genera are founded on the number of joints in the antennæ.

Genus CCCXLIII. Forficula. Linn. Fabr. Latr. Lam. Cuv. 343. Forficula.

Antennæ composed of fourteen joints.

Sp. 1. *Auricularia.* Forceps at the base internally denticulated, and a little beneath with a tooth on each side. Elytra yellowish-brown, with the disc darker. Auricularia.

Forficula auricularia of authors.

Inhabits Europe. Mr Marsham has considered the sexes of this insect as two species, under the names *auricularia* and *neglecta*.

Genus CCCXLIV. Labia. Leach. 344. Labia.

Forficula. Fabr. Latr.

Antennæ twelve-jointed.

Sp. 1. *Minor.* Forceps denticulated within. Minor.

Forficula minor. Fabr. Panz.

Inhabits Europe. The forceps of the male are somewhat larger than that of the female, which character Mr Marsham has considered as specific.

Genus CCCXLV. Labidura. Leach. 345. Labidura.

Forficula. Fabr.

Antennæ with about 30 joints.

Sp. 1. *Gigantea.* Entirely testaceous-yellow. Gigantea.

Forficula gigantea. Fabr.

Inhabits Europe. It was discovered to inhabit Britain, by the Rev. William Bingley, who observed them on the sea-coast, near Christchurch, Hampshire, where they occurred in great abundance.

* We shall transcribe this part of Mr Kirby's paper, with the exception of the terms; which we shall change for those adopted in this article.

Metabolia.

Order VI. ORTHOPTERA.

Order Orthoptera. Oliv. Lam. Latr.
Class Ulonata. Fabr.
Order Hemiptera. Linn.

Characters of the Order.

Elytra coriaceous, the internal margin of one overlapping the same margin of the other. Wings membranaceous, the anterior margin coriaceous, longitudinally folded. Palpi short. Body elongate, narrow. Tarsi with four or three, very rarely with five joints.

Tribe I. Mantides.

Elytra and wings horizontal; the latter simply longitudinally folded. Tarsi five-jointed. Body somewhat cylindric or linear. Feet not formed for leaping.

Family I. *Phasmida.*

Anterior feet not raptorious. Thorax composed of two segments.

346. Phasma. Genus CCCXLVI. Phasma. Licht. Fabr. Latr. Leach.
Mantis. Linn. De Geer, Oliv.
Spectrum. Stoll. Lam.
Body cylindric, filiform, winged. Thorax cylindric, second segment much longer than the first. Feet simple.

Violascens. *Sp.* 1. *Violascens.* Green, with the external edge of the elytra yellowish; the wings, with the exception of the coriaceous margin, violet; the four hinder thighs spiny beneath.
Phasma violascens. Leach, *Zoolog. Miscel.* vol. i. p. 26. tab. 9.
Inhabits New Holland.

347. Spectrum. Genus CCCXLVII. Spectrum. Stoll. Lamarck, Leach.
Phasma. Fabricius, Latreille.
Body cylindric, filiform, without wings. Feet simple.

Rossium. *Sp.* 1. *Rossium*? Body green, or ash-coloured brown, somewhat obsoletely granulated, with a dorsal carinula; feet filiform, angulate-striate; thighs towards their joints beneath with one tooth.
Phasma rossia. Fabricius, Latreille.
Inhabits Italy and the southern parts of France.

348. Phyllium. Genus CCCXLVIII. Phyllium. Illiger, Latreille.
Mantis. Linn. Fabr. Oliv.
Phasma. Lich. Lam.
Spectrum. Stoll.
Body oblong, very much depressed, with elytra and wings. Abdomen oval or elliptic membranaceous.

Siccifolium. *Sp.* 1. *Siccifoluim.* Bright green.
Mantis siccifolia. Lin. Fabr. Donovan, *Nat. Hist. of the Insects of India*, No. 8. fig. 3.
Inhabits the Molucca Isles.

Family II. *Mantida.*

Anterior feet raptorious. Thorax composed of one segment.

349. Empusa. Genus CCCXLIX. Empusa. Illig. Latr.
Mantis. Linn. Fabr. Oliv. Stoll. Lam. Lich.
Antennæ of the male pectinated. Head produced into a horn. Four hinder feet having their knees adorned with leaf-processes.

Mendica. *Sp.* 1. *Mendica.*
Mantis mendica. Fabr. Latr. Stoll. *Mant.* tab. 12. fig. 47.

350. Mantis. Genus CCCL. Mantis. Linn. Latr. Fabr. Oliv. Lam. Lich. Latr. Stoll.

Antennæ in both sexes simple. Head without an horn. Legs all simple.

Religiosa. *Sp.* 1. *Religiosa.* Pale green, somewhat linear; thorax half the length of the elytra, three times longer than broad. Back, with the exception of the anterior part, longitudinally carinated. Lateral margins yellowish, denticulated. Elytra linear, glaucous transparent green, the exterior margin yellowish. Wings of the same colour with the elytra, but paler and more transparent, the tips brownish. Anterior legs with denticulated coxæ. Anterior thighs yellowish within, denticulated at the base beneath; the spines with black tips.
Mantis religiosa. Linn. Latr.
Le Mante. Geoffroy.
Mantis oratoria var β. Fabricius.
Gryllus religiosus. Scopoli.
Inhabits the commons and wastes of southern Europe.

Tribe II. Achetides.

Elytra horizontal. Wings longitudinally folded, often produced beyond the elytra. Tarsi three-jointed. Hinder feet formed for jumping.

Family I. *Gryllotalpida.*

Antennæ not longer than the thorax. Anterior feet compressed, formed for digging. Oviduct not exserted.

351. Gryllotalpa. Genus CCCLI. Gryllotalpa. Ray, Latreille.
Gryllus (*Acheta.*) Linn.
Acheta. Fabr.
Antennæ setaceous, composed of a vast number of joints, (beyond sixty.) Anterior tibiæ and tarsi formed for digging; two first joints of the tarsi very large, dentiform. Hinder feet little formed for jumping.

Vulgaris. *Sp.* 1. *Vulgaris.* Above fuscous, ferruginous-yellowish beneath; anterior tibiæ quadridentate; wings twice the length of the elytra.
Gryllus gryllotalpa. Linn.
Acheta gryllotalpa. Fabricius.
Gryllotalpa vulgaris. Latreille.
Inhabits Europe. The male sings in the evening by rubbing the elytra together.

Didactyla. *Sp.* 2. *Didactyla.* Anterior tibiæ bidentate.
Inhabits Cayenne.
This species has been confounded with *G. vulgaris* in several cabinets.

352. Tridactylus. Genus CCCLII. Tridactylus. Olivier, Latr.
Acheta. Coquebert.
Antennæ moniliform, (very short), ten-jointed. Anterior tibiæ with their joints only spinous. Hinder feet well calculated for leaping.

Paradoxus. *Sp.* 1. *Paradoxus.* Pale luteous; thorax pale fuscous, the sides pale luteous; elytra half the length of the abdomen, brown, hyaline externally with white tips; wings a little longer than the abdomen, with their base white, then pale brown, transversely striated.
Inhabits Guinea. It is the *Acheta digitata* of Coquebert, tab. 21. fig. 3.

Family II. *Achetida.*

Feet not formed for digging. Oviduct exserted. Antennæ longer than the thorax.

353. Acheta. Genus CCCLIII. Acheta. Fabr.
Gryllus. Linn. Geoff. Latr. Oliv. Lam.

Campestris. *Sp.* 1. *Campestris.* Body three times longer than broad, black, shining.
Gryllus campestris. Linn. Latr.
Acheta campestris. Fabricius.
Inhabits the temperate parts of Europe. Is not very common in Britain.

Metabolia.

Tribe III. Locustides.

Elytra and wings oblique. Hinder feet formed for jumping. Tarsi four-jointed. Antennæ setaceous.

334. Locusta.

Genus CCCLIV. Locusta.* Geoff. De Geer, Fabr. Oliv. Lam. Latr.

Gryllus (*tettigonia*). Linn.

Hinder feet twice the length of the body. Oviduct exserted.

Viridissima.

Sp. 1. *Viridissima.* Green; antennæ, vertex, dorsum of the thorax, and suture of the elytra, fuscous-ferrugineous.

Locusta viridissima. Fabricius, Latreille.

Gryllus viridissimus. Linn.

Inhabits Europe. In the autumn, the perfect insect may be found in great plenty near London.

Tribe IV. Gryllides.

Elytra and wings oblique. Hinder feet formed for jumping. Tarsi with three joints. Antennæ filiform or ensiform. Oviduct not exserted.

Family I. *Gryllida.*

Wings not covered by the scutellum.

355. Pneumora.

Genus CCCLV. Pneumora. Thunb. Latr.

Gryllus (*Locusta*). Linn.

Acrydium. De Geer, Olivier.

Antennæ filiform, composed of from 16 to 20 joints. Abdomen bladder like, as if inflated. Feet all shorter than the body.

The species of this curious genus are not well defined; we shall therefore be silent respecting them, lest we add to their confusion.

356. Truxalis.

Genus CCCLVI. Truxalis. Fabricius, Olivier, Lambert, Latreille.

Gryllus, (*Acrida.*) Linn.

Acrydium. De Geer.

Antennæ ensiform. Body narrow-elongate. Thorax behind dilated into an angle. Hinder legs longer than the body.

The species are numerous, but are little known, one species having been confounded with another.

Nasatus.

Sp. 1. *Nasatus.* Fabricius.

357. Gryllus.

Genus CCCLVII. Gryllus. Fabricius, Panzer.

Gryllus, (*Locusta.*) Linn.

Antennæ filiform, or terminated in a club. Hinder legs not, or scarcely, longer than the body.

This genus comprehends a vast number of species.

Migratorius.

Sp. 1. *Migratorius.* Thorax somewhat carinated; mandibles blue.

This species has been taken in Britain occasionally; but in the year 1748 it appeared in several irregular flights, in several parts of Europe, (as we have mentioned in our list of entomological writers,) and visited England, but they perished in a very short time, before they did much harm.

Of all the insects which are capable of adding to the calamities of the human race, locusts seem to possess the most formidable powers of destruction, Legions of these voracious animals, of various species, are produced in Africa, where the devastations they commit is almost incredible. The air is darkened by their numbers; they carry desolation with them wherever they pass; and, in the short space of a few hours, are said to change the most fertile provinces into a barren desert.

Some of the species serve as food, and are eaten fresh as well as salted. In the latter state they are constantly exposed to sale in the Levant; but the quantity of nutritious matter is said to be very small.

Metabolia.

Family II. *Acrydida.*

Wings covered by the scutellum.

358. Acrydrium.

Genus CCCLVIII. Acrydrium. Fabricius, Geoffroy, De Geer, Olivier.

Acheta. Lamarck.

Gryllus, (*Bulla.*) Linn.

Tetrix. Latreille.

Subulata.

Sp. 1. *Subulata.* Obscure testaceous brown, granulose; thorax carinated, marginated.

Gryllus subulatus. Linn.

Acrydrium subulatum. Fabricius, Olivier.

Tetrix subulata. Latreille.

Inhabits Europe. It is found in hot banks, and is subject to some variation in colour.

The species of *Acrydrium* are but little understood. We seem to possess three very distinct indigenous species, all varying in size, sculpture, and colour.

Order VII. DICTUOPTERA.

Order Hemiptera. Linn.
Class Ulonata. Fabricius.
Order Orthoptera. Latreille.
Order Dictuoptera. Leach.

Characters of the Order.

Elytra coriaceous, nervouse, decussating each other. Wings membranaceous, with a few longitudinal folds. Maxillary palpi elongate. Body depressed, oval, or somewhat orbicular. Tarsi with five joints.

359. Blatta.

Genus CCCLIX. Blatta. Linn. Fabricius, &c.

Orientalis.

Sp. 1. *Orientalis.* Elongate-ovate, ferruginous brown. Thorax semicircular, truncate before.

Inhabits North America. Is common in Europe in houses, but is not indigenous to that quarter of the globe.

The genus *Blatta* may be defined, (as it now stands,) to be a general reservoir for all insects, agreeing with the character of the order. Much might be done towards elucidating this hitherto neglected part of entomology; and we trust that some entomographer, who has time, will devote some share of his attention to the examination of the genera and species.

Order VIII. HEMIPTERA.

Order Hemiptera. Linn. Lamarck, Cuvier, Leach.
Class Rhyngota. Fabricius.
Order Hemiptera, Section 1. Heteroptera. Latr.

Characters of the Order.

Rostrum attached to the anterior extremity of the head. Elytra somewhat crustaceous, or coriaceous with the apex membranaceous, placed in an horizontal direction, one decussating the other. Thorax with the first segment, (which bears the feet,) larger than the following one. Haustellum with three setæ. Ocelli or little eyes, two, one obsolete.

Obs. The metamorphosis of all the order is semi-complete.

Section I. Terrestria.

Obs. The insects which compose this section are not

* *Locusta verrucivora* of Fabricius, *Gryllus verrucivorus* of Linnæus, has lately been taken in plenty near Rochester, by J. Herslow, Esq. of St John's College, Cambridge.

Metabolia.

only distinguished from the second section by their economy, but likewise by the structure of some essential organs. The antennæ of this division are exserted, and are very distinct.

Tribe I. Pentatomides.

Antennæ composed of five joints. Rostrum with four distinct joints, the three first of nearly an equal length. Labrum very long, striated. Tarsi with three distinct joints, the first elongate. Head trigonate, immersed even to the eyes in the thorax.

Family I. *Scutellerida.*

Scutellum elongate, covering the elytra and the wings.

360. Scutellera. Genus CCCLX. Scutellera. Lam. Latr. Leach.
Tetyra. Fabricius.
Cimex. Linn. Gmelin, Wolff.

Scutellum covering the whole of the abdomen, longer than broad. Thorax very narrow in front. Antennæ with the second joint shorter than the third.

Sexmaculata. *Sp.* 1. *Sexmaculata.* Red shining with silver; feet, antennæ, middle of the thorax, six spots on the scutellum, breast, epigastrium, and margin of the abdomen, black.

Scutellera sexmaculata. Leach's *Zoological Miscellany*, vol. i. p. 36. tab. 14.
Inhabits new Caledonia.

361. Tetyra. Genus CCCLXI. Tetyra. Fabricius, Leach.
Scutellera. Latreille.
Cimex. Linn.

Scutellum longer than broad, not covering the sides of the abdomen. Thorax very narrow in front. Antennæ with the second joint longer than the third.

Lineata. *Sp.* 1. *Lineata.* Red, thorax with six black lines; scutellum with four black spots; marginal spots of the abdomen, and six lines of black punctures.

Cimex lineatus. Linn.
Tetyra nigro-lineata. Fabricius.
Scutellera nigro-lineata. Latreille.
Inhabits the southern parts of Europe.

362. Thyreocoris. Genus CCCLXII. Thyreocoris. Schrank, Leach.
Scutellera. Latreille.
Tetyra. Fabricius.
Cimex. Wolff.

Scutellum broader than long. Antennæ with the second joint very short. Thorax with the anterior margin not much narrower than the hinder margin.

Globus. *Sp.* 1. *Globus.* Orbiculate, somewhat triangular, broader behind, shining brassy-black, punctate; base of antennæ, row of punctures on each side of the abdomen, and knees, red-yellowish; scutellum with an impressed arcuate line on each side of the base.

Tetyra globus. Fabricius.
Cimex globus. Wolff. *Icon. Cim.* fas. 1. p. 3. tab. 1. fig. 3.
Inhabits southern Europe.

Family II. *Pentatomida.*

Scutellum not covering the wings or elytra.

363. Ælia. Genus CCCLXIII. Ælia. Fabricius.
Cimex. Linn. Wolff.
Pentatoma. Latreille.

Body ovate. Thorax with the anterior margin much narrower than the hinder. Head longer than broad. Antennæ with the second joint not longer than the third; their base covered by the lateral margins of the head. Metabolia.

Acuminata. *Sp.* 1. *Acuminata.* Pale-yellowish, longitudinally lineated with fuscous, impressed-punctate; a fuscous band running down the middle of the back, divided by a whitish line; last joint of the antennæ red.

Cimex acuminatus. Linn.
Ælia acuminata. Fabricius.
Pentatoma acuminatum. Latreille.
Inhabits grassy places. It is rare in Britain.

364. Pentatoma. Genus CCCLXIV. Pentatoma. Olivier, Latreille.
Cimex. Fabricius, Wolff.

Body ovate. Thorax with the anterior margin much narrower than the hinder. Head with nearly equal diameters.

Bidens. *Sp.* 1. *Bidens.* Body griseous above; thorax with a lengthened spine on each side behind.

Cimex bidens. Fabricius.
Pentatoma bidens. Latreille.
Inhabits Europe.

Prasinus. *Sp.* 2. *Prasinus.* Green above; hinder angles of the thorax without spines.

Cimex prasinus. Fabricius.
Inhabits Europe.

365. Cydnus. Genus CCCLXV. Cydnus. Fabricius.
Pentatoma. Latreille.

Body ovate, somewhat orbicular; anterior margin of the thorax narrower than the hinder. Head nearly semicircular. Antennæ with the second joint longer than the third. Tibiæ spinulose.

Oleraceus. *Sp.* 1. *Oleraceus.* Brassy dark green; sides of the head and thorax with a longitudinal line, on the latter red; outer margin of the elytra, a spot on each, with two spots and the apex of the scutellum red; thighs, (apex excepted,) and middle of the tibiæ yellowish.
Inhabits Europe.

Tribe II. Coreides.

Antennæ composed of four joints. Rostrum with four distinct joints, the first three of nearly an equal length. Labrum very long, striated. Tarsi with three distinct joints, the first elongate. Head trigonate, immersed even to the eyes within the thorax.

366. Coreus. Genus CCCLXVI. Coreus.* Fabricius, Lamarck, Wolff. Latreille.
Cimex. Linn. Geoffroy, &c.

Antennæ inserted above a line drawn from the eyes to the base of the labrum; the last joint thick. Thorax with the anterior narrower than the posterior margin. Body ovate, the sides of the abdomen dilated. Head trigonate; neck not apparent.

Marginatus. *Sp.* 1. *Marginatus.* Red-fuscous, obscure; sides of the abdomen elevated, acute; antennæ with their internal base unidentate, the first and last joints blackish, the middle ones red; thighs beneath with a canal, and a few little teeth.

Coreus marginatus. Fabricius, Latreille.
Cimex marginatus. Linn.
Inhabits Europe. Is common on the dock.

367. Berytus. Genus CCCLXVII. Berytus. Fabricius.
Neides. Latreille.

Antennæ inserted above a line drawn from the eyes to the base of the labrum; geniculated about their middle; the first joint very long, the last thick. Body fili-

* From the Coreus, Dr Leach has formed a genus which he has named Myctis, the characters of which are vertex with two ocelli placed transversely; antennæ filiform, four-jointed, joints cylindric, equal, or with the first joint rather longest. Anterior four feet alike in size and form; hinder ones with thick thighs, and with the internal side of the tibiæ dilated; tarsi with the first joint longer than the other two conjoined. Body elongate, flat above; thorax triangular, very narrow in front; abdomen with dilated sides. This genus contains several species, one of which is figured in the first vol. of *Zoological Miscellany*, p. 92. tab. 40. under the title of *Myctis Crucifera*.

Metabolia.

form. Head somewhat conic; neck not apparent. Scutellum minute, linear-conic. Feet elongate. Thighs clavate.

Tipularius.

Sp. 1. *Tipularius.* Reddish-gray; antennæ as long as the body, with the last joint fuscous; clypeus acuminate, and produced; thorax with three elevated lines, which are parallel and longitudinal, two of these are marginal, the other dorsal; elytra striate nervous, impressed-punctate, spotted with fuscous.

Cimex tipularius. Linn.
Berytus tipularius. Fabricius.
Neides tipularius. Latreille.
Inhabits grassy places.

368. Lygæus.

Genus CCCLXVIII. Lygæus. Fabr. Wolff, Latr.
Cimex. Linn. De Geer, &c.

Antennæ filiform, inserted beneath a line drawn from the eyes to the base of the labrum. Body elongate-ovate. Head trigonate, neck not apparent.

Apterus.

Sp. 1. *Apterus.* Red, with black spots. Elytra abbreviated.

Cimex apterus. Stewart.
Lygæus apterus. Fabricius.
Inhabits Europe.

369. Capsus.

Genus CCCLXIX. Capsus. Fabricius, Latreille.
Cimex. Linn.
Lygæus. Wolff.

Head trigonate, neck not apparent. Antennæ setaceous; the second joint at the apex thick, the two last when combined, much shorter than the one before it.

Ater.

Sp. 1. *Ater.* Body black.
Inhabits Europe in grassy places every where.

370. Miris.

Genus CCCLXX. Miris. Fabr. Latr.
Cimex. Linn. Geoff. &c.
Lygæus. Wolff.

Antennæ setaceous, the second and following joints alike. Head trigonate. Neck not apparent.

Vagans.

Sp. 1. *Vagans.*
Lygæus Vagans. Wolff, &c. *Cim.* fas. 4. p. 159. tab. 16. fig. 153.

371. Myodocha.

Genus CCCLXXI. Myodocha. Latreille.
Cimex. De Geer.

Head ovoid, with a distinct neck. Antennæ slightly thicker towards their extremities.

Tipuloides.

Sp. 1. *Tipuloides.*
Cimex tipuloides. De Geer, *Mem. sur les Insectes*, 5. 354. tab. 35. fig. 18.
Myodocha tipuloides. Latreille.

Tribe III. Cimicides.

Rostrum with two or three distinct joints. Labrum very short, not projecting. Feet simple. Eyes not very large.

Family I. *Cimicida.*

Feet formed for walking on the earth, with distinct nails.

372. Nabis.

Genus CCCLXXII. Nabis. Latreille.
Cimex. De Geer.
Reduvius. Wolff.

Body not linear. Antennæ inserted below the middle of the head. Rostrum, with the second joint almost as long as the third. Thorax not bilobed.

Gigas.

Sp. 1. *Gigas.* Brown, obscurely rayed with red.
Reduvius gigas. Wolff. *Cim.* 12. fig. 113.

373. Reduvius.

Genus CCCLXXIII. Reduvius. Fabr. Oliv. Lam. Latr.
Cimex. Linn. Geoff. De Geer.

Body not linear. Antennæ inserted above a line drawn from the eyes to the base of the rostrum. Rostrum, with the middle joint evidently longer than the others. Thorax bilobate, abruptly elevated behind. Tibiæ alike, elongate, somewhat cylindric.

Metabolia.

Personatus.

Sp. 1. *Personatus.* Black.
Reduvius personatus. Fabr. Latr.
Inhabits Europe, is often found in houses, and is said to destroy the common house bug *Cimex lectularius.*

374. Petalochirus.

Genus CCCLXXIV. Petalochirus. Leach.
Petalocheirus. Palissot de Beauvois.
Reduvius. Latreille.

Body not linear. Rostrum, with the middle joint evidently longer than the others. Thorax abruptly elevated behind, bilobate. Anterior tibiæ dilated into an oval plate.

Variegatus.

Sp. 1. *Variegatus.* Body variegated.
Petalocheirus variegatus. Palissot de Beauvois.
Inhabits Africa.

375. Zelus.

Genus CCCLXXV. Zelus. Fabricius, Latreille.
Cimex. Linnæus, De Geer.

Body linear. Anterior pair of feet like the others in form; four hinder ones very long, and filiform.

Longipes.

Sp. 1. *Longipes.*
Zelus longipes. Fabr. Latr.

376. Ploiaria.

Genus CCCLXXVI. Ploiaria. Scopoli, Latreille.
Gerris. Fabricius, Schellenberg.
Cimex. Geoffroy.

Body filiform. Four posterior feet very long, filiform; anterior feet raptorious, with very long coxæ.

Vagebunda.

Sp. 1. *Vagebunda.*
Gerris vagebundus. Fabricius.

377. Cimex.

Genus CCCLXXVII. Cimex. Linn. Latr.
Acanthia. Fabricius.

Body depressed. Rostrum short, setaceous. Wings none.

Lectularius.

Sp. 1. *Lectularius.* Reddish brown, with short hair.
Cimex lectularius. Linn. Fabr. Latr. &c.
Acanthia lectularia. Fabricius.
Inhabits European houses, sucking the blood of man. The common bug.

378. Macrocephalus.

Genus CCCLXXVIII. Macrocephalus. Swederus.
Syrtis. Fabricius.
Acanthia. Schellenberg, Wolff.

Abdomen with the sides dilated into an angle. Anterior feet raptorious. Antennæ capitate, the last joint very large, elongate-ovate. Scutellum very large, unconnected with the thorax, covering nearly the whole of the abdomen.

Cimicoides.

Sp. 1. *Cimicoides.*
Macrocephalus cimicoides. Swederus, *Nov. Act. Stockh.* 8. 1787. 3. tab. 8. Fig. 1.
Syrtis manicata. Fabricius.
Inhabits Georgia and Carolina.

379. Phymata.

Genus CCCLXXIX. Phymata. Latreille, Leach.
Syrtis. Fabricius.
Acanthia. Schellenberg, Wolff.

Body membranaceous, lateral margins elevated. Thorax prolonged into a scutellum behind. Antennæ contiguous at their base, with the last joint thicker and larger, received into a cavity under the sides of the thorax. Anterior feet raptorious.

Crassipes.

Sp. 1. *Crassipes.*
Syrtis crassipes. Fabricius.
Phymata crassipes. Latreille.
Inhabits France and Germany.

380. Tingis.

Genus CCCLXXX.[1] Tingis. Fabricius, Latr.
Cimex. Linn. Geoff. De Geer.
Acanthia. Schrank, Schellenberg, Wolff.

Body entirely depressed, reticulated. Feet all simple. Antennæ terminated by an oval joint, the third joint very long.

Metabolia.

Cardui. *Sp.* 1. *Cardui.* Body greyish.
Tingis cardui. Fabricius, Panzer, Latreille.
Inhabits thistles.

380. ARADUS. GENUS CCCLXXX.[2] ARADUS. Fabricius, Panzer.
CIMEX. Linn. Geof. De Geer.
ACANTHIA. Schrank, Wolff.
COREUS. Schellenberg.
Body depressed. Feet all simple. Antennæ with cylindric joints, the second articulation longest.

Lunatus. *Sp.* 1. *Lunatus.*
Aradus lunatus. Fabricius, Latreille.
Inhabits Europe.

FAMILY II. *Gerrida.*

Feet very long, formed for walking on the water, with the nails very minute, inserted laterally into a fissure at the extremity of the last joint of the tarsi.

381. HYDROMETRA. GENUS CCCLXXXI. HYDROMETRA. Latreille, Lamarck, Fabricius.
CIMEX. Linnæus, Geoffroy.
AQUARIUS. Schellenberg.
Antennæ setaceous, the third joint much longer than the rest. Anterior feet simple. Head elongate-cylindric, apex thickened.

Stagnorum. *Sp.* 1. *Stagnorum.* Black above; feet brown-reddish.
Hydrometra stagnorum. Fabricius.
Cimex stagnorum. Linnæus.
Aquarius paludum. Schellenberg.
Inhabits Europe in moist places.

382. VELIA. GENUS CCCLXXXII. VELIA. Latreille.
CIMEX. Rossi.
HYDROMETRA. Fabricius.
Antennæ filiform, the first joint longest. Anterior feet raptorious. Rostrum two-jointed. Head somewhat vertical.

Rivulorum. *Sp.* 1. *Rivulorum.* Black; sides of the thorax and margins of the abdomen red. Thorax with two anterior punctures; each elytra with three, and a spot of white; inferior sides of the abdomen punctured with black.
Hydrometra rivulorum. Fabricius.
Velia rivulorum. Latreille.
Inhabits running water and springs.

Currens. *Sp.* 2. *Currens.* Apterous, black. Thorax anteriorly, with two silky white spots. Middle of the under part of the abdomen, and its elevated margin, with red punctures.
Velia currens. Latreille.
Hydrometra currens. Fabricius.
Inhabits Europe.
Dr Leach is of opinion, that this is merely the young state of the preceding species.

383. GERRIS. GENUS CCCLXXXIII. GERRIS. Latreille.
CIMEX. Linnæus, De Geer, Schrank, Geoffroy.
AQUARIUS. Schellenberg.
HYDROMETRA. Fabricius.
Antennæ filiform, the first joint longest, the last cylindric. Anterior feet raptorious. Rostrum three-jointed. Head porrected.

Paludum. *Sp.* 1. *Paludum.* Brown-olive, black above, cinereous, silky beneath. Abdomen nearly equally broad. Trunk as long as the head, carinated beneath, a series of impressed lines on each side. Antennæ and feet black. Thorax with an elevated line, extending to the middle of the back. Lateral margins of the thorax and abdomen with the anus reddish.
Hydrometra paludum. Fabricius.
Gerris paludum. Latreille.
Inhabits France, England, and Sweden.

Metabolia.

The species of this genus are certainly but little known; they are either subject to great variation, or are very numerous.

TRIBE IV. ACANTHIDES.

Labrum prominent. Eyes very large. Feet formed for walking and jumping.

384. ACANTHIA. GENUS CCCLXXXIV. ACANTHIA. Schrank, Latr.
CIMEX. Linnæus, De Geer, Geoffroy.
SALDA. Fabricius.
LYGÆUS. Wolff.
Antennæ filiform. Rostrum straight, long.

Maculata. *Sp.* 1. *Maculata.* Black spotted, with pale colour.
Acanthia maculata. Latreille.
Inhabits Europe in moist places.

385. LEPTOPUS. GENUS CCCLXXXV. LEPTOPUS. Dufour, Latr.
Antennæ setaceous. Rostrum arcuate, short.
Obs. Of the species we know nothing; the genus was first observed by Dufour in southern France.

SECTION II. AQUATICA.

Antennæ very minute, not exserted, inserted beneath the eyes.
Obs. All the insects of this Section live in the water.

TRIBE V. BELOSTOMIDES.

Tarsi alike, all cylindric, biarticulated, and furnished with nails. Body depressed.

FAMILY I. *Pelogonida.*

Anterior feet not raptorious.

386. PELOGONUS. GENUS CCCLXXXVI. PELOGONUS. Latreille.
Feet all formed for walking. Tarsi of the anterior pair of feet, with the first joint very short. Body orbiculate-ovate. Antennæ four-jointed.

Marginatus. *Sp.* 1. *Marginatus.*
Pelogonus marginatus. Latreille, *Gen. Crust. et Ins.* 3. 143.
Acanthie bordée. Latreille, *Hist. Nat. des Crust. et des Insect.* 12. p. 142.
Inhabits the south of France.

FAMILY II. *Belostomida.*

Anterior feet raptorious.

387. GALGULUS. GENUS CCCLXXXVII. GALGULUS. Latreille.
NAUCORIS. Fabricius.
Tarsi of all the feet biarticulate, cylindric, with two strong equal nails. Antennæ simple, inserted beneath the internal angle of the eyes, three-jointed.

Oculatus. *Sp.* 1. *Oculatus.*
Galgulus oculatus. Latreille.
Naucoris oculatus. Fabricius.
Inhabits Carolina.

388. BELOSTOMA. GENUS CCCLXXXVIII. BELOSTOMA. Latreille.
Tarsi of the anterior feet with a simple nail. Antennæ semi-pectinate, inserted under the eyes, four-jointed.

Testaceo-pallidum. *Sp.* 1. *Testaceo-pallidum.* Pale, testaceous, eyes cinereous.
Belostoma testaceo pallidum. Latreille.
Inhabits South America.

TRIBE VI. NEPIDES.

Anterior tarsi united with the tibiæ. Body depressed or linear.

FAMILY I. *Naucorida.*

Anus without setæ. Tarsi of the four posterior feet distinctly biarticulate. Antennæ four-jointed.

Metabolia.

389. Naucoris.

Genus CCCLXXXIX. Naucoris. Geoffroy, Fabricius, Olivier, Latreille.

Nepa. Linnæus, De Geer.

Four posterior feet ciliated, formed for swimming. Antennæ inserted beneath the eyes. Body ovate, much depressed.

Obs. This genus, in habit, make a near approach to the family *Belostomida*, and should perhaps be placed in that division.

Family II. *Nepida.*

Anus furnished with two setæ. Tarsi of the four posterior feet one jointed. Antennæ three jointed.

390. Nepa. Genus CCCXC. Nepa. Linn. De Geer, Fabr. Oliv. Lam. Latr.

Hepa. Geoffroy.

Rostrum perpendicularly inflected. Body oval. Anterior thighs thick. Four hinder feet not elongate-filiform.

Cinerea. *Sp.* 1. *Cinerea.* Dark-greyish-black.

Nepa cinerea. Linn. Fabr. Latr.

Punaise d'eau scorpion aquatique. De Geer.

Le Scorpion aquatique a corps ovale. Geoffroy.

Inhabits the ditches of Europe.

391. Ranatra. Genus CCCXCI. Ranatra. Fabr. Schellenberg, Latr.

Nepa. Linn. De Geer, Oliv. Lam.

Hepa. Geoffroy.

Rostrum porrected. Body linear. Four hinder feet very long, filiform. Thighs of anterior feet elongate.

Linearis. *Sp.* 1. *Linearis.* Greyish-brown.

Ranatra linearis. Fabr. Latr. Schell.

Nepa linearis. Linn.

Punaise d'eau scorpion allongé. De Geer.

Le Scorpion aquatique à corps allongé. Geoff.

Inhabits the ditches and ponds of Europe. It is very local in this country. It may occasionally be found near London in Copenhagen Fields, and in ponds near Hammersmith. It has likewise been taken near Halesworth in Suffolk.

Tribe VI. Notonectides.

Tarsi of anterior feet not united with the tibiæ. Body depressed cylindric, or cylindric-oval.

Family I. *Notonectida.*

Tarsi all with two joints.

392. Notonecta. Genus CCCXCII. Notonecta. Linn. Geoff. Fabr. Oliv. Latr.

Nepa. De Geer.

Scutellum triangular, large. Four anterior feet with strong nails; the hinder pair elongate, ciliated, with very minute nails.

Glauca. *Sp.* 1. *Glauca.*

Notonecta glauca. Linn. Fabr. Latr.

Inhabits fresh waters of Europe.

Family II. *Corixida.*

Tarsi of the four anterior feet one jointed, of the hinder pair two-jointed.

393. Corixa. Genus CCCXCIII. Corixa. Geoff. Oliv. Lam. Latr.

Notonecta. Linn.

Nepa. De Geer.

Sigara. Fabr. Schrank, Schellenberg.

Anterior pair of feet without nails; the other feet long, furnished with nails. Scutellum none.

Striata. *Sp.* 1. *Striata.*

Notonecta striata. Linn.

Sigara striata. Fabr.

Corixa striata. Latr.

This species seems to be subject to very great variety in colour and size. It occurs in almost every pond and rivulet, especially where the bottom is slimy.

Metabolia.

Order IX. OMOPTERA.

Order Hemiptera. Linn. Cuvier, Lamarck.

Cl s Rvngota. Fabricius.

Order Hemiptera, Section 2, *Homoptera.* Latr.

Order Omoptera. Leach.

Characters of the Order.

Rostrum attached to the inferior part of the head. Elytra coriaceous or membranaceous throughout, suture straight. Thorax composed of two segments, the second as long or longer than the first. Ocelli three.

Observe. Metamorphosis semicomplete, or incomplete.

Tribe I. Tettigonides.

Antennæ composed of six distinct joints. Ocelli or little eyes three. Tarsi with three joints.

394. Tettigonia. Genus CCCXCIV. Tettigonia. Fabr.

Cicada. Lamarck, Geoff. Linn. De Geer, Latr.

Thighs of the anterior feet thick, dentate.

Hæmatodes. *Sp.* 1. *Hæmatodes.* Body slightly silky tomentose, black; anterior segment and margins of the thorax, sides of the abdomen and nerveurs of the elytra, ferruginous-red.

Cicada hæmatodes. Linn. Latr.

Tettigonia sanguinea. Fabr.

Inhabits southern Europe.

Tribe II. Cicadides.

Antennæ three-jointed. Ocelli two. Tarsi with three joints.

Family I. *Fulgerida.*

Antennæ not inserted in the internal sinus of the eyes; the two first joints conjoined shorter than the head.

395. Fulgora. Genus CCCXCV. Fulgora. Linn. Fabr. Latr. Oliv. Cuv.

Front produced into a rostrum. Eyes globular.

Lanternaria. *Sp.* 1. *Lanternaria.* Rostrum very large oval. Elytra and wings variegated, with true wings ocellated.

Fulgora lanternaria. Linn. Fabr. Latr.

Inhabits Surinam. The rostrum of this, (as of all other species of the Genus) emits a phosphorescent light in the dark. The light of this species is so very vivid, as to enable one to read a newspaper.

Candelaria. *Sp.* 2. *Candelaria.* Front with a subulate, ascending rostrum. Elytra green, variegated with yellowish. Wings yellow with black tips.

Fulgora candelaria. Linn. Fabr. Donov.

Inhabits China, from whence it is very frequently sent home in collections of insects.

396. Flata. Genus CCCXCVI. Flata. Fabr.

Fulgora. Latreille.

Front as if truncated, vertical, not rostrated. Eyes globulare. Elytra very broad, the external margin very much dilated. Body broad triangular.

Reticulata. *Sp.* 1. *Reticulata.*

Flata reticulata. Latr.

Inhabits Europe.

397. Issus. Genus CCCXCVII. Issus. Fabr.

Metabolia.

FULGORA. Latr. Olivier.
CICADA. Villers.
Front as if truncated, not rostrated, vertical. Elytra at their external base very much dilated, with the apex narrower. Body short, deltoid. Eyes globular.

Coleoptratus. *Sp.* 1. *Coleoptratus.* Elytra greyish, often banded or variegated with black.

398. CIXIUS. GENUS CCCXCVIII. CIXIUS. Leach.
FULGORA. Latreille.
FLATA. Fabricius.
Front as if truncated, not rostrated, vertical. Elytra with the external margin nearly straight, or scarcely arcuate. Body elongate, quadrate. Eyes globular.

Nervosus. *Sp.* 1. *Nervosus.*
Flata nervosa. Fabricius.

399. TETIGOMETRA. GENUS CCCXCIX. TETIGOMETRA. Latr.
FULGORA. Panzer.
Antennæ cylindric; second joint somewhat ovate-rounded, twice as long as the first; the apex excavated for the insertion of the third or last joint. Body ovate and depressed. Eyes triangulate.

Virescens. *Sp.* 1. *Virescens.* Yellow-green eyes; and mouth black. Feet red.
Fulgora virescens. Panzer.
Tetigometra virescens. Latr.
Inhabits France and Germany.

FAMILY II. *Delphacida.*

Antennæ inserted in the internal sinus of the eyes, the two first joints as long, or longer than the head.

400. ASIRACA. GENUS CCCC. ASIRACA. Latr.
DELPHAX. Fabricius.
Antennæ as long or longer than the thorax, the first joint very long, compressed, angulate.

Clavicornis. *Sp.* 1. *Clavicornis.* Body brown, or obscure brown variegated; apex of the four anterior tibiæ white; elytra semihyaline; apex with a fuscous band; nerves spotted with fuscous.
Delphax clavicornis. Fabr.
Asiraca clavicornis. Latr.
Inhabits France and England in grassy places.

401. DELPHAX. GENUS CCCCI. DELPHAX. Fabr. Latr.
Antennæ not, or scarcely, longer than the head; the first joint much shorter than the second.

Pellucida. *Sp.* 1. *Pellucida.* Body pellucid.
Delphax pellucida. Fabr.
Inhabits Europe amongst grass.

FAMILY III. *Cercopida.*

Antennæ inserted between the eyes. Thorax not transverse, hinder margin more or less prominent.

402. CETALION. GENUS CCCCII. CETALION. Latr.
LYSTRA. Fabricius.
Antennæ inserted behind the frontlet.

Reticulatum. *Sp.* 1. *Reticulatum.*
Lestra reticulata. Fabricius.

403. CERCOPIS. GENUS CCCCIII. CERCOPIS. Fabr. Schrank, Latr.
CICADA. Linn.
TETTIGONIA. Olivier.
Antennæ inserted on the frontlet, the second longer than the first joint, the third joint short conic. Thorax not dilated.

Sanguinolenta. *Sp.* 1. *Sanguinolenta.* Black, shining; each wing-case with a spot at the base, one in the middle, and a flexuous band at the apex blood-red.
Cicada sanguinolenta. Linn.
Cercopis sanguinolenta. Fabr.
Inhabits France, Germany, and England.

404. LEDRA. GENUS CCCCIV. LEDRA. Fabr. Latr.
CICADA. Linn. Geoffroy.
MEMBRACIS. Olivier, Lamarck, Schrank.
Antennæ inserted on the frontlet, the two first joints equal in length, the first rather thickest, the third ending in a long seta. Thorax on each side dilated into an auricle.

405. MEMBRACIS. GENUS CCCCV. MEMBRACIS. Latr.
CENTROTUS. Fabr.
MEMBRACIS. Fabr.
CICADA. Linn.
Antennæ inserted in the frontlet; the two first joints nearly equally long; the third elongate-conic. Thorax dilated behind.

Cornutus. *Sp.* 1. *Cornutus.* Brownish.
Cicada cornuta. Linn.
Centrotus cornutus. Fabr.
Membracis cornuta. Latr.

FAMILY IV. *Cicadida.*

Antennæ inserted between the eyes. Thorax transverse, hinder margin straight.

406. IASSUS. GENUS CCCCVI. IASSUS. Fabr.
TETTIGONIA. Latr. Olivier, Lamarck.
Front broad, not longer than broad, on each side above the insertion of the antennæ produced into an angle.

Lanio. *Sp.* 1. *Lanio.*
Cicada lanio. Panzer.
Iassus lanio. Fabr.
Tettigonia lanio. Oliv. Lamarck.
Inhabits Europe.

407. CICADA. GENUS CCCCVII. CICADA. Linn. Fabr. Latr.
TETTIGONIA. Olivier, Lamarck.
Front elongate-quadrate, the apex truncate, convex, thickened.

Viridis. *Sp.* 1. *Viridis.*
Cicada viridis. Fabricius, Panzer.
Tettigonia viridis. Latreille.
Inhabits Europe.

TRIBE III. PSYLLIDES.

Tarsi with two joints distinct. Antennæ with ten or eleven joints, the last with two setæ. Legs formed for leaping. Both sexes with wings.

408. PSYLLA. GENUS CCCCVIII. PSYLLA. Geoffroy, Olivier, Lamarck, Latreille.
CHERMES. Linn. De Geer, Fabricius.
Antennæ filiform or slightly setaceous, as long as the body. Thorax with the anterior margin arcuate.

Alni. *Sp.* 1. *Alni.* Green-yellowish; anterior segment of the thorax, scutellum, squamula of the elytra and nerveurs green.
Chermes betulæ alni. Linn.
Chermes alni. Fabricius.
Psylla alni. Latreille.
Inhabits the alder.

409. LIVIA. GENUS CCCCIX. LIVIA. Latreille.
DIRAPHIA. Illiger.
Antennæ shorter than the thorax, the base much thickened even to the middle. Thorax with the anterior segment transverse, straight.

Juncorum. *Sp.* 1. *Juncorum.*
Livia juncorum. Latreille.
Inhabits Junci.

TRIBE V. APHIDES.

Tarsi two-jointed; the first joint very short. Rostrum in both sexes. Antennæ with six or seven or eight joints. Females generally apterous.

Metabolia.

Family I. *Thripsida.*

Tarsi with the last joint vesiculous. Antennæ eight-jointed. Rostrum minute, horizontal, externally without joints. Head elongate quadrate.

410. Thrips. Genus CCCCX. Thrips. Linn. Geoffroy, Latreille, Lamarck, Olivier.

Elytra and wings horizontal and linear.

Physapus. *Sp.* 1. *Physapus.* Black, hairy; antennæ, tibiæ and tarsi pale; middle of the tibiæ pale brown; elytra and wings white.

Thrips physapus. Linn. Fabricius, Latreille.

Family II. *Aphida.*

Tarsi with the last joint with two nails. Antennæ six or seven-jointed. Rostrum very distinct, nearly perpendicular, with three distinct joints. Head transverse.

411. Aphis. Genus CCCCXI. Aphis. Linn. Fabr. Latr. Oliv. Lam.

Antennæ setaceous or filiform, seven-jointed. Elytra larger than the wings, elongate-triangulate. Abdomen towards the apex generally tuberculated or horned. Eyes entire.

The animals of this genus are very numerous, and are found on almost every plant. The French call them *Pucerons*, the English *Plant-lice*. The species require examination. The females are generally apterous.

412. Aleyrodes. Genus CCCCXII. Aleyrodes. Latr. Lamarck.

Tinea. Linnæus.

Phalæna. Geoff.

Antennæ filiform, short, six-jointed. Elytra and wings equal in size. Body mealy. Eyes two, each divided into two.

Chelidonii. *Sp.* 1. *Chelidonii.* Body yellowish, or rosy powdered with white; eyes black; each elytra with a puncture and spot of black.

Tribe VI. Aphides.

Tarsi with one joint and one nail. Rostrum in the female. Wings in the male, but no elytra. Female apterous.

413. Dorthesia. Genus CCCCXIII. Dorthesia. Bosc. Latr.

Coccus. Dorthes, Fabr. Oliv.

Antennæ of the female eight-jointed. Abdomen of the males very setose behind.

Characias. *Sp.* 1. *Characias.*

Coccus characias. Dorthes, Fabr.

Dorthesia characias. Bosc. Latr.

Inhabits the *Euphorbium characias* of southern France.

414. Coccus. Genus CCCCXIV. Coccus. Linn. Geoff. Fabr. Oliv. Latr. Lam.

Antennæ of the female eleven-jointed. Abdomen of the males with two very long setæ at the apex.

Cacti. *Sp.* 1. *Cacti.*

Coccus cacti. Linn. De Geer, Fabr. Latr.

Inhabits fruit-trees.

This genus requires a minute investigation, which should be conducted by some one possessing a great share of patience, and having a very competent knowledge of entomology.

Order X. APTERA.

Order Aptera. Linn. Delam.

Order Suctoria. Latr.

Characters of the Order.

Body somewhat ovate, compressed, covered with a coriaceous skin, and composed of several segments. Trunk short, consisting of three leg-bearing joints. Head small, compressed, rounded above, and truncate before. Eyes minute, orbicular, lateral. Antennæ lamelliform, small, ciliated with spinules, one-jointed at their base, inserted in two excavations behind the eyes. Palpi filiform (composed of four rounded joints), scarcely longer than the head, porrect, generally resting on the rostrum. Legs strong, and formed for jumping, especially the hinder ones. Coxæ and thighs large, compressed. Tarsi elongate, cylindric, composed of five simple joints, the last articulation furnished with two long, acute, slender nails.

Larva without feet.

Pupa foliculate.

Genus CCCCXV. Pulex, of authors. 415. Pulex.

Sp. 1. *Irritans.* Body brunneous, sometimes inclining to rust-colour. Irritans.

The common bed-flea. Is found throughout Europe.

Notwithstanding the inconveniences attending this little insect, there is something pleasing in the appearance of the flea. Its motions are elegant, and all its postures indicate agility. The shell with which it is enveloped is in a state of perpetual cleanliness, while the muscular power which it is capable of exerting is so extraordinary, as to excite our wonder, at so much strength confined and concentrated within so small a space; this species being able to spring, on the most moderate computation, to the distance of at least 200 times its own length. It is remarkable, that Socrates was ridiculed for his pretended experiments on this subject, by Aristophanes. Arist. *Clouds.* act i. scene 2. This circumstance is alluded to in Butler's *Hudibras.*

Sp. 2. *Penetrans.* The *chigger.* Penetrans.

Inhabits the West Indies, penetrating the human skin, and depositing a parcel of eggs within a sac.

The pulices of birds and of mammalia ought to be most carefully examined. There are a vast number of species which have been confounded with *P. irritans.*

Order XI. LEPIDOPTERA.

Order Lepidoptera. Linn. Cuv. Lam. Latr.

Class Glossata. Fabr.

Characters of the Order.

Wings four, covered with scales. Tongue spiral, filiform.

Linné divided this order into three genera, viz. *Papilio* (butterfly), *Sphinx* (hawk-moth), and *Phalæna* (moth), which were characterized by the form of their antennæ; and these divisions form the three great sections of Latreille, as follow.

Section I. Diurna.

Wings four; all, or at least the superior ones, erect when the insect is at rest. Antennæ with their points thicker or capitate; in a very few somewhat setaceous, with the extreme apex hooked.

The insects of this section, which constituted the Linnean genus *Papilio*, all fly by day. Caterpillars with sixteen feet. Chrysalis naked, and generally angulated.

Tribe I. Papilionides.*

Hinder tibiæ with heels only at their extremities. Antennæ not ungulated or hooked at their extremities. Wings all elevated when at rest.

* We shall for the most part only introduce the indigenous genera, with a complete enumeration of the British species.

Metabolia.

FAMILY I. *Papilionida.*

Caterpillar elongate, cylindric. Chrysalis elongate, angular. Tarsi of Imago with distinct nails.

416. PAPILIO. GENUS CCCCXVI. PAPILIO. Fabr. Latr. Leach.

Antennæ, at their points, furnished with a conic-ovate or lengthened-ovate, somewhat arcuate, club. Palpi very short, pressed close to the face, scarcely reaching the clypeus; the two first joints of equal length; the third minute, and nearly obsolete. Feet in both sexes alike, all being formed for walking, and furnished with distinct but simple claws. Anterior wings generally somewhat falcate; hinder ones often tailed; the internal margin excised or folded to admit of free play for the abdomen.

The caterpillar is tentaculated, fleshy, and furcate. The chrysalis angulated, with two processes before; it fastens itself by a transverse thread.

The species of this genus, which constitutes the most beautiful part of the creation, are found chiefly in the warmer regions, very few occurring in the more temperate parts of the world. Their flight is extremely rapid.

Machaon. *Sp.* 1. *Machaon.* Black and yellow; hinder wings tailed; edges of the wings black, with yellow crescents; the tips of the hinder ones with a red spot at their inferior tips.

Papilio Machaon. Linn. Fabr.

Inhabits Europe; the larva in the fennel.

In England it is called the *Swallow-tailed Butterfly,* and is very local. It is the most superb of all the British species of this family. The caterpillar is green, banded with black, marked by a row of red spots. It changes into the chrysalis state in July; and the fly is found in August. Two broods are said to be found; the first in May, having lain in the chrysalis or pupa state all the winter.

Papilio podalirius of Linné, which belongs to this genus, has been introduced into the British *Fauna,* on very dubious authority.

417. DORITIS. GENUS CCCCXVII. DORITIS. Fabricius.

PARNASSIUS. Latreille.

PIERIS. Schrank.

Feet all alike in both sexes. Ungues or claws simple. Palpi rising above the clypeus, very prominent, cylindric-conic, with three very distinct joints. Antennæ with a thickened, somewhat ovate straight head. Hinder wings not tailed; the internal margin excised, to admit of free play for the abdomen.

The chrysalis smooth, somewhat folliculate.

Apollo. *Sp.* 1. *Apollo.* Wings white, rounded, spotted with black; the lower pair marked with annular red spots.

Papilio Apollo. Gmelin.

Parnassius Apollo. Latr.

Doritis Apollo. Fabr.

Inhabits Germany and France.

Larva black, spotted with red. Chrysalis brown, powdered with violet.

This elegant insect, which has been confounded by some authors with *Doritis Nemosyne* and *Phœbus,* is mentioned here in order to inform the reader, that it has no right or title whatever to a place in the British *Fauna,* although it has been described as such by Mr Harworth, and has been figured by Mr Donovan on the most vague and unsatisfactory authority.

418. PONTIA. GENUS CCCCXVIII. PONTIA. Fabr.

PIERIS. Schrank, Latr.

Antennæ elongate, with an abrupt, obconic, compressed head. Palpi slender, somewhat cylindric; the last joint as long as the preceding. Wings not very narrow, or much lengthened; hinder ones grooved to admit the abdomen, but not tailed. Feet alike in both sexes; claws unidentate or bifid. Metabolia.

Chrysalis angulated, fastened by a transverse thread.

* Anterior wings somewhat trigonate; hinder ones somewhat orbiculate.

Sp. 1. *Cratægi.* Wings white, with a faint tinge of yellowish and black nerveurs. Cratægi.

Papilio cratægi. Linn.

Pieris cratægi. Schrank, Latr.

Pontia cratægi. Fabr.

Inhabits Europe. In England, it is found near London, where it is called Black-veined white.

Sp. 2. *Brassicæ,* (large cabbage-butterfly). Brassicæ.

Papilio brassicæ. Linn.

Pontia brassicæ. Fabr.

Pieris brassicæ. Latr.

Inhabits Europe everywhere. The larva feeds on the cabbage.

Sp. 3. *Rapæ,* (small cabbage-butterfly). Rapæ.

Papilio rapæ. Linn.

Pontia rapæ. Fabr.

Pieris rapæ. Latr.

Inhabits Europe on cabbages.

Sp. 4. *Napi,* (green-veined white butterfly). Napi.

Papilio napi. Linn.

Pontia napi. Fabr.

Pieris napi. Latr.

Inhabits Europe everywhere.

Sp. 5. *Cardamines,* (orange-tipt butterfly). Cardamines.

Papilio cardamines. Linn.

Pontia cardamines. Fabr.

Pieris cardamines. Latr.

Inhabits Europe. The larva feeds on the *Cardamine pratensis.*

Papilio daplidice, Linn.; *Pontia daplidice,* Fabr.; *Pieris daplidice* of Latreille, has been introduced into the British catalogue, but on very slender authority.

** Wings somewhat oval.

Sp. 6. *Sinapis.* Wings white, with blackish tips. (Wood white butterfly). Sinapis.

Papilio sinapis. Gmelin.

Pieris sinapis. Latr.

419. COLIAS. GENUS CCCCXIX. COLIAS. Fabr. Latr.

PIERIS. Schrank.

Antennæ short, gradually thickening into an obconic head. Palpi much compressed; the last joint very short. Feet alike in both sexes, all with bifid, or unidentate nails. Wings anterior, somewhat trigonate; hinder rounded, with a groove to receive the abdomen.

Chrysalis angulated, fastened by a transverse thread.

Sp. 1. *Hyale,* (clouded yellow butterfly). Hyale.

Papilio Hyale of authors.

Pieris Hyale. Schrank.

Colias Hyale. Fabr. Latr.

Inhabits Europe. Occurs in England once in three years, in great plenty, in every part of the country. There is a pale coloured variety of each sex, which have been considered as distinct species.

420. GONEPTERYX. GENUS CCCCXX. GONEPTERYX. Leach.

COLIAS. Fabr. Latr.

PIERIS. Schrank.

Antennæ short, gradually thickening into an obconic head. Palpi short, much compressed; the last joint very short. Feet alike in both sexes, all with a bifid or unidentate nail. Wings angulated, large, the hinder one grooved to receive the abdomen.

Metabolia.

Chrysalis angulated, with a thread round its middle.

Rhamni. *Sp.* 1. *Rhamni.* Wing of the male yellow, of the female whitish; with a fulvous spot on each.

Papilio rhamni. Linn.
Colias rhamni. Fabr. Latr.
Pieris rhamni. Schrank.
Gonepteryx rhamni. Leach.

Inhabits Europe in the spring and autumn. Flight slow.

421. Argynnis. Genus CCCCXXI. Argynnis. Fabr. Latr.

Antennæ terminated with a short club. Palpi divaricating abruptly, terminated with a minute, slender, acicular, very short joint; the second joint broad, hairy. Hinder wing orbicular. Anterior feet very short in both sexes. Tarsi with double nails.

Chrysalis suspended by the tail.

Caterpillars spiny.

Lathonia. *Sp.* 1. *Lathonia.*

Papilio Lathonia. Linn.
Argynnis Lathonia. Fabr.

Inhabits Europe. It is very rare in Britain.

Aglaia. *Sp.* 2. *Aglaia.*

Papilio Aglaia. Linn.
Argynnis Aglaia. Fabr.

Inhabits Europe. Is very common. *Papilio Charlotta* of Sowerby and Haworth seem to be but an accidental variety of this species.

Adippe. *Sp.* 3. *Adippe.*

Argynnis Adippe. Fabr.

Inhabits heaths and the borders of woods thoughout Europe.

Paphia. *Sp.* 4. *Paphia.*

Papilio Paphia. Linn.
Argynnis Paphia. Fabr. Latr.

Inhabits the borders of woods in Germany, England, and France.

422. Melitæa. Genus CCCCXXII. Melitæa. Fabr. Argynnis. Latr.

Antennæ terminated by a short club. Palpi very hairy, divaricating, with the last joint acicular, half the length of the preceding joint. Hinder wings orbicular. Anterior feet very short in both sexes. Tarsi with double nails.

Caterpillars pubescent, with fleshy tubercles.

Chrysalis suspended by the tail.

Euphrosyne. *Sp.* 1. *Euphrosyne.* (Pearly border).

Papilio Euphrosyne. Linn.
Argynnis Euphrosyne. Latr.
Melitæa Euphrosyne. Fabr.

Inhabits waste grounds and heaths.

Silene. *Sp.* 2. *Silene.* (Pearly border likeness).

Melitæa Silene. Fabr.

Inhabits the same places with the preceding species.

Cinxia. *Sp.* 3. *Cinxia.* (Glanville).

Papilio Cinxia. Gmelin.
Melitæa Cinxia. Fabr.
Argynnis Cinxia. Latr.

Inhabits Europe. Rare in Britain.

Artemis. *Sp.* 4. *Artemis.* (Greasy).

Papilio Artemis. Gmelin.
Melitæa Artemis. Fabr.

Inhabits Europe. Is common near Norwich in Norfolk.

Dictynna. *Sp.* 5. *Dictynna.* (Heath).

Papilio Dictynna. Gmelin.
Melitæa Dictynna. Fabr.

Inhabits heaths and marshes. *Papilio cos* of Haworth seems to be a variety.

Lucina. *Sp.* 6. *Lucina.* (Duke of Burgundy).

Papilio Lucina. Gmelin.
Melitæa Lucina. Fabr.

Inhabits borders of woods and hedges.

Metabolia.

423. Vanessa. Genus CCCCXXIII. Vanessa. Fabricius, Latreille.

Antennæ terminated with an abrupt short club. Palpi contiguous and terminated gradually in a point; the two combined bearing some resemblance to a rostrum. Anterior pair of feet in both sexes short and very hairy. Tarsi with double nails. Chrysalis suspended by its tail. Caterpillar spiny.

Atalanta. *Sp.* 1. *Atalanta.* (Red admirable.)

Papilio Atalanta. Linn.
Vanessa Atalanta. Fabricius, Latreille.

Inhabits Europe. The larva on nettles.

Cardui. *Sp.* 2. *Cardui.* (Painted lady.)

Papilio cardui. Linn.
Vanessa cardui. Fabricius, Latreille.

Antiopa. *Sp.* 3. *Antiopa.* (Camberwell beauty.)

Papilio Antiopa. Linn.
Vanessa Antiopa. Latreille.

Inhabits Europe. The English variety has invariably a white margin to the wings.

Io. *Sp.* 4. *Io.* (Peacock.)

Papilio Io. Linn.
Vanessa Io. Fabricius, Latreille.

Inhabits the nettle.

Polychloros. *Sp.* 5. *Polychloros.* (Large tortoise-shell.)

Papilio Polychloros. Linn.
Vanessa Polychloros. Fabricius.

Inhabits Europe. The larva on the elm.

Urticæ. *Sp.* 6. *Urticæ.* (Small tortoise-shell.)

Papilo urticæ. Linn.
Vanessa urticæ. Latreille, Fabricius.

Inhabits Europe.

C-album. *Sp.* 7. *C-album.* (Comma.)

Papilio c-album. Linn.
Vanessa c-album. Fabricius.

424. Hipparchia. Genus CCCCXXIV Hipparchia. Fabricius, Leach. Maniola. Schrank. Satyrus. Latreille.

Antennæ with a slender somewhat fuciform or somewhat trigonate orbicular club. Palpi meeting above the tongue, with the second joint very much compressed, and very much longer than the first. Anterior pair of legs shorter than the rest, and often very hairy; feet of the other legs with double nails. Hinder wings somewhat orbicular or orbiculate-triangulate, with the internal margin excavated to receive the abdomen; the middle cell closed behind, from which part the nervures radiate; the other margin entire, or with acute or obtuse indentations. Caterpillar downy, with a globular head somewhat compressed in front; the abdomen bimucronate behind. Chrysalis angulated, with the front bimucronate suspended by the tail. Leach's *Zoolog. Miscel.* vol. i. p. 27.

Galathea. *Sp.* 1. *Galathea.* (Marbled.)

Papilio Galathea. Linn. Gmelin.
Hipparchia Galathea. Fabricius.
Satyrus Galathea. Latreille.

Inhabits Europe in fields.

Hyperanthus. *Sp.* 2. *Hyperanthus.* (Eyed.)

Papilio Hyperanthus. Linn.
Hipparchia Hyperanthus. Fabr.
Satyrus Hyperanthus. Latreille.

Inhabits Europe in fields.

Pamphilus. *Sp.* 3. *Pamphilus.* (Heath.)

Papilio Pamphilus. Linn. Gmelin.
Hipparchia Pamphilus. Fabricius.
Satyrus Pamphilus. Latreille.

Metabolia.

Inhabits heaths.

Blandina. *Sp.* 4. *Blandina.* (Scotch argus.)
Papilio Blandina. Donovan.
Inhabits the isles of Bute and Arran. The male has been confounded with *Hipparchia Ligea* of Fabricius, to which species it is very dissimilar.

Pilosellæ. *Sp.* 5. *Pilosellæ.* (Small meadow brown.)
Papilio Pilosellæ. Gmelin.
Hipparchia Pilosellæ. Fabricius.
Satyrus Pilosellæ. Latreille.
Inhabits fields and the borders of woods.

Janira. *Sp.* 6. *Janira.*
Papilio Janira. Linn.
Papilio Jurtina. Linn.
Hipparchia Janira. Fabricius.
Satyrus Janira. Latreille.
Inhabits fields.

Megäera. *Sp.* 7. *Megäera.* (Gate-keeper.)
Papilio Megäera. Gmelin.
Hipparchia Megäera. Latreille.
Inhabits fields and the borders of woods.

Ægeria. *Sp.* 8. *Ægeria.* (Wood argus.)
Papilio Ægeria. Linn. Gmelin.
Hipparchia Ægeria. Fabricius.
Inhabits borders of woods and fields.

Semele. *Sp.* 9. *Semele.*
Papilio Semele. Gmelin.
Hipparchia Semele. Fabricius.
Inhabits heaths and rocky wastes.

Obs. Besides the species of this genus here enumerated, there are others which have been taken in this country, viz. 1. *Papilio Hero* of Donovan; 2. *Papilio Typhon*; and, 3. *Papilio Daaus* of Haworth: But as these names are probably wrongly assigned to these insects, we shall say nothing more on the subject, but leave this point to be ascertained by the investigations of the reader.

425. Limenitis. Genus CCCCXXV. Limenitis. Fabricius.
Nymphalis. Latreille.
Antennæ gradually clubbed; club slender, round-obconic. Palpi as long as the head, with the second joint not very compressed; the anterior margin not remarkably broader. Anterior pair of feet in both sexes very short and spurious. Wings not much longer than broad Four hinder feet with double nails. Larva elongate. Chrysalis suspended by the tail.

Camilla. *Sp.* 1. *Camilla.* (White admirable.)
Papilio Camilla. Linn. Gmelin.
Limenitis Camilla. Fabricius.
Nymphalis Camilla. Latreille.
Inhabits Europe. Is rare in Britain, except in Charlton wood, Kent, where it is found in great plenty.

426. Apatura. Genus CCCCXXVI. Apatura. Fabricius.
Nymphalis. Latreille.
Antennæ with an elongate-obconic thickened club. Palpi with the second joint not much compressed, the anterior margin broad. Anterior pair of feet very short in both sexes.

Iris. *Sp.* 1. *Iris.* (Purple emperor.)
Papilio Iris. Donovan, Haworth.
Apatura Iris. Fabricius?
Nymphalis Iris. Latreille.
Inhabits England.
This beautiful insect is called wood emperor, emperor of Morocco, &c.

Family II. *Lycænida.*

Larva oval, depressed. Pupa or chrysalis short, contracted, obtuse at both extremities. Tarsi with very small nails. Metabolia.

427. Thecla. Genus CCCCXXVII. Thecla. Fabr.
Polyommatus. Latr.
Feet in both sexes all alike; nails scarcely produced beyond the pulvilli, which are large. Antennæ gradually clubbed; the club elongate, cylindric oval. Hinder wings tailed.

Betulæ. *Sp.* 1. *Betulæ.* (Brown hair streak.)
Papilio betulæ. Gmelin.
Thecla betulæ. Fabr.
Polyommatus betulæ. Latr.
Inhabits Europe, frequenting the borders of woods.

Pruni. *Sp.* 2. *Pruni.* (Black hair-streak).
Papilio pruni. Hübner.
Thecla pruni. Fabr.
Inhabits borders of woods.

Quercus. *Sp.* 3. *Quercûs.* (Purple hair-streak).
Papilio quercûs. Gmelin.
Thecla quercûs. Fabr.
Polyommatus quercûs. Latr.
Inhabits oak woods, flying on the highest branches of the trees.

428. Lycæna. Genus CCCCXXVIII. Lycæna. Fabr.
Polyommatus. Latr.
Legs alike in both sexes; nails projecting beyond the pulvilli, which are small. Antennæ with an abrupt club, somewhat ovate, or somewhat oval.

* Hinder wings more or less tailed.

Dispar. *Sp.* 1. *Dispar.* (Large copper).
Papilio dispar. Haworth.
Papilio Hypothöe. Donovan.
Inhabits the fens of Cambridgeshire, and has been observed near Aberdeen in Scotland.

Chryseis. *Sp.* 2. *Chryseis.* (Purple-edged copper).
Lycæna Chryseis. Fabr.
Inhabits Europe. In Britain it is extremely rare.

Virgaureæ. *Sp.* 3. *Virgaureæ.* (Scarce copper).
Lycæna virgaureæ. Fabr.
Polyommatus virgaureæ. Latr.
Papilio virgaureæ. Gmelin.
Inhabits Europe. Very local in Britain. It is found in some parts of Huntingdonshire.

Phlæas. *Sp.* 4. *Phlæas.* (Small copper).
Lycæna Phlæas. Fabr.
Polyommatus Phlæas. Latr.
Inhabits Europe; much attached to syngenesious plants.

Rubi. *Sp.* 5. *Rubi.* (Green underside).
Papilio rubi. Gmelin.
Lycæna rubi. Fabr.
Polyommatus rubi. Latr.
Inhabits Europe.

** Hinder wings with the posterior margin entire.

Corydon. *Sp.* 6. *Corydon.* (Chalk-hill blue).
Papilio Corydon. Linn. Gmelin.
Lycæna Corydon. Fabr.
Polyommatus Corydon. Latr.
Inhabits chalky districts.

Adonis. *Sp.* 7. *Adonis.* (Clifden blue).
Papilio Adonis. Linn. Gmelin.
Lycæna Adonis. Fabr.
Inhabits chalky districts.

Dorylas. *Sp.* 8. *Dorylas.* (Common blue).
Papilio Dorylas. Gmelin?
Papilio Icarus. Lewin.
Inhabits Europe everywhere.

Argus. *Sp.* 9. *Argus.* (Studded blue).

Metabolia.

Papilio Argus. Gmelin.
Lycæna Argus. Fabr.
Polyommatus Argus. Latr.
Inhabits fields and marshes.

Idas. *Sp.* 10. *Idas.* (Black-spot brown).
Papilio Idas. Gmelin.
Lycæna Idas. Fabr.
Inhabits Europe.

Artaxerxes. *Sp.* 11. *Artaxerxes.* (White-spot brown).
Papilio Artaxerxes. Gmelin, Stewart.
Lycæna Artaxerxes. Fabr.
Inhabits Arthur's Seat, and the base of Kirk-hill, one of the Pentland range, near Edinburgh, in great plenty.

Alsus. *Sp.* 12. *Alsus.* (Bedford blue).
Papilio Alsus. Gmelin.
Lycæna Alsus. Fabr.
Polyommatus Alsus. Latr.
Inhabits Europe.

Argiolus. *Sp.* 13. *Argiolus.* (Azure blue).
Papilio Argiolus. Gmelin.
Inhabits meadows.

Cymon. *Sp.* 14. *Cymon.*
Papilio Cymon. Gmelin, Lewin.
Inhabits Europe. In Britain it is very local. It is found near Sherborne in Dorset, in great abundance.

Tribe II. Hesperides.

Hinder tibiæ with two pair of heels or spurs, one pair at the middle, the other at the usual place. Antennæ hooked at their extremities. Hinder wings elevated when the insect is at rest.

Family I. *Uranida.*

Antennæ filiform, their points narrower and bent. Palpi long, slender.

429. Urania. Genus CCCCXXIX. Urania. Fabr. Latr.
Papilio. Linn. Crammer.
Palpi with the second joint much compressed, the third slender, somewhat cylindric, almost naked.

Leilus. *Sp.* 1. *Leilus.*
Papilio Leilus. Linn.
Urania Leilus. Fabr.

Family II. *Hesperida.*

Antennæ distinctly terminated with a club. Palpi short, thick, and squamose in front.

430. Hesperia. Genus CCCCXXX. Hesperia. Fabr. Cuv. Lam. Latr. Walck.
Papilio. Linn.
Palpi with the third joint cylindric, or cylindric-conic.

* Antennæ ending in an abrupt, very acute hook.

Comma. *Sp.* 1. *Comma.* (Pearl skipper).
Papilio Comma. Gmelin.
Hesperia Comma. Fabr. Latr.
Inhabits Europe. In England, near Lewes, in Sussex.

Sylvanus. *Sp.* 2. *Sylvanus.* (Wood-skipper).
Papilio Sylvanus. Gmelin.
Hesperia Sylvanus. Fabr. Latr.
Inhabits the borders of woods.

** Antennæ with their points arcuate.

Tages. *Sp.* 3. *Tages.* (Dingy skipper).
Papilio Tages. Gmelin.
Hesperia Tages. Fabr. Latr.
Inhabits Europe, on dry heaths and banks.

Malvæ. *Sp.* 4. *Malvæ.* (Mallow skipper).
Papilio malvæ. Gmelin.
Hesperia malvæ. Fabr. Latr.
Inhabits dry banks.

Metabolia.

*** Antennæ with straight points.

Linea. *Sp.* 5. *Linea.* (Small skipper).
Hesperia linea. Fabr. Latr.
Papilio linea. Gmelin.
Inhabits the margins of woods.

Paniscus. *Sp.* 6. *Paniscus.* (Scarce skipper).
Papilio Paniscus. Gmelin.
Hesperia Paniscus. Latr. Fabr.
Inhabits meadows. Very rare in Britain, excepting in some parts of Bedfordshire, where it is common.

Sect. II. Crepuscularia.

Wings horizontal in repose. Antennæ prismatic or fusiform.

The insects of this tribe constitute the Linnean genus *Sphinx*, which has been divided by Fabricius, Latreille, Scopoli, and Hoffmansegg, into a number of genera.

Tribe I. Sphingides.

Palpi short, covered with very short, close scales; the last joint tuberculiform and very short.

431. Laothöe. Genus CCCCXXXI. Laothöe. Fabr.
Sphinx. Linn.
Spectrum. Scopoli.
Smerinthus. Latr.
Antennæ somewhat prismatic, serrated towards the middle, gradually thicker. Tongue very short. Anterior wings angulated. Palpi contiguous.

Ocellata. *Sp.* 1. *Ocellata.* (Eyed hawk-moth).
Sphinx ocellata. Linn.
Laothöe ocellata. Fabr.
Spectrum ocellatum. Scopoli.
Smerinthus ocellatus. Latr.
Inhabits Europe. The larva in the willow and poplar.

Tiliæ. *Sp.* 2. *Tiliæ.* (Lime hawk-moth).
Sphinx tiliæ. Linn. Gmelin.
Laothöe tiliæ. Fabr.
Spectrum tiliæ. Scopoli.
Smerinthus tiliæ. Latreille.
Inhabits the lime in the caterpillar state.

Populi. *Sp.* 3. *Populi.* (Poplar hawk-moth).
Sphinx populi. Linn. Gmelin.
Laothöe populi. Fabr.
Spectrum populi. Scopoli.
Smerinthus populi. Latr.
Inhabits Europe. The larva on poplars and willows.

432. Sphinx. Genus CCCCXXXII. Sphinx. Linn. Fabr. Latreille.
Spectrum. Scopoli.
Palpi contiguous above the tongue. Tongue long, very distinct, convoluted. Antennæ prismatic, thicker towards their middle, in the males slightly ciliated. Abdomen with the anus not bearded.

Porcellus. *Sp.* 1. *Porcellus.* (Small elephant hawk-moth.)
Sphinx porcellus. Gmelin, Fabricius, Latreille.
Inhabits Europe. Is rare in Britain.

Elpenor. *Sp.* 2. *Elpenor.* (Elephant hawk-moth.)
Sphinx Elpenor. Linn. Latreille, Fabricius, Gmelin.
Inhabits Europe.

Lineata. *Sp.* 3. *Lineata.* (Silver line hawk-moth.)
Sphinx lineata. Linn.
Inhabits Europe. *Obs. Sphinx Lineata* of Donovan

Metabolia. is distinct, and must be considered as a doubtful inhabitant of Britain.

Galii. *Sp.* 4. *Galii.* (Scarce spotted elephant.)
Sphinx galii. Fabricius.
Inhabits Europe. Four specimens only have hitherto been taken in Great Britain; two in Cornwall near Penzance, one near Kingsbridge in Devon, and another near London.

Euphorbiæ. *Sp.* 5. *Euphorbiæ.* (Spotted elephant.)
Sphinx euphorbiæ. Gmelin, Fabricius, Latreille.
Inhabits Europe. It is very rare in Britain. The larva has occurred near Plymouth.

Pinastri. *Sp.* 6. *Pinastri.* (Pine hawk-moth.)
Sphinx pinastri. Fabricius, Gmelin.
Inhabits Europe. It has been taken near London, and in Ravelston wood near Edinburgh.

Convolvuli. *Sp.* 7. *Convolvuli.* (Convolvulus hawk-moth.)
Sphinx convolvuli. Linn. Fabricius, Latreille.
Inhabits Europe. It has been taken in the most remote parts of Great Britain, even in the Shetland Islands, but does not make a regular appearance.

Ligustri. *Sp.* 8. *Ligustri.* (Privet hawk-moth.)
Sphinx ligustri. Fabricius, Gmelin.
Inhabits Europe. The larva feeds on the privet and ash.

Atropos. *Sp.* 9. *Atropos.* (Death's head hawk-moth.)
Sphinx Atropos. Linn. Gmelin, Fabricius, Latr.
Spectrum Atropos. Scopoli.
Inhabits Europe. It must be considered as a valuable acquisition to the British cabinet, for although it be very common in the caterpillar state, yet is it bred with extreme difficulty; and the fly when taken on the wing is generally very much mutilated and rubbed. The caterpillar occurs in potatoe fields, and is said also to feed on the jasmine leaves.
The death's head hawk-moth is distinguished by a remarkable spot on its thorax, bearing a slight resemblance to a skull. From this circumstance, and that of its uttering a sharp sound when handled, it has been considered, by the vulgar, as an animal of ill omen, and as a messenger of fate. The members of a female convent, (as we learn from Reaumur,) were thrown into great consternation on discovering one of these insects, which had accidentally flown in at one of the open windows during the evening.

433. Sesia. Genus CCCCXXXIII. Sesia. Fabricius.
Sphinx. Linn. Latreille.
Macroglossum. Scopoli.
Palpi contiguous above the tongue. Tongue very long, distinct and convoluted. Antennæ prismatic, thicker towards their middle, (of the males ciliated.) Abdomen with the anus tufted.

* Wings opaque.

Stellatarum. *Sp.* 1. *Stellatarum.* (Humming-bird hawk-moth.)
Sphinx stellatarum. Linn. Gmelin, Latreille.
Sesia stellatarum. Fabricius.
Macroglossum stellatarum. Scopoli.
Inhabits Europe. The perfect insect feeds, in the wing, on the honey of stellated plants.

** Wings transparent.

Bombyciformis. *Sp.* 2. *Bombyciformis.* (Narrow bordered bee-hawk-moth.)
Sphinx fusiformis. Linn.
Sesia bombyciformis. Fabricius.
Inhabits Europe, on the borders of woods.

Fusiformis. *Sp.* 3. *Fusiformis.* (Broad-bordered bee-hawk-moth.)
Sesia fusiformis. Fabricius.
Sphinx fusiformis. Gmelin.
Inhabits Europe, on the borders of woods.

Tribe Zygænides. Metabolia.

Palpi long, separate, covered with long scales, or porrected hair.

Genus CCCCXXXIV. Ægeria. Fabricius. 434. Ægeria.
Sesia. Latreille, Laspeyres.
Trochilum. Scopoli.
Antennæ fusiform. Abdomen with the anus bearded.

Apiformis. *Sp.* 1. *Apiformis.* (Bee hornet-sphinx.)
Sesia apiformis. Latreille.
Ægeria apiformis. Fabricius.
Trochilum apiforme. Scopoli.
Sphinx apiformis. Linn.
Inhabits Europe.

Craboniformis. *Sp.* 2. *Craboniformis.* (Hornet-sphinx.)
Sesia craboniformis. Fabricius.
Inhabits Europe.

Vespiformis. *Sp.* 3. *Vespiformis.* (Wasp hornet-sphinx.)
Sphinx chrysorrhea. Donovan.
Inhabits Europe.

Obs. There are several other species of this genus found in Britain, but their synonyms have never been satisfactorily ascertained. We may add one more, viz.

Tipuliformis. *Sp.* 4. *Tipuliformis.* (Currant hornet-sphinx.)
Sphinx tipuliformis. Gmelin.
Sesia tipuliformis. Latreille.
Inhabits gardens. The larvæ perforate and destroy the currant bushes, and where they are plenty produce a serious mischief.

Genus CCCCXXXV. Zygæna. Fabricius. 435. Zygæna.
Sphinx. Linn.
Antennæ abruptly flexuous-clavate. Palpi cylindric, conic.

Filipendulæ. *Sp.* 1. *Filipendulæ.* (Six-spot burnet.)
Sphinx filipendulæ. Linn.
Zygæna filipendulæ. Fabricius, Latreille.
Inhabits fields.
Obs. There is another species having but five red spots on the anterior wings, which is distinct, and is generally referred to the *Zygæna loti* of Fabricius.

Genus CCCCXXXVI. Ino. Leach. 436. Ino.
Procris. Fabricius, Latreille.
Zygæna. Panzer, Walckenaer.
Sphinx. Linn.
Antennæ of the male bipectinate, of female simple. Palpi short.

Statices. *Sp.* 1. *Statices.* (Forrester.)
Sphinx statices. Linn.
Zygæna statices. Rossi, Panzer.
Procris statices. Fabricius, Latreille.
Ino statices. Leach.
Inhabits the margins of woods in meadows.

Section III. Nocturna.

Wings horizontal in repose. Antennæ setaceous, gradually narrowing towards their extremities.

Tribe I. Bombycides.

Antennæ of the male at least serrated. Tongue none. Palpi two, short, cylindric, very hairy. Thorax not crested. Wings undivided.

Family I. *Cossida.*

Antennæ with a single series of ciliæ. Wings elongate.

Obs. The larvæ of this family generally live on the solid wood of trees, which they perforate in every direction. Sides of the chrysalis denticulated.

Genus CCCCXXXVII. Hepialus. Fabr. Latr. 437. Hepialus.
Phalæna (*Noctua.*) Linn.
Antennæ moniliform, shorter than the thorax. Pal-

Metabolia.

pi very small, and very hairy. Wings elliptic, equal, long.

Humuli. *Sp.* 1. *Humuli.* (Ghost-swift.)
Noctua humuli. Linn.
Hepialus humuli. Fabricius, Latreille.
Inhabits fields.

Mappa. *Sp.* 2. *Mappa.* (Map-wing swift.)
Phalæna mappa. Donovan.
Inhabits Britain. Has been taken near Dunstar castle, in Somerset, by Mr G. Sowerby. It may be synonymous with *Bombyx velleda* of Hübner.

Hectus. *Sp.* 3. *Hectus.* (Golden swift.)
Phalæna noctua hecta. Gmelin.
Hepialus hectus. Fabricius.
Inhabits Europe.

Obs. We have in Britain several other species, but their characters are evanescent, and their names have never been determined with accuracy.

438. Cossus. Genus CCCCXXXVIII. Cossus. Fabricius, Latreille, Cuvier.
Phalæna Bombyx. Linn.
Antennæ as long as the thorax, setaceous, furnished with a single series of short transverse obtuse teeth. Palpi very distinct, thick, cylindric, and squamous. Anterior wings larger than the posterior.

Ligniperda. *Sp.* 1. *Ligniperda.* (Goat-moth.)
Phalæna (Bombyx) *Cossus*, Linn.
Cossus ligniperda. Fabricius, Latreille.
Inhabits Europe. The larva feeds on the internal parts of the willow and ash. The celebrated Lyonett has immortalized himself by his laborious work on the anatomy of the larva, and perfect insect. The caterpillar diffuses a scent, by which its residence may frequently be made known to those passing such trees as are much infested by it. It remains three years in this state, when it spins a strong web, intermixed with particles of wood, and changes into the chrysalis, which it does in the month of May, and in June the perfect insect starts into existence.

439. Zeuzera. Genus CCCCXXXIX. Zeuzera. Latreille.
Bombyx. Hübner.
Hepialus. Schrank.
Phalæna, (Noctua.) Linn.
Cossus. Fabricius.
Antennæ setaceous, (in the male pectinated to the middle.

Æsculi. *Sp.* 1. *Æsculi.* (Wood-leopard moth.)
Cossus æsculi. Fabricius.
Bombyx æsculi. Hubner.
Zeuzera æsculi. Latreille.
Phalæna æsculi. Linn.
Inhabits Europe. In England it is rather rare, but may be found in St James's Park, in July, if industriously sought after.

Family II. *Bombycida.*

Antennæ of the males with a double series of pectinations.

Obs. The larvæ of this family live on the leaves of trees. Sides of the chrysalis not serrated or denticulated.

440. Saturnia. Genus CCCCXL. Saturnia. Schrank.
Phalæna, (Attacus.) Linn.
Bombyx. Fabricius, Hubner, Latreille.
Wings horizontal. Antennæ with the second joint (in the male) bidentate. Caterpillar naked, elongate, with the anal feet distinct, and resembling the middle ones.

Pavonia minor. *Sp.* 1. *Pavonia minor.* (Emperor moth.)
Phalæna attacus pavonia minor. Linn.
Bombyx pavonia minor. Fabricius.
Inhabits Europe.

441. Lasiocampa. Genus CCCCXLI. Lasiocampa. Schrank.
Bombyx. Fabricius, Latreille.
Superior wings deflexed; inferior ones reversed. Antennæ of the male very much pectinated. Palpi not produced into a rostrum. Caterpillar naked, elongate, with the anal feet distinct, and resembling the middle ones.

Quercûs. *Sp.* 1. *Quercûs.* (The egger moth.)
Phalæna bombyx quercûs. Linn.
Bombyx quercûs. Fabricius, Latreille.
Inhabits Europe. The larva feeds on the bramble.

Obs. The following indigenous species of Fabrician *Bombyx* are referable to this genus, viz. 2. *Trifolii*; 3. *Rubi*; 4. *Cratægi*; 5. *Neustria*; 6. *Populi*; 7. *Lanestris.* The four last are distinguished by their palpi, being more hairy than the rest, and may be considered as forming a subdivision.

442. Bombyx. Genus CCCCXLII. Bombyx. Fabr. Latr. Schrank.
Superior wings deflexed, inferior ones reversed. Antennæ of the male very much pectinated. Palpi produced into a rostrum. Caterpillar naked, with the anal feet like the middle ones distinct.

Quercifolia. *Sp.* 1. *Quercifolia*, (lappet moth.)
Phalæna bombyx quercifolia. Linn.
Bombyx quercifolia. Fabr. Latr.
Inhabits Europe.

Obs. The following indigenous *Bombyces* of Fabricius belong to this genus, viz. 2. *Potatoria*; 3. *Pini.*

443. Laria. Genus CCCCXLIII. Laria. Schrank.
Phalæna (Bombyx.) Linnæus.
Bombyx. Latreille, Fabricius.
Wings deflexed, the under ones entirely covered by the upper ones. Antennæ of the male much pectinated, or much ciliated. Caterpillar naked; the hinder feet distinct like the middle ones.

Dispar. *Sp.* 1. *Dispar*, (gipsey moth).
Phalæna dispar. Linnæus.
Bombyx dispar. Fabricius.
Inhabits Europe.

Obs. This genus requires examination. The following species are found in Britain: 2. *Monacha*, (black arches); 3. *Fascelina*, (scarce tussock); 4. *Pudibunda*, (common tussock); 5. *Reclusa*, (small chocolate-tip); 6. *Curtula?* (large chocolate-tip); 7. *Roboris*; 8. *Trimacula*, (Donovan); 9. *Cæruleocephala*, (figure of eight;) 10. *Coryli*, (nut-tree tussock); 11. *Ziczac*, (pebble prominent); 12. *Dromedarius*, (iron prominent); 13. *Bucephala*, (buft-tip); 14. *Tritophus*, (aspen prominent); 15. *Trepida*, (swallow prominent); with a few other species whose names are not yet determined. *Bombyx visicolora* of Fabricius, (the Kentish glory,) forms a peculiar genus, viz. *Dorvillia*. Leach.

444. Cerura. Genus CCCCXLIV. Cerura. Schrank.
Bombyx. Fabricius, Latreille.
Phalæna, (Bombyx.) Linnæus.
Antennæ in both sexes pectinated, and gradually acuminate. Caterpillar, with the anal feet transformed into a furcate tail.

Vinula. *Sp.* 1. *Vinula*, (puss moth.)
Phalæna bombyx vinula. Linnæus.
Bombyx vinula. Fabricius, Latreille.
Cerura vinula. Schrank.
Inhabits Europe. The larva feeds in willows and poplars.

Furcula. *Sp.* 2. *Furcula*, (kitten moth.)
Bombyx furcula. Latreille, Fabricius.
Inhabits Europe; not common in Britain.

Metabolia.

Tribe II. Arctides.

Noctuo-Bombycites. Latreille.

Palpi two. Antennæ pectinated, or ciliated. Tongue visible, but often short, and somewhat membranaceous. Wings trigonate, deflexed, undivided. Caterpillar with sixteen feet.

445. Arctia. Genus CCCCXLV. Arctia. Schrank, Latreille.

Bombyx. Fabricius.

Palpi with long scales. Antennæ of the males (at least) with a double series of pectinations. Tongue often short, composed of two separate filaments.

* Antennæ ciliated.

Villica. *Sp.* 1. *Villica,* (cream spot tyger).

Bombyx villica. Fabricius.

Inhabits Europe.

Obs. The other indigenous species of this division, are, 2. *Caja,* (tyger moth); 3. *Plantaginis*; 4. *Russula,* (clouded buff); 5. *Mendica,* (muslin); 6. *Methrastri,* (ermine); 7. *Papyritia,* (water ermine); 8. *Lubricipeda,* (buff ermine).

** Antennæ pectinated.

Salicis. *Sp* 1. *Salicis,* (satin moth).

Arctia salicis. Latreille.

Inhabits Europe. The larva on willows and poplars.

Chrysorrhæa. *Sp.* 2 *Chrysorrhæa,* (golden tail moth).

Bombyx chrysorrhæa. Fabricius.

Inhabits Europe.

Phæorrhæa. *Sp.* 3. *Phæorrhæa,* (brown tail moth).

Bombyx phæorrheæ. Haworth.

Bombyx chrysorrhæa. Hübner.

Inhabits Europe. This is the species whose larva commits such destruction amongst white thorn hedges, as mentioned in our history of entomological dissertations.

446. Callimorpha. Genus CCCCXLVI. Callimorpha. Latreille.

Bombyx. Fabricius.

Lothosia. Fabricius.

Palpi with short, not porrect scales. Antennæ simple, or slightly ciliated. Tongue long, the two filaments conjoined.

Dominula. *Sp.* 1. *Dominula,* (scarlet tyger moth.)

Bombyx dominula. Fabricius.

Callimorpha dominula. Latreille.

Inhabits Europe.

Obs. Bombyx, 2. *Rosea* (red arches); 3. *Jacobeæ,* (cinnebar); are referable to this genus.

Tribe III. Tineides.

Antennæ setaceous, simple. Tongue distinct. Palpi two, cylindric. Wings long, oblong, somewhat elliptic, incumbent or convolute, inferior ones much folded, all undivided.

Family I. *Tincida.*

Antennæ distant from each other. Eyes separate, divided by a frontlet.

Division I.

Tongue distinct, elongate. Front not very hairy.

447. Lithosia. Genus CCCCXLVII. Lithosia. Fabr. Latr.

Wings horizontal Palpi shorter than the head, last joint cylindric, distinctly shorter than the second. Back much flattened. Antennæ simple, or but slightly ciliated.

Quadra. *Sp.* 1. *Quadra,* (four-spotted footman).

Phalæna quadra. Linn.

Lithosia quadra. Fabricius, Latreille.

Inhabits Europe.

The other indigenous species are, 2. *Complana*; 3. *Rubricollis*; 4. *Irrorata*; with three species not yet ascertained. Metabolia.

448. Yponomeuta. Genus CCCCXLVIII. Yponomeuta. Latreille.

Phalæna, (Tinea). Linnæus.

Tinea. Fabricius, Hübner.

Wings rolled, or convoluted. Palpi as long as the head, the third joint obconic, as long or longer than the one before it. Antennæ simple.

Evonymella. *Sp.* 1. *Evonymella.*

Phalæna evonymella. Linnæus.

Tinea evonymella. Fabricius.

Yponomeuta evonymella. Latreille.

Inhabits Europe.

449. Nemapogon. Genus CCCCXLIX. Nemapogon. Schrank.

Phalæna (Tinea). Linnæus.

Tinea. Fabricius.

Alucita. Olivier.

Æcophora. Latreille.

Wings broadly fringed, lying on the back. Palpi twice as long or more than the body; the second joint longer than the head, the last joint almost naked, recurved beyond the head.

Obs. To this genus *Tinea,* 1. *Linneella*; 2. *Flavella*; 3. *Roesella,* and their congeners, belong.

Division II.

Tongue not distinct, very short. Front very hairy.

450. Euplocamus. Genus CCCCL. Euplocamus. Latreille.

Tinea. Fabricius.

Pyralis. Hubner.

Palpi two; the second joint with numerous elongate scales, the third joint naked and ascending. Antennæ much pectinated.

Guttella. *Sp.* 1. *Guttella.*

Tinea guttella. Fabricius.

Euplocamus guttellus. Latr.

Inhabits Europe.

451. Tinea. Genus CCCCLI. Tinea. Latr. Fabr. Hübner.

Phalæna (Tinea). Linnæus.

Palpi four, distinct, upper ones small, inflexed. Antennæ simple, or slightly ciliated.

Pelionella. *Sp.* 1. *Pelionella,* (cloth's moth).

Tinea pelionella. Fabr. Latr.

Phalæna tinea pelionella. Linnæus.

Inhabits houses.

Obs. All the cloth moths, of which there are several species, belong to this genus.

Family II. *Nemophorida.*

Antennæ inserted very near to each other. Eyes nearly meeting behind.

452. Nemophora. Genus CCCCLII. Nemophora. Hoffmansegg.

Adela. Latreille.

Nemapogon. Schrank.

Alucita. Fabricius.

Tinea. Hübner.

Phalæna (Tinea). Linnæus.

Degeerella. *Sp.* 1. *Degeerella,* (Japan moth).

Phalæna tinea Degeerella. Gmelin.

Adela Degeerella. Latreille.

Inhabits the borders of woods.

Obs. All the long-horned Japan moths, as they are called by English collectors, belong to this genus.

Tribe IV. Noctuides.

Antennæ setaceous, in the males sometimes pectinated or ciliated. Tongue distinct. Palpi much compressed. Wings horizontal or incumbent, not divided. Thorax thick, often crested.

Metabolia.

Family I. *Erebida.*

Palpi with the last joint as long or longer than the preceding.

433. Erebus. Genus CCCCLIII. Erebus. Latreille.
Noctua. Fabricius.
Wings expanded.
Odorus. *Sp.* 1. *Odorus.*
Noctua odora. Fabricius.
Erebus odorus. Latreille.

Family II. *Noctuida.*

Palpi with the last joint much shorter than the preceding, squamous.

434. Noctua. Genus CCCCLIV. Noctua. Fabr. Latr. Hübner.
Bombyx. Fabricius, Hübner.
Phalæna (Bombyx). Linnæus.
Phalæna (Noctua). Linnæus.
Pæcilia. Schrank.
Cucullia. Schrank.
Obs. The genus *Noctua* requires a minute investigation. It contains several very natural genera, as exhibited in the following divisions:
A. Caterpillar with sixteen feet.
* Caterpillars half-loopers, their anterior feet membranaceous, evidently shorter than the others. Wings horizontal.
Fraxini. *Sp.* 1. *Fraxini,* (clifden nonpareil).
Noctua fraxini. Fabricius, Latreille.
Sponsa. *Sp.* 2. *Sponsa,* (crimson underwing).
Noctua sponsa. Fabricius, Latreille.
To this Section *Noctua,* 3. *Nupta*; 4. *Promissa*; 5. *Pacta*; 6. *Maura,* &c. belong.
** Caterpillars with membranaceous feet of conformable size.
1. Wings horizontal.
Fimbria. *Sp.* 1. *Fimbria,* (broad bordered yellow underwing moth).
Noctua fimbria. Fabricius.
Pronuba. *Sp.* 2. *Pronuba,* (yellow underwing); 3. *Orbona*; 4. *Janthina,* &c.
2. Wings deflexed.
a. Sp. 1. *Rumicis,* (common knot grass moth); 2. *Psi,* (dagger moth), &c.
b. Sp. 1. *Ligustri,* (coronet); 2. *Pisi,* (broom moth), &c.
c. Sp. 1. *Verbasci*; 2. *Tanaceti,* &c.
d. Sp. 1. *Batis,* (peach blossom moth).
e. Sp. 1. *Meticulosa,* (angle shades).
f. Sp. 1. *Palpina,* (pale prominent moth).
g. Sp. 1. *Camelina.*
B. Caterpillar with fourteen feet.
Sp. 1. *Chrysitis,* (burnished brass moth); 2. *Festucæ,* (gold spot moth), &c.

Tribe V. Phalænides.

Antennæ approximating at their base; those of the male often pectinated or ciliated. Clypeus scarcely prominent. Feet slender, rarely hairy. Palpi two. Wings undivided.

Family I. *Phalænida.*

Larva with twelve feet.
435. Phalæna. Genus CCCCLV. Phalæna. Linnæus, Fabricius, Latreille, Leach.
Geometra. Haworth, Hübner.
Antennæ of the male pectinated.
Margaritaria. *Sp.* 1. *Margaritaria,* (large emerald moth), &c.

Metabolia.

Family II. *Geometrida.*

Larva with ten feet.
Genus CCCCLVI. Biston. Leach. 456. Biston.
Phalæna. Linnæus, Fabricius, Latreille.
Geometra. Hübner, Haworth.
Antennæ of the male much pectinated. Body thick. Palpi very hairy.
Sp. 1. *Prodromaria*; 2. *Betularia*; 3. *Hirtaria.* Prodromaria.
Genus CCCCLVII. Geometra. Hübner, Haworth. 457. Geometra.
Phalæna. Fabricius, Latreille, Linnæus.
Antennæ of the male pectinated. Body slender. Palpi but little or not at all hairy. Wings horizontally extended, hinder margin very angular.
Sp. 1. *Lunaria*; 2. *Dolabraria,* &c. Lunaria.
Genus CCCCLVIII. Ourapteryx. Leach. 458. Ourapteryx.
Phalæna. Latreille, Fabricius, Linnæus.
Antennæ somewhat ciliated. Body slender. Palpi but little hairy. Wings horizontally extended, inferior ones prolonged, truncate, and terminated by a tail.
Sp. 1. *Sambucaria,* (swallow-tail moth). Sambucaria.
Inhabits Europe.
Genus CCCCLIX. Abraxas. Leach. 459.
Phalæna. Linnæus, Fabricius, Latreille, Hübner, Haworth. Abraxas.
Antennæ simple, not ciliated. Body slender. Palpi scarcely hirsute. Wings extended horizontally, not angulated or indented.
Sp. 1. *Grossulariata,* (common magpie moth); 2. *Ulmaria,* (scarce magpie moth), &c. Grossulariata.
Genus CCCCLX. Bupalus. Leach. 460. Bupalus.
Phalæna. Linnæus, Fabricius, Latreille.
Geometra. Hübner, Haworth.
Antennæ pectinated in the male. Body slender. Palpi slightly hirsate. Wings horizontally extended, not angulated or indented.
Sp. 1. *Piniaria.* Piniaria.
Phalæna piniaria. Fabricius, Latreille.
Inhabits pine woods.
Genus CCCCLXI. Hipparchus. Leach. 461. Hipparchus.
Phalæna. Fabr. Latr. Linn.
Geometra. Hübner, Haworth.
Wings extended obliquely, the upper covering the lower ones. Body slender. Palpi slightly hirsute. Antennæ of the male pectinated.
Sp. 1. *Papilionaria*; 2. *Prunata,* &c. Papilionaria.

Family III. *Herminida.*

Caterpillars with fourteen feet, the anal ones distinct, the first pair of membranaceous ones wanting.
Genus CCCCLXII. Herminia. Latreille. 462. Herminia.
Phalæna (Pyralis). Linnæus.
Crambus. Fabricius, Bosc.
Pyralis. Hübner.
Wings triangulate, nearly horizontal, anterior margin of the upper wings straight. Palpi two recurved, compressed, often very large. Antennæ ciliated.
Sp. 1. *Proboscidalis,* &c. Proboscidalis.

Family IV. *Platypterycida.*

Caterpillar with fourteen feet, anal ones wanting, the first pair of membranaceous ones distinct.
Genus CCCCLXIII. Platypteryx. Laspeyeres, Latr. 463. Platypteryx.
Phalæna. Fabricius.
Anterior wings fulcate. Antennæ of the male pectinate. Palpi very short, somewhat conic. Tongue short.
Sp. 1. *Falcataria*; 2. *Lacertanaria*; 3. *Cultaria.* Falcataria.

Metabolia.

Obs. The two last species have their anterior wings dentate.

464. Cilix. Genus CCCCLXIV. Cilix. Leach.
Bombyx. Fabricius.
Platypteryx. Latreille.
Anterior wings rounded. Antennæ of the male pectinated. Palpi very short, somewhat conic. Tongue none.

Compressa. *Sp.* 1. *Compressa,* (goose egg moth).
Bombyx compressus. Fabricius.
Platypteryx compressa. Latreille.
Cilix compressa. Leach.

Family V. *Tortricida.*

Caterpillars with sixteen feet. Wings, with the body forming a broad short triangle, dilated on each side anteriorly.

465. Tortrix. Genus CCCCLXV. Tortrix. Hübner.
Phalæna (Tortrix). Linnæus.
Pyralis. Latreille, Fabricius.
Palpi with the second joint distinctly longer than the third, and more squamous; third joint short, truncate or obtuse, not recurved over the head.

Fagana. *Sp.* 1. *Fagana; 2. Chlorana; 3. Pomana,* &c.

466. Simaethis. Genus CCCCLXVI. Simaethis. Leach.
Tortrix. Hubner.
Pyralis. Latreille.
Palpi short, rising, the last joint not recurved over the head; with the second and third joints nearly equally long and equally squamose. Inferior wings not completely covered by the upper ones.

Dentana. *Sp.* 1. *Dentana.*
Tortrix dentana. Hübner.
Pyralis dentana. Latreille.
Simæthes dentana. Leach.
Inhabits Europe.

467. Nola. Genus CCCCLXVII. Nola. Leach.
Pyralis. Hübner, Latreille.
Palpi short, porrect; last joint not recurved over the head; the second and third joints nearly equally long and equally squamose. Under wings completely covered by the upper ones.

Palliolatis. *Sp.* 1. *Palliolatis.*
Pyralis palliolatis. Hübner, Latr.
Nola palliolatis. Leach.
Inhabits Europe.

Tribe VI. Pyralides.

Palpi four. Larva (as far as has been ascertained) with sixteen feet.

Family 1. *Pyralida.*

Superior wings forming with the body a nearly horizontal depressed triangle.

468. Botys. Genus CCCCLXVIII. Botys. Latr.
Phalæna (Pyralis). Linn.
Pyralis. Hübner, Schrank, Scopoli.
Nymphala. Schrank.
Scopula. Schrank.
Pyrausta. Schrank.
Crambus. Fabricius.
Tongue distinct, conspicuous. Palpi exserted.

Purpuraria. *Sp.* 1. *Purpuraria.* 2. *Potamogata.* 3. *Verticalis.* 4. *Lemnata,* &c.

469. Pyralis. Genus CCCCLXIX. Pyralis. Hübner, Schrank, Schiffermüller.
Phalena (Pyralis). Linn.
Crambus. Fabricius.
Aglossa. Latreille.
Tongue none. Inferior palpi largest, the second joint very squamous, the squamæ porrected in bundles.

Pinguinalis. *Sp.* 1. *Pinguinalis.*
Phalæna pyralis pinguinalis. Linn.
Crambus pinguinalis. Fabricius.
Aglossa pinguinalis. Latreille.
Inhabits Europe.

Family II. *Tincida.*

Superior wings very long, enveloping the sides of the body.

470. Galleria. Genus CCCCLXX. Galleria. Fabricius, Latr.
Phalæna (Tinea). Linn.
Tongue very short. Palpi short: Inferior palpi largest, with close scales; upper ones concealed by the scales of the clypeus. Wings narrow, covering and pressing against the sides of the body.

Alvearia. *Sp.* 1. *Alvearia.*
Galeria alvearia. Fabricius, Latr.

471. Crambus. Genus CCCCLXXI. Crambus. Fabr. Latr.
Phalæna (Tinea). Linn.
Tinea. Geoffroy.
Wings narrow, convoluted round the body. Palpi exserted, inferior ones largest. Head with short closely applied scales. Tongue distinct.

Pineti. *Sp.* 1. *Pineti.* 2. *Pascuorum.* 3. *Pratorum,* &c.

472. Tinea. Genus CCCCLXXII. Tinea. Hubner, Geoffroy, Scopoli.
Alucita. Latreille.
Phalæna (Tinea). Linn.
Ypsolophus. Fabricius.
Wings narrow abruptly deflexed, behind and above ascending. Inferior palpi with the second joint covered with numerous fasciculi of scales; the last erect, conic, naked. Head with a bifid crest in front.

Nemorum. *Sp.* 1. *Nemorum.* 2. *Vittatus,* &c.

Tribe VII. Alucitides.

Pterophorites. Latreille.
Wings divided, or formed of feathers united at their base.

473. Pterophorus. Genus CCCCLXXIII. Pterophorus. Geoffroy, Latreille, Fabricius.
Alucita. Hübner, Schrank, Scopoli.
Phalæna (Alucita). Linn.
Palpi small, from their base ascending, not longer than the head, shortly and nearly equally squamose. Anterior wings composed of two, posterior of three feathers. Pupa naked suspended by a hair.

Pentadactylus. *Sp.* 1. *Pentadactylus.* 2. *Didactylus,* &c.

474. Alucita. Genus CCCCLXXIV. Alucita. Hübner, Scopoli.
Pterophorus. Geoffroy, Fabricius.
Phalæna (Alucita). Linn. Villers.
Orneodes. Latreille.
Palpi produced much longer than the head; the second joint very squamous; the last joint naked, erect. Pupa folliculate.

Hexadactyla. *Sp.* 1. *Hexadactyla.*
Orneodes hexadactylus. Latreille.
Pterophorus hexadactylus. Fabricius.
Phalæna alucita hexadactyla. Linn.
Alucita hexadactyla. Hübner.
Inhabits Europe, often entering houses.

Order XII. TRICHOPTERA.

Order Trichoptera. Kirby.
Order Neuroptera. Linn. Cuvier, Latr. Lam.

Metabolia.

Characters of the Order.

Wings much deflexed, with strong nervures, hispid or hairy, the lower wings plicate. Antennæ inserted between the eyes, often very long, composed of an infinity of joints. Feet elongate, spinulose. Tarsi elongate, five-jointed; the last joint with two small nails.

Larva elongate, agile, somewhat cylindric, composed of twelve joints, the three first harder than the rest, and each bearing a pair of feet; the last segment with two hooked processes. It inhabits tubes constructed of sand, bits of wood, stone, or grass, glued together by a cement impenetrable to water.

Papa somewhat resembling the perfect insect, shut up in the tube it lived in whilst a larva, but having the power of motion prior to its emerging from the water (in which it resides), for the purpose of changing into the fly-state.

Genus I. Phryganea. Linn. Fabr. Geoff. Latreille.

Obs. This genus Dr Leach has divided into several genera, from the proportion of the antennæ and palpi. We shall give as many examples as we can; but we must refer to a work which he is about to publish, entitled *Trichoptera Systematica*, for a more particular account, and for the characters of these genera, and of others named, 1. *Ceraclea*, 2. *Göera*, 3. *Potomaria*, 4. *Prosoponia*, 5. *Chimarra*, 6. *Tinodes*, 7. *Philopotamus*, and 8. *Neuronia*.

Tribe I. Leptocerides.

Antennæ much longer than the whole body.

475. Leptocerus. Genus CCCCLXXV. Leptocerus. Leach's MSS.

Antennæ simple, not denticulated.

Interruptus. *Sp.* 1. *Interruptus.*

Phryganea interrupta. Fabricius.

Leptocerus interruptus. Leach's MSS.

Inhabits Great Britain. It is found in great plenty near Luss, on the banks of Loch Lomond, on the margins of rivulets at Dreghorn near Edinburgh, and near Carlisle in northern England. It occurs during the day time on the smaller branches of trees, and in the afternoon flies about in great abundance, in flocks.

476. Odontocerum. Genus CCCCLXXVI. Odontocerum. Leach's MSS.

Antennæ with their inner edge denticulated.

Griseum. *Sp.* 1. *Griseum.*

Odontocerum griseum. Leach's MSS.

Inhabits Ireland and England. It is common at Dunlough Gap, near Killarny; and near Carlisle, on the banks of the Eden river. It has likewise been taken in Norfolk by Mr Scales, near Cheltenham, and near Plymouth, by Dr Leach.

Tribe II. Phryganides.

Antennæ as long as the body.

477. Phryganea. Genus CCCCLXXVII. Phryganea. Leach's MSS.

Anterior wings soft, villose.

Grandis. *Sp.* 1. *Grandis.*

Phryganea grandis. Linn. Fabr. Latr.

Inhabits Europe.

478. Limnephilus. Genus CCCCLXXVIII. Limnephilus. Leach's MSS.

Anterior wings slightly coriaceous, nervures hispid or hairy.

Rhombicus. *Sp.* 1. *Rhombicus.*

Phryganea rhombica. Linn.

Limnephilus rhombicus. Leach's MSS.

Inhabits Europe.

Metabolia.

Order XIII. NEUROPTERA.

Order Neuroptera. Linn. Latr. Lam. Cuvier.

Class Odonata. Fabricius.

Class Synistata. Fabricius.

Wings four, naked, reticulated, and divided into a vast number of areolæ.

Sect. I. Subulicornes.

Antennæ subulate, very short, the last joint setiform. Maxillary palpi very short. Wings extended horizontally, or erect, very much reticulated.

Metamorphosis semicomplete.

Larvæ and Pupæ aquatic, somewhat resembling the perfect insect.

Tribe I. Libellulides.

Tarsi three-jointed. Mandibles strong, corneous. Maxillæ corneous, strong. Wings equal, or the hinder ones a little larger at their base. Abdomen not terminated with setæ or filaments. Eyes very large.

Family I. *Libellulida.*

Wings horizontal. Head hemispheric, with a distinct vesicle, on which the little eyes are placed in a triangle, Abdomen more or less depressed. Lip with the middle lamella smallest.

Genus CCCCLXXIX. Libellula. Linn. Fabricius, Latreille, Leach. 479. Libellula.

Posterior wings alike in both sexes.

Sp. 1. *Depressa.* Depressa.

Libellula depressa. Linn. Fabr. Latr.

Sp. 2. *Conspurcata.* Conspurcata.

Libellula conspurcata. Fabr. Sowerby.

Libellula quadrifusciata. Donovan.

Sp. 3. *Quadrimaculata.* Quadrimaculata.

Libellula quadrimaculata. Linn. Fabr. Donovan.

Sp. 4. *Cancellata.* Cancellata.

Libellula cancellata. Linn. Donovan.

Inhabits Europe. Is common on the Croydon Canal, near London.

Sp. 5. *Vulgata.* Vulgata.

Libellula vulgata. Linn. Fabr. Donovan.

Sp. 6. *Donovani.* Donovani.

Libellula Donovani. Leach.

Libellula biguttata. Donovan.

Sp. 7. *Scotica.* Scotica.

Libellula Scotica. Leach, Donovan.

Genus CCCCLXXX. Cordulia. Leach's MSS. 480. Cordulia.

Libellula. Linn. Donovan. Panzer, Latreille.

Posterior wings in the male produced into an angle at the anal edge.

Sp. 1. *Ænea.* Ænea.

Libellula ænea. Linn. Donovan, Panzer, Latreille.

Cordulia ænea. Leach's MSS.

Family II. *Æshnides.*

Wings horizontal. Head hemispheric, without a distinct vesicle for the little eyes, which are arranged in a straight line. Abdomen cylindric, sometimes clavate. Lip with the middle lamella not much smaller than the others.

Genus CCCCLXXXI. Cordulegaster. Leach's MSS. 481. Cordulegaster.

Libellula. Linn. Donovan.

Æshna. Latreille.

Hinder wings of the male angulated at their anal

Metabolia.

edge. Abdomen of the male clavate, of the female with an acuminated process.

Annulatus. *Sp.* 1. *Annulatus.*
Libellula forcipata. Harris.
Æshna annulata. Latreille.
Libellula Boltonii. Donovan.
Cordulegaster annulatus. Leach's MSS.
Inhabits Yorkshire, Devonshire, Dorsetshire, Somersetshire, and Cornwall. It likewise occurs amongst the lakes, in the north of England; amongst the Pentland hills, near Edinburgh; and on Loch Lomond and Loch Katrine.

482. Gomphus. Genus CCCCLXXXII. Gomphus. Leach's MSS.
Libellula. Linn. Donovan.
Wings of the male angulated at their anal edge. Abdomen clavate in both sexes.

Vulgatissimus. *Sp.* 1. *Vulgatissimus.*
Libellula vulgatissima. Linn.
Libellula forcipata. Donovan.
Gomphus vulgatissimus. Leach's MSS.
Inhabits Europe. Is occasionally taken near London.

483. Æshna. Genus CCCCLXXXIII. Æshna. Fabricius.
Libellula. Linn. Donovan.
Hinder wings of the male angulated at their anal edge. Abdomen cylindric in both sexes, not clavate.

Grandis. *Sp.* 1. *Grandis.*
Libellula grandis. Linn. Donovan.
Æshna grandis. Fabricius.
Inhabits Europe.
Obs. There are several European species, which have been confounded with *Æshna grandis.*

484. Anax. Genus CCCCLXXXIV. Anax. Leach's MSS.
Hinder wings of the male not angulated at their anal edge, but resembling those of the female. Abdomen cylindric in both sexes; not clavate.

Imperator. *Sp.* 1. *Imperator.*
Inhabits England.

Family III. *Agrionida.*

Wings erect. Head transverse. Abdomen cylindric-linear. Ocelli, or little eyes, placed in a triangle.

485. Agrion. Genus CCCCLXXXV. Agrion. Fabr. Latreille.
Libellula. Linn.
Wings membranaceous, with a rhomboidal stigma. Abdomen of the male not armed with a forceps-like appendage.
Obs. We have of this genus several indigenous species, not accurately determined.

486. Lestes. Genus CCCCLXXXVI. Lestes. Leach.
Wings membranaceous, with an oblong quadrate stigma. Abdomen of the male armed with a forceps-like appendage.
Obs. We have three indigenous species.

487. Calepteryx. Genus CCCCLXXXVII. Calepteryx. Leach's MSS.
Agrion. Fabricius Latreille.
Wings coriaceo-membranaceous, without a real stigma, in place of which is sometimes an irregular opaque spot. Abdomen of the male furnished with a forceps-like appendage.
Obs. This genus comprehends those *Agrionida* with coloured wings.

Tribe II. Ephemerides.

Tarsi four-jointed. Mouth not distinct. Inferior wings much smaller than the others, sometimes wanting. Abdomen with the extremity furnished with filaments.
Metamorphosis quadruple.

Family I. *Bäetida.*

Metabolia.

Tail with two filaments.

488. Baetis. Genus CCCCLXXXVIII. Baetis. Leach's MSS.
Ephemera. Linn. Fabricius, Latreille.
Wings four.

Bioculatis. *Sp.* 1. *Bioculatus.*
Ephemera bioculata. Linn. Fabr.
Bäetis bioculatus. Leach's MSS.
Inhabits Europe.

489. Cloeon. Genus CCCCLXXXIX. Cloeon. Leach.
Ephemera. Linn. Fabricius.
Wings two.

Pallida. *Sp.* 1. *Pallida.*
Ephemera diptera. Linn. Fabr.
Cloëon pallida. Leach's MSS.

Family II. *Ephemerida.*

Tail with three filaments.

490. Ephemera. Genus CCCCXC. Ephemera. Linn. Fabr. Latr. Leach.

Vulgata. *Sp.* 1. *Vulgata.*
Ephemera vulgata. Linn. Fabr.
Inhabits Europe.

Sect. II. Filicornes.

Antennæ longer than the head, not subulate. Wings generally deflexed, or incumbent.

Tribe I. Panorpides.

Head anteriorly produced into a rostrum.

Family I. *Physapida.*

Wings extended, unequal, anterior ones somewhat triangulate-rounded, the hinder ones very long, linear. Ocelli none.

491. Physapus. Genus CCCCXCI. Physapus.
Panorpa. Linn. Fabricius.
Nemoptera. Latreille.

Coa. *Sp.* 1. *Coa.*
Panorpa coa. Linn. Fabr.
Nemoptera coa. Latreille.
Inhabits Portugal, Spain, and the islands of the Archipelago.

Family II. *Panorpida.*

Wings equal, ovate-elliptic, laying one over the other. Ocelli three, approximate, arranged in a triangle.

492. Panorpa. Genus CCCCXCII. Panorpa. Linn. Fabr. Lam. Latr.
Tarsi with two bent claws, denticulated beneath, having a spongy pulvillus between them. Palpi nearly equal, filiform; the last joint cylindric-ovate. Mandibles with their points distinctly bidentate. Abdomen of the male with the three last joints forming a tail armed with a forceps.

Communis. *Sp.* 1. *Communis.*
Panorpa communis. Linn. Fabr. Latr. Panz.
Inhabits Europe.

493. Bittacus. Genus CCCCXCIII. Bittacus. Latreille.
Panorpa. Linn. Fabr.
Tarsi with a single nail. Palpi of the maxillæ distinctly longer than the labial ones; the second and third joint much lengthened, thicker: labial palpi with two elongate cylindric joints. Mandibles very long, narrow; apex acute, entire. Abdomen cylindric, that of the male not terminated with a forceps. Legs long.

Tipularius. *Sp.* 1. *Tipularius.* Obscure reddish; wings imma-

Metabolia. culate; external margins ciliated; stigmata obscure; points of the tibiæ fuscous.

Panorpa tipularia. Linn. Fabr.
Bittacus tipularius. Latreille.
Inhabits southern France.

TRIBE II. MYRMELEONIDES.*

Antennæ thicker towards their extremities. Palpi six. Wings equal. Tarsi five-jointed, the first and last joints longest; claws two, strong, elongate, acute.

494. MYRMELEON. GENUS CCCCXCIV. MYRMELEON. Linnæus, De Geer, Fabricius, Latreille, Leach.

Antennæ gradually thicker towards their extremities; shorter than the body. Eyes entire. Abdomen very long, linear. Labial palpi very long, apex obconic, truncate.

Libelluloides. *Sp.* 1. *Libelluloides.* Body yellow, lineated with black; antennæ black; wings hyaline, with distant spots and points of blackish colour; under wings less maculated, with two abbreviated blackish bands; feet variegated.

Myrmeleon libelluloides. Linn. Latr. Fabr.
Inhabits the south of Europe, and all Africa.

495. FORMICALEO. GENUS CCCCXCV. FORMICALEO. Geoff. Leach.
MYRMELEON. Linn. Fabricius, Latreille.

Antennæ gradually thicker towards their extremities; shorter than the body. Eyes entire. Abdomen very long, linear. Labial palpi with the last joint incrassate fusiform, subulated towards the apex.

Formicarius. *Sp.* 1. *Formicarius.* Wings hyaline, apex acute maculated with fuscous; costal mark and some anastomoses whitish.

Myrmeleon formicarium. Linn. Latr. Fabr.
Formicaleo formicarius. Leach's MSS.
Inhabits Europe in sandy districts; it varies with immaculate wings.

496. ASCALAPHUS. GENUS CCCCXCVI. ASCALAPHUS. Fabricius, Latreille, Lamarck, Leach.
LIBELLOIDES. Schæffer.
MYRMELEON. Linn.

Antennæ abruptly terminated by an obtrigonate club. Eyes composed of two conjoined segments. Abdomen longer than the thorax, long-ovate.

Barbarus. *Sp.* 1. *Barbarus.* Body black spotted with yellow; wings nervured with golden yellow; upper ones from the base of the hinder margin even to the border, blackish, the border broadly paler; inferior ones with the base blackish, hyaline in the middle, the apex black.

Ascalaphus barbarus. Fabricius, Latreille.
Inhabits Barbary.

Italicus. *Sp.* 2. *Italicus.* Black, maculated with luteous; wings obscurely nervured; superior ones with their basial costa, and with a spot opposite to the internal margin, white, yellow, or sulphur coloured, the intermediate space black: under ones with the base black, the middle white-yellow, the posterior margin and apex blackish.

Ascalaphus italicus. Fabricius, Latreille.
Inhabits southern Europe and part of Germany.

TRIBE III. HEMEROBIDES.

Antennæ filiform or setaceous. Palpi four. Wings equal. Tarsi five-jointed.

FAMILY I. *Hemerobida.*

Ocelli, or little eyes, not distinct.

GENUS CCCCXCVII. CHRYSOPA. Leach's MSS. Metabolia.
HEMEROBIUS. Linné, Geoffroy, Fabricius, Latreille, Olivier, Lamarck. 497. CHRYSOPA.

Antennæ (at least as long as the body) with cylindric joints longer than broad.

Sp. 1. *Perla.* Perla.
Hemerobius perla. Linné, Fabricius, Latreille.
Chrysopa perla. Leach's MSS.
Inhabits woods.

Sp. 2. *Reticulata.* Reticulata.
Hemerobius chrysops. Linn.
Chrysopa reticulata. Leach's MSS.
Inhabits Europe.

GENUS CCCCXCVIII. HEMEROBIUS.† Linné, Fabricius, Latreille, Lamarck, Leach. 498 HEMEROBIUS.

Antennæ as long, or shorter than the body, joints moniliform.

Sp. 1. *Hirtus.* Hirtus.
Hemerobius hirtus. Linn. Fabr. Latr.
Inhabits Germany.

FAMILY II. *Osmylida.* ‡

Ocelli three distinct.

GENUS CCCCXCIX. OSMYLUS. Latreille. 499. OSMYLUS.
HEMEROBIUS. Fabr. Villers, Rœmer, Donovan.

Antennæ moniliform,

Sp. 1. *Maculatus.* Fuscous; head and feet testaceous; wings hairy, the upper ones and the costal margin of the inferior ones spotted with black. Maculatus.

Hemerobius maculatus. Fabricius,
Hemerobius chrysops. Rœmer, Donovan.
Hemerobius fulvicephalus. Villers.
Inhabits France, Germany, and England; confounded with *Hemerobius chrysops* of Linnæus.

TRIBE IV. CORYDALIDES.

Thorax with the first segment large, not much longer than broad. Tarsi five-jointed. Wings of equal size. Feet resembling each other.

FAMILY I. *Corydalida.*

Ocelli three arranged in a triangle. Wings incumbent horizontally. Tarsi with all the joints entire.

GENUS D. CORYDALIS. Latreille, Palissot. 500. CORYDALIS.
HEMEROBIUS. Fabricius, Olivier.
RAPHIDIA. Linn.

Antennæ simple, the joints very short, cylindric. Mandibles very large as long as the thorax. Head broader than the thorax.

Obs. Latreille considers this genus akin to *Raphidia*, notwithstanding the difference of the tarsal joints, both in number and form.

Sp. 1. *Cornuta.* Cornuta.
Hemerobius cornutus. Fabricius, Olivier.
Corydalis cornutus. Latreille, Palissot de Beauvois.
Raphidia cornuta. Linn.
Inhabits Africa, and part of America.

GENUS DI. CHAULIODES. Latreille, Palissot. 501. CHAULIODES.
HEMEROBIUS. Linn. De Geer, Olivier.
SEMBLIS. Fabricius.

Antennæ pectinated. Mandibles short. Head of the same breadth as the thorax.

Sp. 1. *Pectinicornis.* Pectinicornis.
Hemerobius pectinicornis. Linn.
Semblis pectinicornis. Fabricius.
Chauliodes pectinicornis. Latr. Palisot de Beauvois.

* This tribe probably contains two families.
† *Hemerobius phalænoides* Dr Leach places in a peculiar genus named DREPANEPTERYX.
‡ In the first volume of the *Zoological Miscellany*, is instituted a new genus, named NYMPHES, which belongs to this family.

Metabolia.

Inhabits northern America.

FAMILY II. *Sialida.*

Wings deflexed. Tarsi with the last joint but one bifid. Ocelli none.

502. SIALIS. GENUS DII. SIALIS. Latreille.
HEMEROBIUS. Geoffroy, De Geer, Olivier.
SEMBLIS. Fabricius.

Niger. *Sp.* 1. *Niger.*
Hémérobe aquatic noir. De Geer.
Hemerobius lutrarius. Linnæus?
Semblis lutrarius? Fabricius.
Inhabits Europe. The larva in water.

TRIBE V. MANTISPIDES.

Anterior feet raptorious. Thorax with the first segment large, long. Tarsi five-jointed. Wings of equal size, deflexed.

503. MANTISPA. GENUS DIII. MANTISPA. Illiger, Latreille.
RAPHIDIA. Scopoli, Linnæus.
MANTIS. Fabricius, Pallas, Olivier.
Nerveures hairy.

Pagana. *Sp.* 1. *Pagana.* Pubescent-yellowish; thorax roughish; elytra with a yellowish costa, stigma darker.
Mantispa pagana. Illiger, Latreille.
Raphidia mantispa. Scopoli, Linn.
Mantis persa. Pallas.
Mantis pagana. Fabricius, Panzer.
Inhabits France and Germany.

TRIBE VI. RAPHIDIDES.

Wings of equal size. Thorax with the first segment large. Tarsi with four distinct joints, the last but one bilobate. Antennæ nearly setaceous. Ocelli three, arranged in a triangle.

504. RAPHIDIA. GENUS DIV. RAPHIDIA. Linn. Geoff. De Geer, Fabr. Oliv. Lam. Latr.
Head oval, narrowed behind, inflexed. Thorax with the first segment very long, narrow, and somewhat cylindric. Anus of the females with two united setæ.

Ophiopsis. *Sp.* 1. *Ophiopsis.*
Raphidia ophiopsis. Linn. Fabr. Latr.
Inhabits Europe.

TRIBE VII. TERMITIDES.

Wings of equal size, horizontally incumbent. Thorax with the first segment large. Tarsi with three distinct joints, the penultimate joint entire. Antennæ moniliform, inserted before the eyes. Head short, rounded behind. Ocellus one.

The animals of this tribe congregate in great numbers, and live in societies, being generally known by the term white ants, a name applied to all the species indiscriminately.

505. TERMES. GENUS DV. TERMES. Linn. De Geer, Fabr. Oliv. Lam. Latr.
PERLA. De Geer.
HEMEROBIUS. Linn.

Lucifugum. *Sp.* 1. *Lucifugum.* Black, shining, and pubescent; thorax transversely quadrate, with the angles rounded, with an impression on each side of the anterior part, the intermediate space somewhat carinated; wings fuscescent-hyaline, the costa blackish; apex of the joints of the antennæ, tibiæ, (base excepted), and all the tarsi, pale-reddish.
Termes lucifugum. Rossi, Latreille.
Inhabits Italy.

Metabolia.

TRIBE VIII. PSOCIDES.

Inferior wings smaller than the superior ones. Some are apterous. Palpi two, composed of four joints.

FAMILY I. *Psocida.*

Tarsi two-jointed.

506. PSOCUS. GENUS DVI. PSOCUS. Latr. Fabr. Lam. Coquebert.
HEMEROBIUS. Linnæus.
Wings four.

Bipunctatus. *Sp.* 1. *Bipunctatus.* Variegated with yellow and black; head above the clypeus blackish; superior wings with a small costal mark, and another on the opposite margin black; the interjected cords blackish; stigma white, with a black spot.
Psocus bipunctatus. Latreille, Fabricius, Coquebert.
Hemerobius bipunctatus. Linn.
Inhabits Europe.

FAMILY II. *Atropida.*

Tarsi three-jointed.

507. ATROPOS. GENUS DVII. ATROPOS. Leach's MSS.
TERMES. Linn. De Geer.
PSOCUS. Fabricius, Latreille, Coquebert.
PEDICULUS. (Pou,) Geoffroy.

Lignaria. *Sp.* 1. *Lignaria.*
Termes pulsatorium. Linn.
Termes lignarium. De Geer.
Le Pou du Bois. Geoffroy.
Psocus pulsatorius. Fabricius, Latreille, Coquebert.
Inhabits old books, often beating like a watch, whence it has acquired the name of death-watch.
Psocus fatedicus of Fabricius, is referable to the genus Atropos, but whether it be a distinct species from *Atropos lignaria* is certainly very doubtful.

TRIBE IX. PERLARIDES.

Inferior wings larger than the superior ones, with longitudinal folds. Tarsi with three joints. Mandibles distinct. Thorax with the first segment large.
Obs. The wings horizontally incumbent.

508. NEMOURA. GENUS DVIII. NEMOURA. Latreille.
PHRYGANEA. Linnæus.
PERLA. Geoffroy, De Geer.
SEMBLIS. Fabricius.
Labrum very distinct, almost semicircular. Mandibles corneous. Palpi filiform. Tarsi with equal lengthened joints (the middle one scarcely shorter) not spongy beneath. Anus without setæ.

Nebulosa. *Sp.* 1. *Nebulosa.* Fuscous-black, pubescent; abdomen and feet reddish-fuscous; wings cinereous, immaculate, the nerveures darker.
Le Perle Brune à ailes pâles. Geoffroy.
Nemoura nebulosa. Latreille.
Inhabits Europe.

509. PERLA. GENUS DIX. PERLA. Geoffroy, De Geer, Olivier, Lamarck, Latreille.
PHRYGANEA. Linn.
SEMBLIS. Fabricius.
Labrum obscure, transversely linear. Mandibles almost membranaceous. Palpi almost setaceous. Tarsi with the two basal joints shorter than the third. Anus with two long setæ.

Marginata. *Sp.* 1. *Marginata.*
Semblis marginata. Fabricius.
Perla marginata. Latreille.
Inhabits Europe.
Phryganea bicaudata of Linnæus belongs to this genus.

Metabolia.

Order XIV. HYMENOPTERA.

Order Hymenoptera. Linn. Latr. Lam. Cuvier.
Class Piezata. Fabricius.

Characters of the Order.

Wings nervured, (the areolæ large and unequal in size,) the inferior ones smaller than the upper. Anus of the females with a sting or an oviduct.

Section I. Terebrantia.

Oviduct lamelliform or filiform, in a few resembling a sting and valved; the vagina bivalve, received in a canal beneath before the anus, the valves compressed, in some compressed lamelliform; in others elongate-cylindric, setaceous.

Division I.

Abdomen united to the thorax along its whole breadth, without any distinct peduncle.

Tribe I. Tenthredinides.

Abdomen sessile. Oviduct composed of two lamellæ which are serrated. Mandibles more or less long, terminated by two strong teeth. Wings with the marginal cells complete.

Family I. *Tenthridinida.*

Labrum distinct. Larvæ with membranaceous feet.

510. Cimbex. Genus DX. Cimbex. Oliv. Fabr. Spinoli, Latr.
Tenthredo. Linnæus, Jurine, Panzer, De Geer.
Crabro. Geoffroy.
Clavellaria. De Lamarck.
Antennæ terminated by a distinct club, nearly ovoid.
Obs. This genus is artificial; it contains several natural genera, which may be defined from the joints composing their antennæ.

* Antennæ with five joints before the club, which is nearly solid.

Femorata. *Sp.* 1. *Femorata.* Fabricius.
Axillaris. *Sp.* 2. *Axillaris.* Panzer.

** Antennæ with five joints before the club, which is distinctly articulated.

Leucorum. *Sp.* 3. *Leucorum.* Fabricius.

*** Antennæ with four joints before the club, which is indistinctly articulated.

Amerinæ. *Sp.* 4. *Amerinæ.* Fabricius, Panzer.
Marginata. *Sp.* 5. *Marginata.* Fabricius, Panzer.
Læta. *Sp.* 6. *Læta.* Panzer.
Obscura. *Sp.* 7. *Obscura.* Panzer.

**** Antennæ with four joints before the club, which is two-jointed.

Faciata. *Sp.* 8. *Faciata.* Fabricius, Panzer.

***** Antennæ with four joints before the club, which is composed of three joints.

Sericea. *Sp.* 9. *Sericea.* Fabricius, Panzer.
Tenthredo sericea and *nitens* of Linnæus are but sexual distinctions of the same species.

511. Hylotoma. Genus DXI. Hylotoma. Latr. Fabr. Spinoli.
Tenthredo. Linné, Geoffroy, De Geer, Panzer, Lamarck, Olivier.
Cryptus. Jurine.
Arge. Schrank.
Antennæ gradually thickening towards their extremities, composed of three joints. Superior wings with four submarginal cells, and one marginal cell emitting a little branch.

Metabolia.

Rosæ. *Sp.* 1. *Rosæ.*
Tenthredo rosæ. Linn.
Hylotoma rosæ. Fabricius, Latreille.
Inhabits Europe.
Obs. Hylotoma furcata of Latreille, *Tenthredo furcata* of Panzer, and its congeners, are distinguished from the genuine *Hylotomæ*, by having filiform bifurcate antennæ, and should constitute a peculiar genus.

512. Tenthredo. Genus DXII. Tenthredo.* Linné, Geoffroy, De Geer, Latreille.
Allantus. Jurine.
Antennæ simple, composed of nine joints. Superior wings with two marginal and with four submarginal cells.

Scrophulariæ. *Sp.* 1. *Scrophulariæ.*
Tenthredo scrophulariæ. Linn. Fabr. Panzer.
Allantus scrophulariæ. Jurine.
Inhabits *Scrophularia nodosa* and *aquatica* when in flower.

Militaris. *Sp.* 2. *Militaris.*
Tenthredo militaris. Fabricius, Panzer.
Inhabits grassy places and the margins of woods.

513. Dolerus. Genus DXIII. Dolerus. Jurine, Latreille.
Tenthredo. Fabricius, Linnæus.
Antennæ simple, nine-jointed. Superior wings with two marginal and three submarginal cells.

Gonagra. *Sp.* 1. *Gonagra.*
Dolerus gonager. Jurine, Latreille.
Tenthredo gonagra. Fabricius, Panzer.
Inhabits Europe.

514. Nematus. Genus DXIV. Nematus. Jurine, Latreille.
Antennæ simple, nine-jointed. Superior wings with one marginal and four submarginal cells.

Septentrionalis. *Sp.* 1. *Septentrionalis.*
Tenthredo septentrionalis. Fabr. Panzer.
Nematus septentrionalis. Jurine, Latr.
Inhabits the European woods.

515. Pristiphora. Genus DXV. Pristiphora. Latr.
Pteronis. Jurine.
Antennæ simple, nine-jointed. Superior wings with one marginal, and three submarginal cells. Mandibles bidentate.

Testacea. *Sp.* 1. *Testacea.*
Pteronus testaceus. Jurine.
Pristiphora testacea. Latr.

516. Cladius. Genus DXVI. Cladius. Latr. Illiger.
Tenthredo. Panzer.
Antennæ nine-jointed, branched in the male, simple in the female. Superior wings with one marginal and four submarginal areolæ or cells. Mandibles bidentate.

Difformis. *Sp.* 1. *Difformis.*
Tenthredo difformis. Panzer.
Cladius difformis. Latr.
Inhabits Europe.

517. Lophyrus. Genus DXVII. Lophyrus. Latr.
Pteronus. Jurine.
Hylotoma. Fabr.
Tenthredo. Linn. De Geer, Oliv. Lam. Panzer.
Antennæ pennated in the males, serrated in the females. Superior wings with one marginal and three submarginal cells. Mandibles tridentate.

Pini. *Sp.* 1. *Pini.*
Tenthredo pini. Linn.

* Some species which are placed in this genus by Latreille, have ten or fourteen joints in their antennæ; these should constitute distinct genera.

Metabolia.

Hylotoma pini. Fabr.
Lophyrus pini. Latr.
Inhabits Europe.

FAMILY II. *Xiphydrida.*

Labrum obscure. Larvæ with scaly feet, or at least not membranaceous.

518. MEGALADONTES. GENUS DXVIII. MEGALADONTES. Latr. Spinoli.
TARPA. Fabr. Panzer.
CEPHALEIA. Jurine.
DIPRION. Schrank.
Mandibles long, slender, and strongly bent. Neck not elongate. Oviduct not exserted. Antennæ pectinated or serrated.

Cephalotes. *Sp.* 1. *Cephalotes.*
Megalodontes cephalotes. Spinoli, Latr.
Tarpa cephalotes. Fabr.
Inhabits Europe.

519. PAMPHILIUS. GENUS DXIX. PAMPHILIUS. Latr. Olivier.
TENTHREDO. Linn. Lamarck, Panzer.
LYDA. Fabr. Spinoli.
CEPHALEIA. Jurine.
PSEN. Schrank.
Mandibles long, slender, and strongly bent. Neck not elongate. Oviduct not exserted. Antennæ simple in both sexes.

Erythrocephalus. *Sp.* 1. *Erythrocephalus.*
Pamphilus erythrocephalus. Latr.
Lyda erythrocephala. Fabr.
Inhabits Germany and England.

520. CEPHUS. GENUS DXX. CEPHUS. Latr. Fabr. Panz.
SIREX. Linn.
ASTATUS. Klug.
TRACHELUS. Jurine.
Mandibles exserted, longer than wide. Neck long. Oviduct exserted. Antennæ inserted in the front between the eyes, gradually thicker externally.

Troglodyta. *Sp.* 1. *Troglodyta.*
Cephus troglodyta. Panzer, Latr.
Inhabits Europe.

Pygmæus. *Sp.* 2. *Pygmæus.*
Cephus pygmæus. Latr. Fabr.
Sirex pygmæus. Linn.
Inhabits Europe.

521. XIPHYDRIA. GENUS DXXI. XIPHYDRIA. Latr. Fabr. Panz. Spinoli.
SIREX. Linn.
UROCERUS. Jurine.
HYBONOTUS. Klug.
Mandibles exserted, longer than wide. Neck long. Oviduct exserted. Antennæ setaceous, inserted above the clypeus.

Camelus. *Sp.* 1. *Camelus.*
Sirex camelus. Linn.
Hybonotus camelus. Klug.
Xiphydria camelus. Latr. Fabr.
Inhabits Europe.

Dromedarius. *Sp.* 2. *Dromedarius.*
Hybonotus dromedarius. Klug.
Xiphydria dromedarius. Latr. Fabr.
Inhabits Europe.

TRIBE II. UROCERIDES.*

Abdomen sessile. Oviduct filiform, exserted, or inclosed in a groove beneath the abdomen. Mandibles short.

Metabolia.

GENUS DXXII. ORYSSUS. Latr. Fabr. Jurine, Lam. Klug. Panz.
SPHEX. Scopoli.

522. ORYSSUS.

Mandibles with their internal edge not dentated. Maxillary palpi long and pendulous. Antennæ filiform, compressed, inserted under the anterior margin of the clypeus. Superior wings with one marginal cell, and two submarginal, the last incomplete. Oviduct capillary, hidden in a longitudinal groove.

Coronatus. *Sp.* 1. *Coronatus.*
Oryssus coronatus. Fabr. Latr. Coquebert.
Oryssus vespertilio. Klug, Panzer.
Sphex abietina. Scopoli.
Inhabits Europe.

523. UROCERUS. GENUS DXXIII. UROCERUS. Geoff. Schæff. Oliv. Lam. Latr. Leach.
SIREX. Linn. Fabr. Jurine, Panz. Klug, Leach.
ICHNEUMON. De Geer, Scopoli.
Mandibles dentated on their internal edge. Maxillary palpi very small. Labial palpi terminated by a very thick, hairy joint. Antennæ gradually narrowing externally, inserted in the front; longer than the thorax. Superior wings with two marginal and two submarginal cells complete. Abdomen terminating in a point. Oviduct exserted, composed of three parts, the outer ones valviform.

Obs. This genus contains two great divisions, which, from their characters, are evidently natural genera.

* Antennæ with 25 joints. Abdomen of the female terminated with an abrupt elongate horn. Labial palpi with a distinct basal joint. Maxillary palpi with two distinct joints of equal length.

UROCERUS. GENUS UROCERUS. Leach.

Gigas. *Sp.* 1. *Gigas.*
Sirex mariscus. Fabr. (Male).
Sirex gigas. Linn. Fabr. Latr. (Female).
Urocerus gigas. Latr.
Inhabits Europe. Is rare in Britain.

Psyllius. *Sp.* 2. *Psyllius.*
Sirex psyllius. Fabr. Klug.
Urocerus gigas. (Variety). Latr.
Inhabits Europe. Was taken near Edinburgh by Mr John Wilson, of the College, Edinburgh.

** Antennæ with 21 or 23 joints. Maxillary palpi with their basal joint very short, scarcely to be found.

A. Abdomen of the female terminated by an abrupt, elongate horn. Labial palpi distinctly triaticulated.

SIREX. GENUS SIREX. Leach.

Spectrum. *Sp.* 3. *Spectrum.*
Sirex emarginatus. Fabr. (Male).
Sirex spectrum. Linn. Panzer, Klug. (Female).
Urocerus spectrum. Latr.

B. Abdomen of the female with the extremity gradually acuminated.

Juvencus. *Sp.* 4. *Juvencus.*
Sirex juvencus. Linn. Fabr. Klug, (Female).
Sirex noctilio. Fabr. Panzer, (Male).
Urocerus juvencus. Latr.
Sirex juvencus. Leach.
Inhabits Europe. Is rare in Britain.

524. TREMEX. GENUS DXXIV. TREMEX. Latr.
SIREX. Jurine, Fabr. Klug.
Mandibles denticulated on their internal edge. Maxillary palpi very small. Labial palpi terminated by a joint, very thick and very hairy. Antennæ setaceous,

* This tribe, Dr Leach has proposed to divide into two families, the one to contain the genus *Oryssus*, the other *Sirex*, *Urocerus* and *Tremex*.

Metabolia. inserted in the front. Superior wings with two marginal, and two submarginal cells, complete. Abdomen terminating in a point. Oviduct exserted, composed of three parts, the outer ones valviform.

Fuscicornis. *Sp.* 1. *Fuscicornis.*
Sirex fuscicornis. Fabr. Klug.
Tremex fuscicornis. Latr.

Columba. *Sp.* 2. *Columba.*
Sirex columba. Fabr.
Tremex columba. Latr.

Division II.

Abdomen united to the thorax by a slender peduncle.

Tribe III. Evanides.

Inferior wings with very distinct nervures. Antennæ with 13 or 14 joints.

525. Evania. Genus DXXV. Evania. Fabr. Oliv. Lam. Jurine, Panzer.
Sphex. Linn.
Ichneumon. De Geer.
Abdomen very small, much compressed, triangular or ovoid, abruptly pediculated, and inserted behind the metathorax.

* Antennæ with the third joint much longer than the second. Upper wings with distinct nervures and cells. Mandibles with their internal edge truncate-unidentate. Maxillary palpi with five distinct joints, the basal joint obsolete; the last joint but one of the labial palpi much dilated. Superior wings with a triangular marginal cell; first submarginal cell distinct; the second open; three middle cells open beneath.

Lævigata. *Sp.* 1. *Lævigata.*
Evanie lisse. Oliv.
Evania appendigaster. Fabr.
Evania lævigata. Latr.
Inhabits America.
Dr Leach has seen this insect alive in some boxes of American insects, and he possesses two specimens taken at large in London.

** Antennæ with the third joint much longer than the second. Upper wings with distinct nervures and cells. Mandibles with their internal edge distinctly and acutely tridentate. Maxillary palpi with six distinct joints; the last joint but one of the labial palpi not much dilated. Superior wings with the marginal cell semiovate; middle cells two; apex without cells.

Appendigaster. *Sp.* 2. *Appendigaster.*
Evania appendigaster. Panz. Oliv. Latr.
Sphex appendigaster. Linn.
Inhabits southern France, Spain, and Italy.

*** Antennæ with the third joint not much longer than the second. Superior wings with the nervures and cells obliterated.

Minuta. *Sp.* 3. *Minuta.*
Evania minuta. Oliv. Fabr. Latr.
Brachygaster minutus. Leach's MSS.
Inhabits France and England.

526. Fœnus Genus DXXVI. Fœnus. Fabr. Latr. Jurine, Panz.
Ichneumon. Linn. Geoff. De Geer.
Gasteruption. Latr (obsolete).
Neck elongate. Hinder tibiæ clavate. Abdomen a lengthened club.

Jaculator. *Sp.* 1. *Jaculator.*
Fœnus jaculator. Fabr. Panz. Latr.
Ichneumon jaculator. Linn.
Inhabits Europe.

Metabolia.

527. Pelecinus. Genus DXXVII. Pelecinus. Latr. Fabr.
Neck not apparent. Hinder tibiæ clavate. Abdomen slender, long, and filiform.

Polycerator. *Sp.* 1. *Polycerator.*
Pelecinus polycerator. Latr. Fabr.
Inhabits America.

528. Aulacus. Genus DXXVIII. Aulacus. Jurine, Spinoli.
Abdomen elliptic, compressed, with a gradually formed peduncle, inserted at the extremity of an elevation in the metathorax.

Striatus. *Sp.* 1. *Striatus.*
Aulacus striatus. Jurine, Latr.
Inhabits the Alps.

Tribe IV. Ichneumonides.

Abdomen attached to the thorax by a part of its transverse diameter. Inferior wings with very distinct nervures. Antennæ with 21 joints and more.

Family I. *Stephanida.*

Mandibles terminated by an entire point, or with but a very obscure notch. Head globose.

529. Stephanus. Genus DXXIX. Stephanus. Jurine, Illiger, Latreille.
Bracon. Fabr. Panzer.
Thorax much attenuated anteriorly. Metathorax cylindric, straight or horizontal. Abdomen inserted at the superior and posterior extremity of the metathorax, the first segment abruptly narrower than the rest.

Coronatus. *Sp.* 1. *Coronatus.*
Stephanus coronatus. Jurine, Latr.
Bracon serrator. Fabr. Panzer.
Inhabits Germany.

530. Xorides. Genus DXXX. Xorides. Latr.
Anomalon. Jurine.
Cryptus. Fabr.
Metathorax with the hinder segment convex, and at the apex rounded. Abdomen distinctly pedunculated, inserted under the posterior and superior apex of the metathorax.

Indicatorius. *Sp.* 1. *Indicatorius.*
Xorides indicatorius. Latr.
Inhabits Europe.

Family II. *Ichneumonida.*

Mandibles bidentate, or notched at their extremity.

Division I.

Abdomen with five very distinct segments.

Subdivision 1.

Superior wings with the first submarginal cell very large; the two discoidal cells situated longitudinally, one above the other.

531. Ichneumon. Genus DXXXI. Ichneumon. Latreille.
Maxillary palpi with very unequal joints. Oviduct with its base not covered by a large scale, exserted.

Obs. This genus, which has been attentively examined by Latreille, consists of several natural genera; but the characters are obscure, and are not yet fully understood. Under this head, the following genera, (or parts of them), proposed by Jurine, Fabricius, Panzer, Illiger, and Walckenaer, are comprehended; viz. 1. *Cryptus*, 2. *Bassus*, 3. *Pimpla*, 4. *Joppa*, 5. *Metopius*, 6. *Trogus*, 7. *Alomya*, 8. *Peltastes*, 9. *Ophion*, and, 10. *Banchus.*

Metabolia.

The following divisions are proposed by Latreille, who has submitted these insects to a scrupulous and daily investigation.

Division A.

Abdomen but little or not at all compressed.

Subdivision a.

Extremity of the abdomen of the female compressed, and obliquely truncated; oviduct exserted.

1. * Abdomen cylindric, with a very short peduncle.
GENUS PIMPLA of Fabricius.

2. ** Abdomen somewhat ovoid, with the peduncle long, slender, and arcuate.
GENUS CRYPTUS of Fabricius.

Subdivision b.

Extremity of the abdomen of the female slightly compressed, not obliquely truncated; oviduct scarcely prominent or exserted.

3. * Abdomen cylindric, almost sessile.
GENUS METOPIUS of Panzer; PELASTES of Illiger.

4. ** Abdomen almost fusiform or cylindric, gradually narrower towards the base; the peduncle not slender or arcuate.
GENUS ALOMYA of Panzer.

5. *** Abdomen ellipsoid or ovalate, with the peduncle slender and arcuate.
GENUS ICHNEUMON of Fabricius.

Division B.

Abdomen very much compressed.

6. * Abdomen, apex truncate in the females.
GENUS OPHION of Fabricius.

7. ** Abdomen with the apex pointed.
GENUS BANCHUS of Fabricius.

532. ACÆNITUS.

GENUS DXXXII. ACÆNITUS. Latr.
CRYPTUS. Fabr. Panzer.
ICHNEUMON. Schæffer, Scopoli, Oliv.
ANOMALON. Jurine.
Palpi with their joints not very unlike each other. Oviduct covered at its base by a large scale.

Dubitator.

Sp. 1. *Dubitator.*
Cryptus dubitator. Fabr. Panzer.
Acænitus dubitator. Latr.
Inhabits Germany.

Subdivision 2.

Superior wings with the first submarginal cell small, or moderately sized; the two discoidal cells placed in a transverse line by the side of each other.

533. BRACON.

GENUS DXXXIII. BRACON. Jurine, Fabr. Panzer, Illiger, Spinoli, Latr.
ICHNEUMON. Linn. Scopoli, Schrank.
VIPIO. Latr. (Rejected name).
Mouth produced into a rostrum. Superior wings with the two first submarginal cells nearly equal, square.

Desertor.

Sp. 1. *Desertor.*
Bracon desertor. Fabr. Latr.

534. AGATHIS.

GENUS DXXXIV. AGATHIS. Latr.
ICHNEUMON. Jurine.
BRACON. Fabr. Spinoli.
Mouth produced into a rostrum. Superior wings with the second submarginal cell very small.

Panzeri.

Sp. 1. *Panzeri.*
Ichneumon panzeri. Jurine.
Agathis panzeri. Latreille.

Metabolia.

GENUS DXXXV. MICROGASTER. Latreille, Illiger, Spinoli.

535. MICROGASTER.

ICHNEUMON. Linnæus, Fabricius, Jurine, Rossi.
CEROPALES. Fabricius.
CRYPTUS. Fabricius.
BASSUS. Panzer.
Mouth not produced. Abdomen very small and depressed. Oviduct short. Superior wings with one marginal cell nearly obsolete in some, and three submarginal; the second minute, the last terminal imperfect.

Deprimator.

Sp. 1. *Deprimator.*
Ichneumon deprimator. Fabricius.
Microgaster deprimator. Latreille.
Inhabits Germany.

DIVISION II.

Abdomen almost inarticulate, with but three distinct segments.

536. SIGALPHUS.

GENUS DXXXVI. SIGALPHUS. Latreille, Spinoli.
SPHÆROPYX. Hoffmansegg.
CRYPTUS. Fabricius.
ICHNEUMON. Fabricius.
CHELONUS. Jurine, Panz. Illiger.
BRACON. Jurine.

Irrorator.

Sp. 1. *Irrorator.*
Sigalphus irrorator. Latreille.
Cryptus irrorator. Fabricius.

FAMILY III. *Alysiada.*

Mandibles tridentate at their extremities, forming an irregular square.

537. ALYSIA.

GENUS DXXXVII. ALYSIA. Latr.
CRYPTUS. Fabricius.
BASSUS. Panzer.
BRACON. Jurine.
CECHENUS. Illiger.

Manducator.

Sp. 1. *Manducator.*
Cryptus manducator. Fabricius.
Bracon manducator. Jurine.
Bassus manducator. Panzer.
Inhabits Germany.

TRIBE X. DIPLOLEPIDES.

Abdomen inserted to the thorax by a part only of its transverse diameter. Inferior wings without distinct nervures. Body not contractile into a sphere. Abdomen compressed or depressed. Oviduct filiform. Palpi very short. Antennæ filiform, straight, from thirteen to sixteen-jointed.

FAMILY I. *Diplolepida.*

Abdomen very shortly, or not at all pedunculated.

538. IBALIA.

GENUS DXXXVIII. IBALIA. Latreille, Illiger.
BANCHUS. Fabricius.
SAGARIS. Panzer.
CYNIPS. Jurine.
Abdomen very much compressed, knife-shaped. Antennæ filiform, joints cylindric.

Cultellator.

Sp. 1. *Cultellator.*
Ibalia cultellator. Latreille.
Banchus cultellator. Fabricius.
Sagaris cultellator. Panzer.
Inhabits Germany and the south of France.

539. DIPLOLEPIS.

GENUS DXXXIX. DIPLOLEPIS. Geoffroy, Olivier, Panzer, Illiger.
CYNIPS Linnæus, Scopoli Illiger.
Abdomen with the inferior part compressed, triangular-ovoid. Antennæ filiform, joints cylindric.

Metabolia.

Sp. 1. *Quercus-folii.*
Cynips quercus-folii. Linnæus.
Quercus-folii. *Diplolepis quercus-folii.* Latr.
Inhabits Europe.

540. Figites. Genus DXL. Figites. Latr. Jurine.
Cynips. Rossi.
Abdomen with its inferior part compressed, triangular-ovoid. Antennæ moniliform, thicker towards their extremities.

Scutellaris. *Sp.* 1. *Scutellaris.*
Figites scutellaris. Jurine, Latr.
Cynips scutellaris. Rossi.
Inhabits France and England.

Family II. *Eucharida.*

Abdomen with a very distinct elongate peduncle.

541. Eucharis. Genus DXLI. Eucharis. Latr. Fabr. Panzer, Spin.
Cynips. Olivier.
Ichneumon. Rossi.
Chalcis. Jurine.

Ascendens. *Sp.* 1. *Ascendens.*
Eucharis ascendens. Latreille, Fabricius, Panzer.
Inhabits Germany.

Tribe VI. Cynipsides.

Abdomen attached to the thorax by a part only of its transverse diameter. Inferior wings without distinct nervures. Body not contractable into a ball. Abdomen compressed, or depressed. Oviduct filiform. Palpi very short. Antennæ broken, clavate, or gradually thicker externally, from six to twelve-jointed. Hinder feet formed for leaping.

Family I. *Chalcida.*

Hinder tibiæ very much arcuated.

542. Leucospis. Genus DXLII. Leucospis. Fabr. Oliv. Panz. Jurine, Illiger, Spinoli, Latr.
Cynips. De Latour.
Vespa. Sulzer, Christus.
Abdomen as if sessile, somewhat ovate, compressed, thicker above. Maxillary palpi with the second and third joints equally long. Superior wings longitudinally duplicated, with the marginal and the third submarginal cells distinct, abbreviated, open.

Gigas. *Sp.* 1. *Gigas.*
Leucospis gigas. Fabr. Latr.
Inhabits France and Germany.

543. Chalcis. Genus DXLIII. Chalcis. Fabr. Oliv. Panzer, Jurine, Illiger, Latr.
Sphex. Linnæus.
Vespa. Linnæus.
Abdomen ovoid-triangular, not sessile, terminated by a point. Superior wings not folded, with the marginal and submarginal cells none or obliterated. Maxillary palpi, with the last joint but one shorter than the one before it.

* Abdomen with an elongate peduncle.

Clavipes. *Sp.* 1. *Clavipes.*
Chalcis clavipes. Latreille.
Inhabits Europe.

** Abdomen with a very short peduncle.

Minuta. *Sp.* 2. *Minuta.*
Chalcis minuta. Fabricius, Panzer, Latreille.
Inhabits Europe.

Family II. *Cynipsida.*

Hinder tibiæ straight.

Metabolia.

Division I.

Anterior segment of the thorax large, forming a transverse quadrate, or triangular, with the apex obtuse or truncate.

Subdivision 1.

Mandibles with three or four teeth. Thorax with the anterior segment rounded. Antennæ with eight joints, and above.

544. Eurytoma. Genus DXLIV. Eurytoma. Illiger, Latreille.
Ichneumon. De Geer.
Cynips. Fabricius, Schrank.
Diplolepis. Fabricius.
Eucharis. Fabricius, Panzer.
Chalcis. Jurine.
Figites. Spinoli.
Antennæ with distinct, somewhat rounded joints, verticillate-pilose in the males. Abdomen much compresed. Oviduct moderately exserted.

Serratulæ. *Sp.* 1. *Serratulæ.*
Cynips serratulæ. Fabricius.
Eucharis serratulæ. Panzer.
Eurytoma serratulæ. Latreille.
Inhabits Germany.

545. Cynips. Genus DXLV. Cynips. Geoffroy, Schæff. Fabr. Olivier, Walck. Latreille.
Ichneumon. Linnæus.
Diplolepis. Fabr. Illiger, Spin.
Cleptes. Fabricius.
Chalcis. Cuvier, Lam. Jurine.
Antennæ with cylindric joints. Abdomen compressed. Oviduct exserted.

Capreæ. *Sp.* 1. *Capreæ.*
Cynips capreæ. Fabricius, Latreille.
Inhabits Europe.

Subdivision 2.

Mandibles with three or four teeth. Thorax with the anterior segment rounded. Antennæ six or seven-jointed, branched sometimes in the males.

546. Eulophus. Genus DXLVI. Eulophus. Geoffroy, Olivier, Latr.
Ichneumon. Linnæus, De Geer, Spinoli.
Diplolepis. Fabricius, Spinoli.
Cleptes. Fabricius.
Cynips. Christus, Jurine.
Chalcis. Lamarck, Jurine.

Ramicornis. *Sp.* 1. *Ramicornis.*
Diplolepis ramicornis. Fabr.
Eulophus ramicornis. Latr.
Inhabits Europe.

Subdivision 3.

Thorax with the anterior segment attenuated in front, somewhat conic. Mandibles bidentate.

547. Cleonymus. Genus DXLVII. Cleonymus. Latreille.
Diplolepis. Fabricius, Spinoli.
Ichneumon. De Geer, Rossi.
Antennæ inserted towards the middle of the face. Maxillary palpi with four, labial with three joints. Abdomen depressed, trigonate.

Depressa. *Sp.* 1. *Depressa.*
Diplolepis depressa. Fabricius.
Cleonymus depressus. Latreille.
Inhabits Europe.

548. Spalangia. Genus DXLVIII. Spalangia. Latreille, Spinoli.
Antennæ inserted near the mouth. Palpi biarticulate. Abdomen ovate-conic.

Metabolia.

Sp. 1. *Nigra.*
Spalangia nigra. Latreille, Spinoli.
Nigra. Inhabits France.

DIVISION II.

Thorax with the anterior segment very short, transverse-linear.

Subdivision 1.

Mandibles almost quadrate, with three or four distinct teeth.

549. PERILAMPUS. GENUS DXLIX. PERILAMPUS. Latreille.
DIPLOLEPIS. Fabricius, Illiger, Panzer, Spinoli.
CHALCIS. Rossi, Cuvier, Lamarck, Jurine.
CYNIPS. Olivier, Walckenaer.
Mandibles strongly toothed. Club of the antennæ short, fusiform.
Violaceus. *Sp.* 1. *Violaceus.*
Diplolepis violacea. Fabricius.
Perilampus violaceus. Latreille.
550. PTEROMALUS. GENUS DL. PTEROMALUS. Swed. Latr.
ICHNEUMON. Linnæus.
DIPLOLEPIS. Fabricius, Spinoli.
CLEPTES. Fabricius.
CYNIPS. Olivier.
Tortricis. *Sp.* 1. *Tortricis.*
Pteromalus tortricis. Latreille.

Subdivision 2.

Mandibles terminated in a point, with two or more teeth.

551. ENCYRTUS. GENUS DLI. ENCYRTUS. Latreille.
ICHNEUMON. Rossi.
MIRA? Schellenberg.
Mandibles terminated with but one tooth. Abdomen very short, trigonate. Head much compressed behind. Scutellum large.
Infidus. *Sp.* 1. *Infidus.*
Ichneumon infidus. Rossi.
Encyrtus infidus. Latreille.
Mira mucora? Schellenberg?
Inhabits Europe.
552. PLATYGASTER. GENUS DLII. PLATYGASTER. Latreille.
SCELIO. Latreille, (rejected name.)
Mandibles terminated by two teeth. Abdomen elongate, depressed. Antennæ ten-jointed; the first joint very long, the third much longer than the following joints. Head trigonate-globose.
Ruficornis. *Sp.* 1. *Ruficornis.*
Platygaster ruficornis. Latreille.
Inhabits France.
553. SCELIO. GENUS DLIII. SCELIO. Latreille.
CERAPHRON? Jurine, Spinola.
Mandibles terminated by two teeth. Abdomen elongate, depressed. Antennæ ten-jointed, the first and third joints but little lengthened.
Rugulosus. *Sp.* 1. *Rugulosus.*
Scelio rugulosus. Latreille.
554. TELIAS. GENUS DLIV. TELIAS. Latreille.
Mandibles terminated by two teeth. Abdomen elongate, depressed. Antennæ twelve jointed.
Brevicornis. *Sp.* 1. *Brevicornis.*
Telias brevicornis. Latreille.

TRIBE VII. PROCTOTRUPIDES.

Abdomen attached to the metathorax by a portion of its transverse diameter. Inferior wings without distinct nervures. Body not contractable into a ball. Abdomen compressed, or depressed, the hinder extremity produced into a point or tubular tail, which is univalve or bivalve. Maxillary palpi long and pendant. Metabolia.

DIVISION I.

Thorax not binodate, the anterior segment transverse, arcuate.

Subdivision 1.

Antennæ with the first joint very long; inserted towards the mouth.

GENUS DLV. SPARASION. Latreille. 555. SPARASION.
CERAPHRON. Jurine.
Antennæ twelve-jointed. Abdomen elliptic, depressed, without any very distinct peduncle.
Frontale. *Sp.* 4. *Frontale.*
Sparasion frontale. Latreille.
Ceraphron cornutus. Jurine, (female.)
Inhabits France.
GENUS DLVI. CERAPHRON. Jurine, Spinola, Latr. 556. CERAPHRON.
Antennæ eleven-jointed. Abdomen ovoid, compressed, pedunculated distinctly.
Sulcatus. *Sp.* 1. *Sulcatus.*
Ceraphron sulcatus. Jurine, Spinola, Latreille.
GENUS DLVII. ANTEON. Jurine, Latreille. 557. ANTEON.
Antennæ ten-jointed. Abdomen very distinctly and abruptly pedunculated, ovoid and depressed.
Jurineanum. *Sp.* 1. *Jurineanum.*
Anteon jurineanum. Latreille.

Subdivision 2.

Antennæ inserted towards the middle of the face, or in the front, the first joint very long.

GENUS DLVIII. PSILUS. Jurine, Panzer, Spinola. 558. PSILUS.
DIAPRIA. Latreille.
CHALCIS. Fabricius.
ICHNEUMON. Villers, Rossi.
Antennæ moniliform; of the males fourteen-jointed; of the females twelve-jointed. Superior wings with no cells; the costal nerve abbreviated, thicker towards its extremity.
Cornutus. *Sp.* 1. *Cornutus.*
Psilus cornutus. Panzer.
Diapria cornuta. Latreille.
Inhabits Europe.
GENUS DLIX. BELYTA. Jurine, Latreille. 559. BELYTA.
CINETUS. Jurine.
Antennæ filiform; of the male fifteen; of the female fourteen-jointed; all the basal joints elongate. Superior wings with the cells complete.
Bicolor. *Sp.* 1. *Bicolor.*
Belyta bicolor. Jurine, Latreille.

Subdivision 3.

Antennæ with the first joint not elongate.

GENUS DLX. PROCTOTRUPES. Latreille, Spinola. 560. PROCTOTRUPES.
CODRUS. Jurine, Panzer.
ERIODORUS. Walck.
Antennæ thirteen-jointed. Mandibles without teeth. Superior wings with three complete cells. Abdomen scarcely pedunculated, terminated by a joint more or less long.
Brevipennis. *Sp.* 1. *Brevipennis.*
Proctotrupes brevipennis. Latreille, *Gen. Crust. et Ins.* 4. 38. tab. 13. fig. 1.
Inhabits Europe.
GENUS DLXI. HELORUS. Latreille, Jurine. 561. HELORUS.
SPHEX. Panzer.

Metabolia. PSEN. Panzer.

Antennæ fifteen jointed. Mandibles dentated. Superior wings with more than three complete cells. Abdomen distinctly and abruptly pedunculated, not terminated in a point.

Anomalipes. *Sp.* 1. *Anomalipes.*
Sphex anomalipes. Panzer.
Helorus anomalipes. Latreille.
Inhabits Germany and France.

DIVISION II.

Thorax binodate, the anterior segment elongate-quadrate, or somewhat triangular. Antennæ inserted on the clypeus, near to the mouth.

562. DRYINUS. GENUS DLXII. DRYINUS. Latreille.
GONATOPUS. Klug.

Antennæ straight, ten-jointed. Mandibles with many teeth. Thorax binodate. Anterior feet very long, terminated by two very large nails internally denticulated, one of these reflexed.

Formicarius. *Sp.* 1. *Formicarius.*
Dryinus formicarius. Latreille.
Inhabits France.

563. BETHYLUS. GENUS DLXIII. BETHYLUS. Latreille, Fabricius, Illiger, Spinola.
OMALUS. Jurine.
CERAPHRON. Panzer.

Antennæ broken, composed of thirteen joints. Mandibles bidentate. Thorax binodate, the anterior segment elongate-quadrate. Feet simple.

Cenopterus. *Sp.* 1. *Cenopterus.*
Bethylus cenopterus. Latreille.

TRIBE VIII. CHRYSIDIDES.

Abdomen attached to the metathorax by a portion only of its transverse diameter. Inferior wings without distinct nervures. Body not contractable into a ball.

FAMILY I. *Cleptida.*

Abdomen semicylindric or semicircular, with five segments in the male, and four in the females. Thorax attenuated in front, divided transversely by four segments.

564. CLEPTES. GENUS DLXIV. CLEPTES. Latreille, Fabricius, Panzer, Jurine, Illiger, Spinoli.
SPHEX. Linn. Vill.
CHRYSIS. Olivier.
VESPA. Geoffroy.
ICHNEUMON. Rossi, Walck.

Semiaurata. *Sp.* 1. *Semiaurata.*
Cleptes semiaurata. Fabricius, Latreille.
Inhabits Europe.

FAMILY II. *Chrysida.*

Abdomen semicylindric, truncated or rounded behind, often dentated, composed of three, sometimes of four joints. Thorax semicylindric, divided by three transverse sutures.

DIVISION I.

Metathorax with the middle produced into a scutellum.

Subdivision 1.

Abdomen with the second segment larger than the others. Palpi many-jointed.

565. ELAMPUS. GENUS DLXV. ELAMPUS. Spinoli, Latreille.
CHRYSIS. Fabricius, Jurine.
HEDYCHRUM. Panzer, Lepeletier.

Mandibles dentated. Abdomen terminated by an obtuse point; the second segment larger than the others. Metabolia.

Sp. 1. *Panzeri.* Panzeri.
Elampus panzeri. Spinoli.
Chrysis panzeri. Fabricius.
Inhabits France and Germany.

GENUS DLXVI. STILBUM. Spinoli, Latreille. 566. STILBUM.
CHRYSIS. Linn. Olivier, Illiger, Jurine.

Mandibles without teeth. Abdomen with the third segment very large, slightly dentate behind.

Sp. 1. *Splendidum.* Splendidum.
Chrysis splendida. Fabricius, Donovan.
Inhabits India.

Subdivision 2.

Abdomen with the third or fourth segment larger than the others. Palpi two-jointed, (and very small.)

GENUS DLXVII. PARNOPES. Latreille, Fabricius, Spinoli, Illiger, Lepeletier. 567. PARNOPES.
CHRYSIS. Rossi, Olivier, Jurine.

Sp. 1. *Carnea.* Carnea.
Parnopes carnea. Latreille.
Inhabits France and southern Italy.

DIVISION II.

Metathorax with the middle not elongated into a scutellum.

GENUS DLXVIII. EUCHRÆUS. Latreille. 568. EUCHRÆUS.
CHRYSIS. Fabricius, Jurine, Lepeletier.

Mandibles with one tooth on their internal edge. Abdomen semicylindric, elongate, the last segment with a transverse elevation, and a row of impressed dots.

Sp. 1. *Purpuratus.* Purpuratus.
Chrysis purpurata. Fabricius.
Euchræus purpuratus. Latreille.
Inhabits France.

GENUS DLXIX. CHRYSIS of authors. 569. CHRYSIS.
VESPA. Geoffroy.

Mandibles with one tooth on their internal edges. Abdomen semicylindric, elongate; the last segment abruptly divided by an impression, with a transverse row of impressed dots.

Sp. 1. *Ignita.* Ignita.
Chrysis ignita. Linn. Fabricius, &c.

GENUS DLXX. HEDYCHRUM. Latr. Panzer Spin. 570. HEDYCHRUM.
CHRYSIS. Linn. Fabricius, Illiger, Lamarck, Lepeletier.

Mandibles bidentate on their internal edge. Abdomen semicircular, with the extremity rounded; all the segments united.

Sp. 1. *Auratum.* Auratum.
Chrysis aurata. Fabricius.

SECTION II. ACULEATA.

Oviduct none. Sting or aculeus in the females having a communication with poisonous glands. Abdomen attached to the thorax in all by a part only of its transverse diameter.

DIVISION I.

Hinder feet not pollinigerous; their tarsi with the first joint cylindric, not much larger than the others, nor much compressed. Larvæ omnivorous.

Subdivision 1.

Ocelli or stemmata not distinct. Wings often wanting in the females and neuters.

Metabolia.

Tribe I. Formicarides.*

Abdomen with a peduncle abruptly formed, with a scale on two knots. Antennæ thicker towards their extremities, the first joint very long, more so in the females and neuters. Labrum large, perpendicular, corneous.

Obs. These insects live in societies consisting of vast numbers. The males and the females are furnished with wings, the neuters being apterous.

571. Formica. Genus DLXXI. Formica of authors.

Lasius. Fabricius.

Peduncle of the abdomen formed of one simple scale. Sting not punctorious. Poisonous glands in the females and neuters. Antennæ inserted in the front.

Herculanea. *Sp.* 1. *Herculanea.*

Formica herculanea. Latreille.

Inhabits the European woods, building a large nest with bits of sticks.

572. Polyergus. Genus DLXXII. Polyergus. Latreille, Spinoli.

Formica. Jurine.

Peduncle of the abdomen formed of but one simple scale. Sting not punctorious. Poisonous glands in the females and neuters. Antennæ inserted near the mouth.

Rufescens. *Sp.* 1. *Rufescens.*

Polyergus rufescens. Latreille.

573. Ponera. Genus DLXXIII. Ponera. Latreille, Illiger.

Formica. Linn. Fabr. De Geer, Olivier.

Peduncle of the abdomen formed of one scale or knot. Sting in females and the neuters.

* Mandibles of the neuters narrow, elongate, cheliform.

Genus Odontomachus of Latreille's old works. Myrmecia, Fabricius.

Chelifera. *Sp.* 1. *Chelifera.*

Ponera chelifera. Latreille.

** Mandibles of the neuters broad and triangular.

Genus Ponera of Latreille's older works.

Crassinoda. *Sp.* 2. *Crassinoda.*

Formica crassinoda. Fabricius.

Ponera crassinoda. Latreille.

574. Atta. Genus DLXXIV. Atta. Fabr. Illig. Jur. Latr.

Formica. Linn. Fabricius, Villers.

Peduncle of the abdomen formed of two knots. Sting in the females and the neuters. Antennæ entirely exserted. Palpi very short; maxillary ones with six distinct joints. Head of the neuters very large.

* Mandibles of the neuters very narrow, and much elongated.

Genus Eciton of Latreille's older works; Myrmecia, Fabricius.

Hamata. *Sp.* 1. *Hamata.*

Myrmecia hamata. Fabricius.

Atta hamata. Latreille.

** Mandibles of the neuters elongate-trigonate, much denticulated.

Formica of Latreille's older works; Atta, Fabr.

Cephalotes. *Sp* 2. *Cephalotes.*

Atta cephalotes. Latreille, Fabricius.

*** Mandibles of the neuters short, trigonate, scarcely denticulated.

Genus Formica of Latreille's older works, and of Fabricius.

Capitata. *Sp.* 3. *Capitata.*

Atta capitata. Latreille.

575. Myrmica. Genus DLXXV. Myrmica. Latr. Spinoli.

Formica. Linn. Geoffroy, Panzer, Illiger.

Manica. Jurine.

Myrmecia. Fabricius.

Metabolia.

Peduncle of the abdomen formed of two knots. Antennæ entirely exserted. Maxillary palpi long; six-jointed. Neuters and females armed with stings.

* Mandibles very narrow, very long: Antennæ filiform.

Forficata. *Sp.* 1. *Forficata.*

Myrmecia forficata. Fabr.

Myrmica forficata. Latr.

** Mandibles trigonate, but little elongate: Antennæ thicker towards their extremities.

a. Superior wings with three submarginal cells; the first and second perfect.

Subterranea. *Sp.* 2. *Subterranea.*

Mermica subterranea. Latr.

b. Superior wings with two submarginal cells; the first perfect.

Fugax. *Sp.* 3. *Fugax.*

Myrmeca fugax. Latreille.

576. Cryptocerus. Genus DLXXVI. Cryptocerus. Latr. Fabr. Illiger.

Formica. Linn. Olivier.

Manica. Jurine.

Peduncle of the abdomen formed of two knots. Antennæ with the first joint lodged in a lateral ridge of the head. Neutrals and females armed with a sting.

Atratus. *Sp.* 1. *Atratus.*

Cryptocerus atratus. Latr.

Tribe II. Mutillarides.

Antennæ filiform, vibratous, the first and third joints elongate.

The insects of this family are solitary. The males are winged, the females apterous, and there are no neuters.

Family I. *Dorylida.*

Antennæ inserted at the mouth, the first joint very long. Head small. Abdomen cylindric, having the first joint nearly trigonate, with the superior sides more elevated, or transverse; rounded above, and separated from the following joint by an incision. Tibiæ slender, not spinose.

577. Labidus. Genus DLXXVII. Labidus. Latreille, Jurine.

Abdomen with the first segment nearly trigonate, with the sides elevated like a horse's shoe. Superior wings with three submarginal cells.

Latreillii. *Sp.* 1. *Latreillii.*

Labidus Latreille. Jurine.

Dorylus mediatus of Fabricius is probably to be referred to this genus.

578. Dorylus. Genus DLXXVIII. Dorylus.† Fabricius, Jurine, Illiger, Olivier, Latreille.

Abdomen with the first segment transverse, rounded above, and separated from the following joint by an incision. Superior wings with two submarginal cells.

Helvolus. *Sp.* 1. *Helvolus.*

Dorylus helvolus. Fabricius, Latreille.

Family II. *Mutillida.*

Antennæ inserted in the middle of the face. Head large. Abdomen somewhat conic or ovoid. Tibiæ spinose.

* Huber has written a work on the economy of these animals.

† The males only of this and the preceding genus are known; the females are supposed to be apterous and solitary.

Metabolia.

Division I.

Abdomen with the two first segments nodiform. Superior wings with one submarginal cell.

579. Apterogyna. Genus DLXXIX. Apterogyna. Latreille.

Antennæ setaceous, of the male as long as the body, of the females a little shorter. Mandibles arcutate. Maxillary palpi long.

Olivierii. *Sp.* 1. *Olivierii.*

Apterogyna Olivierii. Latr.

Inhabits Arabia.

Division II.

Abdomen with the first segment of the abdomen nodiform. Superior wings with three submarginal cells.

Subdivision 1.

Maxillary palpi as long or longer than the maxillæ. Antennæ longer than the head, the first joint not receiving the second.

580. Mutilla. Genus DLXXX. Mutilla. Linn. Fabricius, Panz. Jur. Illig. Spinoli.

Sphex. De Geer.

Apis. Christus, Harris.

Abdomen (of both sexes) ovoid and convex, the second segment large, somewhat companulated. Thorax of the females cubical, with no transverse sutures.

Europæa. *Sp.* 1. *Europæa.*

Mutilla Europæa. Linn. Fabr. Panz. Latr.

Apis with no wings!! of Harris.

Inhabits Europe.

581. Methoca. Genus DLXXXI. Methoca. Latreille.

Mutilla. Jurine.

Abdomen (of the females) ovoid and convex, with the second segment large. Thorax composed of three segments, nodose.

Ichneumonoides. *Sp.* 1. *Ichneumonoides.*

Methoca Ichneumonoides. Latr.

582. Myrmosa. Genus DLXXXII. Myrmosa. Latr. Jur. Panz.

Mutilla. Rossi.

Hylæus. Fabricius.

Abdomen depressed, elliptic in the males, conic in the females. Thorax composed of two segments, the anterior segment transverse.

Melanocephala. *Sp.* 1. *Melanocephala.*

Myrmosa melanocephala. Latr.

Inhabits Europe.

583. Schlerodermus. Genus DLXXXIII. Schlerodermus. Klug. Latr.

Abdomen of the females conic. Thorax divided into three segments by two transverse sutures, the hinder one elongate.

Domesticus. *Sp.* 1. *Domesticus.*

Schlerodermus domesticus. Klug. Latreille.

Subdivision 2.

Maxillary palpi shorter than the maxillæ. Antennæ slender, longer than the head; the first segment receiving the second.

584. Myrmecodes. Genus DLXXXIV. Myrmecodes. Latreille.

Tiphia. Fabricius.

Mandibles porrected, arcuate, edentulous. Palpi very short, three or four-jointed, the last joint obsolete; labial palpi shorter, scarcely visible, somewhat conic; labial ones cylindric. Antennæ not much longer than the head. Thorax elongate-cubic, a little narrowed behind, composed of three segments meeting together, the first segment largest.

Metabolia.

Pedestris. *Sp.* 1. *Pedestris.*

Tiphia Pedestris. Fabricius.

Inhabits New Holland.

Subdivision 2.

Ocelli distinct, smooth. Wings never wanting.

Tribe III. Scolides.

Thorax with the first segment transverse quadrate, or forming an arc. Feet short, or moderately long; the hinder ones thick, spinulose, or strongly ciliated. Antennæ shorter than the head and trunk. Superior wings with the marginal cell detached from the apex; not doubled longitudinally.

Family I. *Tiphida.*

Maxillary palpi long, with the joints very unequal. Antennæ with the first joint obconic.

585. Tiphia. Genus DLXXXV. Tiphia. Fabr. Panz. Illig. Jur. Spinoli.

Sphex. Scopoli, Christus.

Bethylus. Panzer.

Mandibles without teeth. Antennæ shorter than the thorax in both sexes. Abdomen ovate.

Femorata. *Sp.* 1. *Femorata.*

Tiphia femorata. Fabr. Jur. Latr.

Bethyllus femoratus. Panzer.

Inhabits Europe.

586. Tengyra. Genus DLXXXVI. Tengyra. Latr.

Mandibles with two teeth. Antennæ of the males almost as long as the body. Abdomen of the males very much elongated, almost linear.

Sanvitali. *Sp.* 1. *Sanvitali.*

Tingyra sanvitali. Latreille.

Inhabits Italy.

Family II. *Scolida.*

Maxillary palpi short, joints equal. Antennæ with the first joint long, nearly cylindric.

Division I.

Thorax with the anterior segment transverse-quadrate, the hinder margin straight or but little arcuated.

587. Mizine. Genus DLXXXVII. Mizine. Latr. Illig. Spinoli.

Plesia. Jurine.

Elis. Fabricius.

Tiphia. Fabr. Panzer.

Sapyga. Jurine, Panzer.

Scolia. Rossi.

Mandibles bidentate.

Maculata. *Sp.* 1. *Maculata.*

Tiphia maculata. Fabricius.

Mizine maculata. Latreille.

Volvulus. *Sp.* 2. *Volvulus.*

Elis volvulus. Fabricius.

588. Meria. Genus DLXXXVIII. Meria. Illiger, Latreille.

Bethylus. Fabricius.

Tiphia. Rossi.

Tachus. Jurine, Spinoli.

Mandibles without teeth.

Staphylinus. *Sp.* 1. *Staphylinus.*

Tachus staphylinus. Jurine.

Meria staphylinus. Latreille.

Division II.

Thorax with the anterior segment much contracted in the middle, and very much arcuated behind.

589. Scolia. Genus DLXXXIX. Scolia. Latreille.

Metabolia.

* Superior wings with three submarginal cells, the last small; and two perfect discoidal cells. Four hinder tibiæ with acute spurs or heels.

Hortorum. *Sp.* 1. *Hortorum.*

Scolia hortorum. Fabricius, Latreille.

** Superior wings with three submarginal cells, the last small; and with three perfect discoidal cells. Hinder tibiæ with the heels broader at their extremities, and rounded.

Interrupta. *Sp.* 2. *Interrupta.*

Elis interrupta. Fabricius.

*** Superior wings with two submarginal cells, the second receiving two recurrent nervures: Three perfect discoidal cells: Tibiæ as in the last division.

Abdominalis. *Sp.* 3. *Abdominalis.*

Scolia abdominalis. Latreille.

**** Superior wings with two submarginal cells, the second receiving one recurrent nervure; two perfect discoidal cells, and one imperfect below: Four hinder tibiæ with acute heels.

Tridens. *Sp.* 4. *Tridens.*

Scolia tridens. Fabricius.

Tribe IV. Sapygides.

Thorax with the first segment forming an arch, or a transverse square. Feet moderate, or short, slender, not strongly ciliated or spined. Antennæ in both sexes as long as the head and the trunk. Superior wings with the marginal cell not remote; not folded longitudinally.

590. Sapyga. Genus DXC. Sapyga. Latr. Jur. Klug. Illiger, Spinoli.

Apis. Linn.

Vespa. Geoffroy.

Hellus. Fabricius, Panzer.

Sphex. Villers.

Mandibles very strong, trigonate, many-toothed. Antennæ thicker towards their extremities.

Sexpunctatus. *Sp.* 1. *Sexpunctatus.*

Hellus sexpunctatus. Fabricius.

Inhabits Europe.

591. Polychrum. Genus DXCI. Polychrum. Spinoli, Latreille.

Mandibles very strong, trigonate, many-toothed. Antennæ filiform.

Repandum. *Sp.* 1. *Repandum.*

Polychrum repandum. Spinoli, Latreille.

592. Thynnus. Genus DXCII. Thynnus. Fabricius, Salzer, Latreille, Jurine, Donovan.

Mandibles (of the males) narrow, bidentate, arcuate. Antennæ slender, nearly setaceous.

Dentatus. *Sp.* 1. *Dentatus.*

Thynnus dentatus. Fabr. Latr. Donovan.

Inhabits New Holland.

Tribe V. Pompilides.

Thorax with the first segment forming an arch, or a transverse square. Feet long, the hinder ones as long as the head and trunk. Antennæ slender, formed of elongate, and slightly serrated joints. Superior wings not folding longitudinally.

Family I. *Pompilida.*

Superior wings with three submarginal cells complete.

593. Pepsis. Genus DXCIII. Pepsis. Fabricius, Latreille.

Pompilus. Jurine, Illiger.

Palpi equally long; the two last joints of the maxillary ones, and the last of the labial ones, shorter than the rest.

Stellata. *Sp.* 1. *Stellata.*

Pepsis stellata. Fabricius, Latreille.

Genus DXCIV. Pompilus. Latreille.

Metabolia.

594. Pompilus.

Maxillary palpi longer than the labial ones, with the last joint thicker, conic-obovate; the three last joints nearly equally long. Labrum inserted under the clypeus. Antennæ (of the females at least,) with their points convoluted.

Obs. This artificial genus contains the following genera, proposed by the most learned writers on the hymenopterous insects, viz. 1. Pompilus, Fabr. Panzer, Jur. Illig. Walck. Spin. 2. Sphex, Linn. Scop. Vill. Cuv. Lam. 3. Ichneumon, Geoff. 4. Pepsis, Fabr. 5. Salius, Fabr. 6. Cryptocheilus, Panzer. With the rejected genus 7. Psammochares of Latreille.

Annulatus. *Sp.* 1. *Annulatus.*

Pompilus annulatus. Latr. Fabr.

Cryptocheilus annulatus. Panzer.

Viaticus. *Sp.* 2. *Viaticus.*

Pompilus viaticus. Latr. Fabr. Panzer.

Bicolor. *Sp.* 3. *Bicolor.*

Salius bicolor. Fabricius.

Pompilus bicolor. Latreille.

Dispar. *Sp.* 4. *Dispar.*

Pompilus dispar. Latreille.

Planiceps. *Sp.* 5. *Planiceps.*

Pompilus planiceps. Latreille.

595. Ceropales. Genus DXCV. Ceropales. Latr. Fabr. Jur. Panz. Spinoli.

Evania. Olivier, Villers, Rossi, Cuvier.

Maxillary palpi pendulous, longer than the maxillary ones; the three last joints equally long, the last joint thicker, conic-obovate. Labrum entirely exserted, entering to the anterior margin of the clypeus. Antennæ (in both sexes) thick, rigid, with the middle arcuated, not convoluted.

Maculata. *Sp.* 1. *Maculata.*

Ceropales maculata. Fabricius, Latreille.

Family II. *Aphorida.*

Superior wings with two complete submarginal cells.

596. Aporus. Genus DXCVI. Aporus. Spinoli, Latreille.

Superior wings with the second submarginal cell receiving two recurrent nervures.

Unicolor. *Sp.* 1. *Unicolor.*

Aporus unicolor. Spinoli, Latreille.

Tribe VI. Sphecides.

Thorax with the first segment transverse linear. Feet long; the hinder ones as long as the head and trunk. Ocelli distinct. Superior wings not folding longitudinally.

Family I. *Sphecida.*

Mandibles with their internal edge denticulated.

597. Amophila. Genus DXCVII. Amophila. Kirby, Latreille.

Sphex. Linn. De Geer, Panzer, Lamarck, Cuvier, Jurine, Illiger, Spinoli.

Pepsis. Fabricius, Spinoli.

Miscus. Jurine.

Antennæ inserted about the middle of the face. Maxillæ and labrum much longer than the head, bent in the middle. Palpi very slender, with cylindric joints.

* Abdomen twice the length of the thorax, with the petiolus gradually formed, elongate, and two-jointed.

a. Superior wings with the third submarginal cell not petiolated.

Armata. *Sp.* 1. *Armata.*

Sphex armata. Rossi.

Amophila armata. Latreille.

Metabolia.

b. Superior wings with the third submarginal cell petiolated.

Campestris. *Sp.* 2. *Campestris.*
Amophila campestris. Latreille.
Inhabits sandy places.

** Abdomen as long (scarcely longer) as the thorax, peduncle short, abrupt.

Arenaria. *Sp.* 3. *Arenaria.*
Pepsis arenaria. Fabricius.
Amophila arenaria. Latreille.
Inhabits sandy ground.

398. Sphex. Genus DXCVIII. Sphex. Linn. Fabr. Cuvier, Lamarck, Jurine, Illiger.
Ichneumon. Geoffroy.
Apis. Linn.
Pro-apis. De Geer.
Pepsis. Fabricius, Spinola.
Chlorion. Fabricius.
Antennæ inserted about the middle of the face. Maxillæ and labrum scarcely longer than the head, and bent towards their extremities. Maxillary palpi with all the joints elongate and obconic.

Flavipennis. *Sp.* 1. *Flavipennis.*
Pepsis flavipennis. Fabricius.
Sphex flavipennis. Latreille.
Obs. Pepsis pennsylvanica, and *Maxillosa,* with *Chlorion ichneumoneum* of Fabricius, are referable to this genus.

399. Pronæus. Genus DXCIX. Pronæus. Latreille.
Dryinus. Fabricius.
Pepsis. Palisot de Beauvois.
Antennæ inserted at the mouth, (at the base of the clypeus?) Maxillary palpi filiform, longer than the labial palpi. Maxillæ terminated by a lanceolate lobe. Lip with the intermediate division elongate.

Æneus. *Sp.* 1. *Æneus.*
Dryinus æneus. Fabricius.
Pronæus æneus. Latreille.

600. Chlorion. Genus DC. Chlorion. Latr. Fabricius, Panzer.
Sphex. Christus, Cuvier.
Pepsis. Illiger.
Ampulex. Jurine.
Antennæ inserted at the mouth, (at the base of the clypeus?) Maxillary palpi filiform, longer than the labial ones. Maxillæ terminated by a short lobe. Lip with the divisions short, as if quadrioblate.

Lobatum. *Sp.* 1. *Lobatum.*
Clorion lobatum. Fabr. Latr.

601. Dolichurus. Genus DCI. Dolichurus. Latreille.
Pison. Jurine.
Pompilus. Spinola.
Antennæ inserted at the mouth, (at the base of the clypeus?) Maxillary palpi setaceous, longer than the labial ones.

Ater. *Sp.* 1. *Ater.*
Pompilus corniculus. Spinola.
Dolichurus ater. Latreille.

Family II. *Pelopœida.*

Mandibles without teeth on their internal edges.

602. Podium. Genus DCII. Podium. Fabricius, Latreille.
Antennæ inserted below the middle of the face. Clypeus broader than long. Maxillæ entirely coriaceous. Palpi nearly of equal length.

Rufipes. *Sp.* 1. *Rufipes.*
Podium rufipes. Fabr. Latr.

603. Pelopæus. Genus DCIII. Pelopæus. Latreille, Fabr. Panzer. Spinola.
Pepsis. Illiger.
Sceliphron. Klug.
Sphex. Linn. Cuvier, Lamarck, Jurine.
Antennæ inserted at the middle of the face. Clypeus with nearly equal diameters. Maxillæ with their extremities partly membranaceous. Maxillary palpi longer than the labial ones.

Spirifex. *Sp.* 1. *Spirifex.*
Sphex spirifex. Linn.
Pelopæus spirifex. Latreille.

Destillatorius. *Sp.* 2. *Destillatorius.*
Sphex spirifex. Panzer (*Faun. Ins. Germ.*)
Pelopæus destillatorius. Latreille.

Pensilis. *Sp.* 3. *Pensilis.*
Pelopæus pensilis. Latreille.

Tubifex. *Sp.* 4. *Tubifex.*
Pelopæus tubifex. Latreille.
Obs. The above four species are often confounded under the title of *Sphex spirifex* of Linnæus.

Tribe VII. Bembecides.

Thorax with the first segment transverse, linear. Feet short or moderately long. Labrum entirely exserted, very large. Ocelli very distinct. Superior wings not folded longitudinally.

604. Bembex. Genus DCIV. Bembex. Fabricius, Olivier, Rossi, Cuvier, Lamarck, Panzer, Jurine, Illiger, Spinola.
Apis. Linn. Villers, Christus.
Vespa. Sulzer.
Labrum elongate-triangular. Mandibles simply unidentate on their internal edge. Maxillary palpi very short, four jointed. Superior wings with the marginal and the last submarginal cell almost meeting at their extremity, separated only by a very short angle.

Rostrata. *Sp.* 1. *Rostrata.*
Bembex rostrata. Fabricius, Panzer, Latreille.
Inhabits Germany.

605. Monedula. Genus DCV. Monedula. Latreille, Panzer.
Vespa. Linn. De Geer.
Bembex. Olivier, Jurine.
Stictia. Illiger.
Labrum elongate-triangular. Mandibles with two or three denticules on their internal edge. Maxillary palpi as long as the maxillæ, composed of six-joints. Superior wings with the marginal and last submarginal cells divided by a very distint space.

Carolina. *Sp.* 1. *Carolina.*
Bembex carolina. Fabricius.
Monedula carolina. Latreille.

606. Stizus. Genus DCVI. Stizus. Latr. Jurine, Spinola.
Bembex. Olivier, Fabricius.
Crabro. Rossi, Fabricius.
Larra. Illiger, Fabricius.
Sphex. Villers.
Mellinus. Panzer.
Liris. Fabricius.
Scolia. Fabricius.
Labrum short, semicircular. Palpi filiform, maxillary ones longer, six-jointed; labial ones four-jointed.

Ruficornis. *Sp.* 1. *Ruficornis.*
Larra ruficornis. Fabricius.
Monedula ruficornis. Latreille.

Tribe VIII. Larrides.

Thorax with the first segment transverse-linear. Feet short or moderately long. Labrum entirely concealed, or but very obscure. Eyes elongate, reaching the hinder margin. Ocelli very distinct. Antennæ inserted near the mouth; the first joint obovoid, or in-

Metabolia.

serted in the middle of the face. Superior wings not folding longitudinally.

FAMILY I. *Larrida.*

Superior wings with two or three submarginal cells complete.

DIVISION I.

Eyes entire, not emarginate. Mandibles without an emargination on their internal edge.

Subdivision 1.

Antennæ thicker externally. Eyes separate.

607. GORYTES. GENUS DCVII. GORYTES. Latreille, Illiger, Spin.
MELLINUS. Fabricius, Walckenaer.
VESPA. Linn. Geoffroy.
SPHEX. Rossi.
ARPACTUS. Jurine, Panzer.
OXYBELUS. Fabricius.

Antennæ inserted below the middle of the face. Mandibles unidentate. Superior wings with the second submarginal cell sessile.

Quinquecinctus. *Sp.* 1. *Quinquecinctus.*
Gorytes quinquecinctus. Latreille.

608. NYSSON. GENUS DCVIII. NYSSON. Latreille, Jurine, Panzer, Illiger, Spinola.
CRABRO. Fabr. Olivier, Rossi.
OXYBELUS. Fabricius.
POMPILUS. Fabr.
MELLINUS. Fabr.
SPHEX. Villers.

Antennæ inserted below the middle of the face. Mandibles without teeth. Superior wings with the second submarginal cell petiolated.

Spinosus. *Sp.* 1. *Spinosus.*
Nysson spinosus. Latreille.

609. PSEN. GENUS DCIX. PSEN. Latr. Jurine, Panzer, Illiger, Spinola.
PELOPÆUS. Fabr.
TRYPOXYLON. Fabr.

Antennæ inserted in the middle of the face, towards the front. Abdomen with the peduncle abrupt and short.

Ater. *Sp.* 1. *Ater.*
Psen ater. Latreille.
Trypoxylon atratum. Fabr.
Inhabits Europe.

Subdivision 2.

Eyes meeting behind. Antennæ filiform.

610. ASTATA. GENUS DCX. ASTATA. Latr. Spinola.
SPHEX. Villers, Rossi.
DIMORPHA. Jurine, Panzer, Illiger.

Antennæ inserted towards the mouth, at the base of the clypeus.

DIVISION II.

Eyes entire, not emarginate. Mandibles emarginate on their internal edge.

Subdivision 1.

Superior wings with three submarginal cells.

611. PALARUS. GENUS DCXI. PALARUS. Latreille.
GONIUS. Jurine, Panzer.
PHILANTHUS. Fabr.
CRABRO. Rossi.

Antennæ very short, thicker towards their tips. Clypeus divided into three parts by two impressed lines. Superior wings with the second submarginal cell petiolated. Metabolia.

Flavipes. *Sp.* 1. *Flavipes.*
Palarus flavipes. Latr.
Philanthus flavipes. Fabr.

612. LARRA. GENUS DCXII. LARRA. Fabricius, Olivier, Jurine, Panzer, Spinola, Latreille.
LIRIS. Fabricius, Illiger.
SPHEX. Villers, Rossi.

Antennæ filiform. Superior wings with the third submarginal cell narrow, almost lunate. Mandibles without a tooth-like process on their internal edge.

Ichneumoniformis. *Sp.* 1. *Ichneumoniformis.*
Larra ichneumoniformis. Panzer, Fabr. Latr.

613. LYROPS. GENUS DCXIII. LYROPS. Illiger, Latreille.
TACHYTES. Panzer.
LARRA. Fabricius, Jurine.
LIRIS. Fabr.
ANDRENA. Rossi.

Antennæ filiform. Superior wings with the third submarginal cell narrow, almost lunate. Mandibles with a strong tooth on their internal edge.

Tricolor. *Sp.* 1. *Tricolor.*
Larra tricolor. Fabr.
Tachytes tricolor. Panzer.
Inhabits Germany.

Subdivision 2.

Superior wings with two submarginal cells.

614. DINETUS. GENUS DCXIV. DINETUS. Jurine, Panzer, Illiger, Latreille.
SPHEX. Schæffer.
POMPILUS. Fabricius.
CRABRO. Rossi.

Antennæ, (of the males,) moniliform, terminated by elongate, cylindric joints, convoluted in the middle. Mandibles acutely unidentate on their internal edge. Superior wings with the marginal cell appendiculated; the two submarginal cells sessile.

Pictus. *Sp.* 1. *Pictus.*
Dinetus pictus. Jurine, Panzer, Latreille.

615. MISCOPHUS. GENUS DCXV. MISCOPHUS. Jurine, Latreille.

Antennæ with the joints alike in both sexes. Mandibles without distinct teeth. Superior wings with the second submarginal cell petiolated.

Bicolor. *Sp.* 1. *Bicolor.*
Miscophus bicolor. Jurine, Latreille.
Inhabits France.

DIVISION III.

Eyes notched.

616. PISON. GENUS DCXVI. PISON. Jurine, Latreille.
TACHYBULUS. Latreille's older works.
ALYSON. Spinola.

Superior wings with three distinct submarginal cells. Abdomen conic, with a very short, almost imperceptible peduncle.

Ater. *Sp.* 1. *Ater.*
Pison niger. Latreille.
Alyson ater. Spinola.
Tachybulus ater. Latr. *Gen. Crust. et Ins.* 4. p. 75.

617. TRYPOXYLON. GENUS DCXVII. TRYPOXYLON. Latreille, Fabricius, Panzer, Illiger, Spinola.
SPHEX. Linnæus, Vill. Cuv. Rossi, Christus.
APIUS. Jurine.

Superior wings with three submarginal perfect cells; the first distinct, receiving a recurrent nervure; the second obsolete, much smaller, receiving another ner-

Metabolia.

vure; the third also obsolete, terminal. Abdomen long and gradually pedunculated.

FAMILY I. *Oxybellida.*

Superior wings with one complete submarginal cell.

618. NITELA. GENUS DCXVIII. NITELA. Latreille.

Antennæ filiform nearly straight, longer than the head, the second and third joints nearly of equal length. Mandibles bidentate at their extremities. Tibiæ not spinose. Tarsi with small *pulvilli.*

Spinolæ. *Sp.* 1. *Spinolæ.*

Nitela Spinolæ. Latreille.

Inhabits the south of France.

619. OXYBELUS. GENUS DCXIX. OXYBELUS. Latreille, Fabricius, Panzer, Jurine, Illiger, Spinola.

VESPA. Linnæus, Villers, Christus.

SPHEX. Schæffer.

CRABRO. Olivier, Rossi.

Antennæ thicker towards their extremities, longer than the head, convoluted, the second joint much shorter than the third. Mandibles without teeth at their extremities. Tibiæ spinose. Tarsi with large *pulvilli.*

Uniglumis. *Sp.* 1. *Uniglumis.*

Vespa uniglumis. Linn.

Oxybelus uniglumis. Fabricius, Latreille.

Inhabits Europe.

TRIBE IX. CRABRONIDES.

Thorax with the first segment transverse-linear. Feet short, or moderately long. Labrum entirely concealed or but obscure. Eyes not reaching the hinder part of the head. Ocelli very distinct. Superior wings not folded longitudinally. Antennæ inserted at the mouth with the first joint cylindric or conic, or towards the middle of the face.

FAMILY I. *Crabronida.*

Superior wings with one or two complete submarginal cells.

DIVISION I.

Mandibles with their extremities bifid. Superior wings with but one recurrent nervure.

620. CRABRO. GENUS DCXX. CRABRO. Fabricius, Olivier, Rossi, Jurine, Panzer, Illiger, Spinola.

SPHEX. Linn. Villers.

VESPA. Linn. Geoffroy.

PEMPHREDON. Fabricius, Spinola.

Antennæ with the first joint long and cylindric. Superior wings with one complete submarginal cell.

Cribrarius. *Sp.* 1. *Cribrarius.*

Crabro cribrarius. Fabricius, Latreille.

Inhabits Europe.

Subterraneus. *Sp.* 2. *Subterraneus.*

Crabro subterraneus. Fabricius, Latreille.

Inhabits Europe.

Tibialis. *Sp.* 3. *Tibialis.*

Pemphredon tibialis. Fabricius.

Inhabits Europe.

Obs. These three species may be considered as the types of as many genera.

621. STIGNUS. GENUS DCXXI. STIGNUS. Jurine, Panzer, Illiger, Spinola, Latreille.

Antennæ with the first joint obconic. Superior wings with two complete submarginal cells; and two discoidal cells.

Ater. *Sp.* 1. *Ater.*

Stignus ater. Jurine, Latreille.

622. CEMONUS. GENUS DCXXII. CEMONUS. Jurine.

PSEN. Panzer.

PEMPHEDRON. Fabricius.

STIGMUS. Latreille.

Antennæ with the first joint obconic. Superior wings with two complete submarginal, and three discoidal cells.

Minutus. *Sp.* 1. *Minutus.*

Pemphredon minutus. Fabricius.

Psen pallipes. Panzer.

Cemonus minutus. Jurine.

Stigmus minutus. Latreille.

Inhabits Europe.

DIVISION II.

Mandibles strong, many-toothed. Superior wings with two recurrent nervures.

623. PEMPHEDRON. GENUS DCXXIII. PEMPHEDRON. Latreille, Fabricius, Spinola.

CEMONUS. Jurine, Panzer, Illiger.

Superior wings with the submarginal cell not narrower towards the apex. Antennæ with the first joint longest, thickest.

Unicolor. *Sp.* 1. *Unicolor.*

Pemphedron unicolor. Latreille.

Cemonus unicolor. Jurine.

Inhabits Europe.

FAMILY II. *Mellinida.*

Superior wings with three complete submarginal cells.

DIVISION I.

Antennæ inserted at the mouth, filiform. Clypeus not trilobate.

624. MELLINUS. GENUS DCXXIV. MELLINUS. Fabricius, Panzer, Jurine, Illiger, Spinola.

SPHEX. De Geer, Cuvier, Villers.

VESPA. Linn. Rossi, Harris.

Superior wings with all the submarginal cells sessile. Abdomen distinctly pedunculated. Tarsi terminated by a thick joint, bearing a large *pulvillus.*

Ruficornis. *Sp.* 1. *Ruficornis.*

Mellinus ruficornis. Fabr. Panzer, Latreille.

Inhabits Europe.

625. ALYSON. GENUS DCXXV. ALYSON. Jurine, Panz. Latr.

POMPILUS. Fabricius.

Superior wings with the second submarginal cell petiolated. Abdomen with a short peduncle. Tarsi with a small pulvillus.

Lunicornis. *Sp.* 1. *Lunicornis.*

Pompilus lunicornis. Fabricius.

Alyson lunicornis. Panzer, Latreille.

Inhabits Europe.

DIVISION II.

Antennæ thicker towards their extremities, inserted about the middle of the face. Clypeus trilobate.

626. CERCERIS. GENUS DCXXVI. CERCERIS. Latr. Illig. Spinola.

SPHEX. Schæffer, Villers, Rossi.

VESPA. Geoffroy, Olivier, Harris.

PHILANTHUS. Fabricius, Jurine, Panzer.

BEMBEX. Rossi.

CRABRO. Rossi.

Antennæ gradually thicker externally, very much approximating at their base, almost as long as the thorax, the third joint somewhat cylindric. Mandibles with a tooth in their internal edge. Superior wings with the second submarginal cell petiolated.

Major. *Sp.* 1. *Major.*

Metabolia.

Cerceris major. Spinola, Latreille.

Sp. 1. *Quadricinctus.*

Quadricinctus.

Philanthus quadricinctus. Fabricius, Panzer.

Inhabits Europe.

627. Philanthus.

Genus DCXXVII. Philanthus. Fabr. Panzer, Illiger, Jurine, Spinola, Latreille.

Vespa. Geoffroy, Villers.

Sphex. Schæffer.

Crabro. Rossi.

Simblephilus. Jurine.

Antennæ distant, abruptly thicker towards their extremities. Mandibles without any process in their internal edge. Superior wings with all the submarginal cells sessile.

Coronatus.

Sp. 1. *Coronatus.*

Philanthus coronatus. Fabricius, Panzer, Latreille.

Inhabits Europe.

Tribe X. Vespides.

Superior wings folded longitudinally. Thorax, with the first segment forming an arc, prolonged behind even to the origin of the superior wings. Antennæ twelve-jointed, with their extremities pointed. Lip with three glandiliferous divisions, or with four long plumose setæ.

Family I. *Eumenida.*

(Solitary wasps.)

Mandibles longer than broad, anteriorly meeting like a rostrum. Lip with the intermediate division narrow, and very long. Clypeus cordiform, with the point porrected, and more or less truncated.

Division I.

Lip without glands at their extremity, divided into four very long linear and plumose divisions. Mandibles of the male very large.

628. Synagris.

Genus DCXXVIII. Synagris. Latreille, Fabricius.

Vespa. Olivier, Jurine.

Palpi four-jointed; maxillary ones very short, labial ones longest. Abdomen ovate-conic, the two anterior segments not coarctate.

Cornuta.

Sp. 1. *Cornuta.*

Synagris cornuta. Fabricius, Latreille.

Division II.

Lip having four glandular points at its extremity, parted into three pieces, the middle one large, and bifid or notched at its extremity.

Subdivision 1.

Superior wings doubled, three submarginal cells complete. Maxillary palpi six-jointed, not very much shorter than the labial ones.

629. Rygchium.

Genus DCXXIX. Rygchium. Spinola.

Odynerus. Latreille.

Vespa. Fabricius.

Abdomen ovoid-conic, the first segment not, or scarcely, narrower than the second. Maxillary palpi, with the last joint scarcely longer than the terminal process of the maxillæ; labial palpi smooth, the last joint distinct, the first evidently longer than the second. Maxillæ with their process very long and narrow.

Europæum.

Sp. 1. *Europæum.*

Rygchium Europæum. Spinola.

Vespa oculata. Fabricius.

Odynerus Europæus. Latreille.

Inhabits Europe.

Metabolia.

Genus DCXXX. Pterochilus. Klug, Panzer.

Odynerus. Latreille.

Vespa. Panzer.

630. Pterochilus.

Abdomen ovoid-conic. Labium very long. Maxillary palpi, with the last joint not extending beyond the extremity of the maxillæ; labial palpi hairy, the fourth joint obtuse, scarcely visible. Maxillæ with the terminal lobe narrow and long.

Phalæratus.

Sp. 1. *Phalæratus.*

Pterochilus phalæratus. Klug.

Vespa phalærata. Panzer.

Odynerus phalæratus. Latreille.

Inhabits Europe.

631. Odynerus.

Genus DCXXXI. Odynerus. Latreille.

Vespa. Panzer, Fabricius.

Abdomen ovoid-conic, the second segment broader than the first. Maxillary palpi, with two or three of the joints extending beyond the extremity of the maxillæ. Maxillæ with the terminal lobe short, short-lance shaped.

Spinipes.

Sp. 1. *Spinipes.*

Vespa spinipes. Panzer, Fabricius.

Odynerus spinipes. Latreille.

Inhabits Europe.

632. Eumenes.

Genus DCXXXII. Eumenes. Latreille, Fabricius.

Abdomen with the first segment contracted into an elongate peduncle, the second segment campanulated. Clypeus longitudinal, anteriorly produced into a point. Mandibles forming by their junction a long-pointed rostrum.

Coarctata.

Sp. 1. *Coarctata.*

Eumenes coarctata. Fabricius, Latreille.

Inhabits Europe.

633. Zethus.

Genus DCXXXIII. Zethus. Fabricius, Latreille.

Clypeus as broad, or broader than long, without any remarkable production in front. Maxillary palpi shorter than the maxillæ.

Cæruleo-pennis.

Sp. 1. *Cæruleo-pennis.*

Zethus cæruleo-pennis. Latreille, Fabricius.

634. Discælius.

Genus DCXXXIV. Discælius. Latreille.

Vespa. Panzer.

Clypeus as broad, or broader than long, without any remarkable protuberance before. Maxillary palpi longer than the maxillæ.

Zonalis.

Sp. 1. *Zonalis.*

Vespa zonalis. Panzer.

Discælius zonalis. Latr.

Inhabits Europe.

Subdivision 2.

Superior wings extended, two submarginal cells complete. Maxillary palpi with less than six joints, shorter than the labial ones.

635. Ceramius.

Genus DCXXXV. Ceramius. Latreille.

Fonscolumbii.

Sp. 1. *Fonscolumbii.*

Ceramius Fonscolumbii. Latreille.

Family II. *Vespida.*

(Social wasps.)

Mandibles longer than broad, long-quadrate, with their extremities obliquely truncated. Clypeus almost quadrate. Lip with the intermediate division a little lengthened, cordiform.

636. Polistes.

Genus DCXXXVI. Polistes. Latreille, Fabricius, Illiger, Spinola.

Vespa. Linnæus, Geoffroy, Panzer, Jurine.

Mandibles (at least of the females and neuters) with their internal edge armed with three equal teeth, the

Metabolia. upper one shorter, emarginated, acute or obtuse. Clypeus, with the middle of the anterior margin, produced into a little acute entire tooth. Abdomen oval or elliptic, in many with a long peduncle.

Gallica. *Sp.* 1. *Gallica.*
Polistes gallica. Fabricius, Latreille.
Inhabits Europe.

637. Vespa. Genus DCXXXVII. Vespa of authors.

Mandibles (at least of the females and neuters) with the second tooth much broader than the two under ones, the upper one obtuse. Clypeus with the anterior margin broadly truncate, and somewhat emarginate, with a tooth on each side. Abdomen ovoid-conic, with the base abruptly truncated, and very shortly pedunculated.

Crabro. *Sp.* 1. *Crabro.* (Hornet.)
Vespa crabro. Linnæus, Fabricius, Latreille, &c.
Inhabits Europe, building its nest in hollow trees.

Vulgaris. *Sp.* 2. *Vulgaris.* (Common wasp.)
Vespa vulgaris. Linnæus, Fabricius, &c.
Inhabits Europe, building its nest in holes under ground.

Britannica. *Sp.* 3. *Britannica.*
Vespa Britannica. Leach, *Zool. Mis.*
Inhabits Britain, and builds a nest suspended from trees.

Tribe XI. Masarides.

Superior wings doubled longitudinally. Thorax with the first segment forming an arc, prolonged behind even to the base of the superior wings. Antennæ eight-jointed or more, terminated by a club. Lip without any glandular points, long, filiform, tubulose, beneath with two linear elongate laciniæ.

638. Masaris. Genus DCXXXVIII. Masaris. Fabricius, Latr.

Antennæ (of the male) as long as the head and trunk, eight-jointed, the last joint thicker, obconic. Abdomen much elongated.

Vespiformis. *Sp.* 1. *Vespiformis.*
Masaris vespiformis. Fabricius, Latreille.
Inhabits Barbary.

639. Chelonites. Genus DCXXXIX. Chelonites. Latreille, Fabricius, Illiger, Spinola, Panzer.
Masaris. Jurine, Cuvier, Lamarck.
Chrysis. Rossi.
Vespa. Villers.
Cimbex. Oliv.

Antennæ eight-jointed, longer than the head, the eighth joint with the following joints forming an obconic club. Abdomen a little longer than the trunk.

Apiformis. *Sp.* 1. *Apiformis.*
Chelonites apiformis. Fabricius, Panzer, Latreille.
Masaris apiformis. Jurine.
Vespa abbreviata. Villers.
Cimbex vespiformis. Olivier.
Inhabits Italy and the south of France.

Division II.

Hinder feet pollenigerous; their tarsi, with the first joint, very large, and compressed, elongate-quadrate, or obtrigonous. Larvæ pollenivorous.

Tribe XII. Andrenides.

Lip with the apex subcordate or subhastate, on each side with one auricle; nearly straight, or slightly incurved in some, reflexed in others, shorter than the sheathing tube. Palpi alike.

Family I. *Prosopida.*

Lip with the apex dilated, somewhat cordiform.

Genus DCXL. Colletes. Latreille, Illiger, Spinola, Klug. Metabolia.

Apis. Linnæus, Olivier, Villers. 640. Colletes.
Andrena. Fabricius, Jurine.
Hylæus. Cuvier.
Evodia. Panzer.
Melitta. * *a.* Kirby.

Hinder feet pollenigerous. Superior wings with three submarginal cells. Antennæ with the third joint longer than the second. Abdomen much elongated, more or less villose. Ocelli forming a curved line. Tongue obtuse, the apex bilobate.

The shape of the tongue is admirably adapted for the construction of its cells, which are described by the accurate Reaumur in the fifth memoir of his sixth volume, "*dont les nids sont faits d'especes de membranes soyeuses.*" According to this author, they make their nests in the earth that fills the cavities of certain stone walls. Some of them choose a northern aspect sheltered by trees. These nests are cylindrical, and consist of from two to four cells placed end to end, each of which is formed like a thimble, the end of one fitting into the other. The cells vary in size. The cylinder runs in a horizontal direction; but sometimes, from the intervention of a stone or of some other obstacle, it takes a different course, so that the last cell forms an angle with the first. The cells are composed of many layers of a very thin and transparent membrane, and the colour is generally reddish brown, which arises from the substance with which they are constructed. This is sometimes nearly liquid, at others it is merely a paste composed of pollen and honey. The larva, when hatched, very soon imbibes all that is liquid, and when full grown quite fills its cell. The substance with which they form their cells has not been ascertained, but Reaumur conjectures it to be a secretion from the insect.

Succincta. *Sp.* 1. *Succincta.*
Colletes succincta. Latreille.
Melitta succincta. Kirby.
Evodia calendarum. Panzer.
Andrena succincta. Fabricius.
Inhabits Europe.

Fodiens. *Sp.* 2. *Fodiens.*
Colletes fodiens. Latr.
Melitta fodiens. Kirby.
Inhabits Europe.

641. Prosopis. Genus DCXLI. Prosopis. Jurine, Fabricius, Illiger, Panzer, Spinoli, Klug.
Hylæus. Latreille, Cuvier, Walckenaer.
Apis. Linn. Geoff.
Andrena. Olivier.
Vespa. Rossi.

Hinder feet not pollenigerous. Superior wings with two submarginal cells. Antennæ with the second and third joints nearly equally long. Abdomen conic, gibbous above. Tongue obtuse, the apex truncated, on each side auriculated. Ocelli placed in a triangle.

Obs. The insects of this genus, when pressed between the fingers, emit an agreeable odour.

Family II. *Andrenida.*

Lip with the intermediate process lanceolate, acute.

Division I.

Lip when at rest reflexed.

Subdivision I.

Superior wings with two submarginal cells.

642. Dasypoda. Genus DCXLII. Dasypoda. Latreille, Fabricius, Panzer, Illiger, Spinola, Klug.

Metabolia.

ANDRENA. Rossi.
APIS. Christus.
TRACHUSA. Jurine.
MELITTA. Kirby. Maxillæ inflexed at their middle, or below, their terminal process triangular-lanceolate, and longer than their palpi. Hinder feet, with the first joint of their tarsi as long, or longer than the tibiæ.

Hirtipes.

Sp. 1. *Hirtipes.*
Dasypoda hirtipes. Fabricius, Panzer, Latreille.
Inhabits Europe.

Plumipes.

Sp. 2. *Plumipes.*
Dasypoda plumipes. Panzer.
Melitta Swammerdamella. Kirby.
Inhabits Europe. It was first noticed by the illustrious Swammerdam. They burrow in sandy soil, throwing up a heap of sand without their hole.

Subdivision 2.

Superior wings with three submarginal cells, the second small.

643. ANDRENA.

GENUS DCXLIII. ANDRENA. Fabricius, Panzer, Jurine, Illiger, Spinola, Klug.
APIS. Linnæus, Villers.
MELITTA. ** *c.* Kirby.
Maxillæ bent at their extremity, their terminal lobe scarcely longer than broad. Hinder feet, with the first joint of their tarsi shorter than the tibiæ. Labium or lip little elongate, shorter than its palpi.

The species of this genus are extremely numerous, and a very large portion of them inhabit Britain. Their proboscis is downy and thick. The hinder legs of the male are furnished with a flocculus at their base, the tibiæ with a thick scopa or brush, and their anus is covered by a fringe of hairs. They nidificate under ground in a light soil, some choosing banks over which bushes are scattered, others bare perpendicular sections, but all seem to prefer a southern aspect. They excavate burrows of a cylindric form, from five inches to nearly a foot or more in depth, of such a diameter only as to admit the insect. In making these holes, they remove the earth grain by grain, which they throw up on the outside of their holes in the form of a hillock. Some species penetrate in a horizontal, and others in a perpendicular direction. They construct a cell at the bottom of this hole, which they replenish with pollen made into a paste with honey, and in this they deposit their eggs. The pollen they carry in the scopa or brush of their hinder tibiæ, upon the flocculus at the base of the hinder thighs, and on the hairs of the metathorax. When the female has committed her egg to the paste, she very carefully stops the mouth of her hole, to prevent the ingress of ants, or of other insects who might be enemies to the larva.

644. CILISSA.

GENUS DCXLIV. CILISSA. Leach's MSS.
MELITTA. Kirby.
ANDRENA. Latreille, Panzer.
Maxillæ bent near their middle, the terminal process very much longer than broad. Lip elongate, longer than its palpi. Superior wings with three submarginal cells, the second small.

This genus is not only distinguished from *Andrena* by the characters of the lip and maxillæ, but also by having a longer tongue with very minute auricles, and the tops of the valves cultriform.

Tricincta.

Sp. 1. *Tricincta.*
Melitta tricincta. Kirby.
Andrena tricincta. Latreille.
Cilissa tricincta. Leach's MSS.
Inhabits England.

Metabolia.

Hæmorrhoidalis.

Sp. 2. *Hæmorrhoidalis.*
Andrena hæmorrhoidalis. Panzer.
Melitta chrysura. Kirby.
Inhabits Germany and England.

DIVISION II.

Lip with the intermediate division incurved, or nearly straight. Superior wings in all with three complete submarginal cells.

Subdivision 1.

Lip with the intermediate division nearly straight, not twice the length of the head.

645. SPHECODES.

GENUS DCXLV. SPHECODES. Latreille.
SPHEX. Linnæus, Villers, Rossi.
APIS. Geoffroy.
PROAPIS. De Geer.
NOMADA. Fabricius.
ANDRENA. Olivier, Panzer, Jurine, Spinola.
DICHROA. Illiger, Klug.
MELITTA. ** *a.* Kirby.
Labrum trigonate, of the male entire, of the female generally emarginate. Antennæ of the males long, almost moniliform, arcuated. Abdomen with the greater portion smooth.

The species of *Sphecodes* at first sight, bear a near resemblance to *Sphex*. They make their nests in bare sections of banks exposed to the sun, and nearly vertical. According to Reaumur, they excavate to the depth of nine or ten inches, and deposit their eggs in a mass of pollen mixed with honey.

Gibbus.

Sp. 1. *Gibbus.*
Sphecodes gibbus. Latreille.
Nomada gibba. Fabricius.
Melitta gibba. Kirby.
Dichroa analis. Illiger.
Inhabits Europe.

Subdivision 2.

Lip with the intermediate division incurved, longer than the lateral ones, and twice as long or more than the head.

646. HYLÆUS.

GENUS DCXLVI. HYLÆUS. Fabr. Illig. Spin. Klug.
APIS. Linnæus, Villers, Rossi.
ANDRENA. Olivier, Panzer, Jurine, Spinola.
HYLÆUS. Fabricius, Illiger, Klug.
MELITTA. ** *b.* Kirby.
HALICTUS. Latreille.
Lip lanceolate, little sericeous. Hinder feet in both sexes alike. Anus of the females with a longitudinal groove above.

The males of this genus are remarkable for an elongate cylindric body. The wings of many of the species are beautifully iridescent. They nidificate in bare banks.

Sexcinctus.

Sp. 1. *Sexcinctus.*
Hylæus sexcinctus. Fabricius.
Halictus sexcinctus. Latreille.
Inhabits Europe.

647. NOMIA.

GENUS DCXLVII. NOMIA. Latreille.
MEGILLA. Fabricius.
LASIUS. Jurine, Panzer.
Lip very hairy, or tomentose. Hinder feet of the male with dilated incrassated tibiæ and thighs.

Diversipes.

Sp. 1. *Diversipes.*
Nomia diversipes. Latreille.
Megilla curvipes? Fabricius.

Diffòrmis.

Sp. 2. *Diffòrmis.*
Lasius diffòrmis. Jurine, Panzer.
Inhabits Germany.

Metabolia.

Tribe XIII. Apides.

Lip with the apex inflected, the intermediate lacinia filiform, and very long. Labial palpi, with the two first joints resembling a compressed seta.

Family I. *Panurgida.*

(Solitary bees.)

Hinder tarsi with the first joint nearly equally broad, or gradually narrowing from the base to the apex, the second joint originating from the middle of its apex.

Division I.

Palpi alike.

648. Systropha. Genus DCXLVIII. Systropha. Illiger, Klug.
Apis. Schæffer, Rossi.
Eucera. Scopoli.
Andrena. Olivier.
Hylæus. Fabricius.
Ceratina. Jurine.
Anthidium. Panzer.

Mandibles bidentate. Superior wings with three complete submarginal cells. Ocelli disposed in transverse straight lines. Antennæ filiform, elongate; the apex convoluted in the males, of the females elongate-clavate, the apex acuminate.

Spiralis. *Sp.* 1. *Spiralis.*
Systropha spiralis. Illiger.
Andrena spiralis. Olivier.
Hylæus spiralis. Fabricius.
Anthidium spirale. Panzer.
Inhabits Europe.

649. Panurgus. Genus DCXLIX. Panurgus. Panzer, Spinola, Latr.
Apis. Scopoli.
Dasypoda. Illiger, Fabricius.
Apis. Kirby. * *a.*
Eriops. Klug.

Mandibles not dentated. Antennæ straight in both sexes, and subclavate. Superior wings with two submarginal cells. Ocelli disposed in a triangle.

Lobatus. *Sp.* 1. *Lobatus.*
Panurgus lobatus. Panzer.
Dasypoda lobata. Fabr.
Inhabits Europe.

Division II.

Palpi unequal; the labial palpi setiform.

Subdivision 1.

Labrum nearly quadrate, transverse, or not much longer than broad. Mandibles tridentate at their points. (Superior wings with three submarginal cells).

650. Xylocopa. Genus DCL. Xylocopa. Latr. Illiger, Panzer, Jur. Klug. Spinola, Fabr.
Apis. Linn. Geoff. Vill. Rossi, Kirby. (** *d.* 2. *β*).
Bombus. Fabr.
Centris. Fabr.

Labrum transverse, abruptly carinated transversely, the anterior margin ciliated, emarginated. Antennæ filiform, with the scapus very long.

The wings of this genus are generally violet coloured, and composed of a substance between membrane and corium.

Violacea. *Sp.* 1. *Violacea.*
Xylocopa violacea. Fabr. Panzer, and Latr.
Apis violacea. Linn.
Inhabits Europe.

Metabolia.

The following account of the economy of this species is extracted from Reaumur. "The mother bee usually makes her appearance in the spring, as soon as the winter is over; she may then be met with in gardens, visiting such walls as are covered with trees trained on trellis-work, in a sunny aspect. When once she has begun to make her appearance, she frequently returns, and for a long period may be known by her size, and her humming noise, which much resembles that of the genus *Bombus*. The object of these early visits is to fix upon a piece of wood calculated for her purposes. She generally selects the putrescent supporters of arbours, or vine-props, and will sometimes attack garden-seats, thick doors, and window-shutters; but she generally (if not always) selects a piece cylindrical and perpendicular. With her strong mandibles she bores into it, directing her course obliquely downwards, then proceeding in a direction parallel with its sides, till she has bored a cylindric hole from twelve to fifteen inches in length, and seven or eight lines in diameter. Sometimes three or four tunnels are bored in the same piece, nearly parallel with each other. A passage is left where she enters, or first begins to bore, and another at the end of the pipe. As the industrious animal proceeds in her employment, she clears away the wood which she detaches, throwing it out upon the ground, where it appears like a small heap of saw-dust. Thus we see she has prepared a long cylinder in the midst of the wood, sheltered from the weather and from external injuries, and fitted for her purposes. She now enters to the bottom of the cylinder, and deposits an egg, and then lays in a store of pollen mixed with honey, sufficient for the nutriment of the larva when hatched. At the height of seven or eight lines, which is the depth of each cell, she next constructs, of particles of the saw-dust (formed in the boring of her tunnel) glued together, and also to the sides of the cylinder, an annular stage. When this is sufficiently hardened, its anterior edge affords a support for a second ring of the same materials; and thus the ceiling is gradually formed of these concentric circles, until a small orifice in the centre only remains; and this is also filled up with a circular mass of the agglutinated saw-dust. This partition exhibits the appearance of as many concentric circles as the animal has joinings; and is about the thickness of a French crown-piece. It serves for the ceiling of the lower, and floor of the upper apartment. One cell being completed, she proceeds to another, which she furnishes in the same manner; and so on, till she has divided her whole tunnel into apartments, which are usually about twelve. When the larva assumes the pupa, it is placed in its cell, with its head downwards, and is thus prevented, when it has attained its perfect state, and is eager to emerge into day, from disturbing the tenants of the upper cells, who, being of later date each than its superincumbent neighbour, are not quite so perfected as to be ready to go forth upon the world."

651. Ceratina. Genus DCLI. Ceratina. Latr. Jurine, Spinola.
Apis. Villers, Rossi, Kirby. (** *d.* 2. *a*).
Megilla. Fabr. Illiger.
Prosopis. Fabr.
Pithitis. Klug.
Clavicera. Walckenaer.

Labrum almost quadrate, perpendicular, entire. Antennæ gradually thickening towards their extremities; the scapus not large.

Cærulea. *Sp.* 1. *Cærulea.*
Apis cærulea. Villers.

Metabolia.

Apis cyænea. Kirby.
Inhabits Europe.

Subdivision 2.

Labrum longer than broad, inclined perpendicularly; porrect beneath the mandibles, elongate, quadrate. Mandibles strong; porrected, with the apex bidentate, in some; trigonate, and often multidentate, in others.

* Labial palpi with the three first joints continuous, the fourth inserted under the external apex of the third.

652. Rophites. Genus DCLII. Rophites. Spinola, Latr.
Mandibles triangular. Maxillary palpi six-jointed.
Quinquespinosa. *Sp.* 1. *Quinquespinosa.*
Rophites quinquespinosa. Spinola, Latr.

653. Chelostoma. Genus DCLIII. Chelostoma. Latr.
Apis. Linn. Villers, Kirby. (** *c.* 2. *γ*).
Hylæus. Fabr.
Anthophora. Illiger, Fabr.
Anthidium. Panzer.
Trachusa. Jurine.
Mandibles (of the females) arcuated, their apex bidentate or furcate, porrect, internally hairy. Maxillary palpi three-jointed.
The bodies of the insects composing this genus are very long, slender, and cylindric. The belly of the male, near the anus, is concave, and covered with down; and at its base is a horn or protuberance. When asleep, they roll themselves up like an armadillo, the horn or protuberance fitting into the anal cavity. They nidificate in posts and rails. The males usually repose in the centre of a flower.

Florisomnis. *Sp.* 1. *Florisomnis.*
Hylæus florisomnis. Fabr. Panzer.
Apis florisomnis. Linn.
Chelostoma florisomnis. Latr.
Inhabits Europe. The female is *Apis maxillosa* of Linné and Kirby; *Hylæus maxillosus* of Fabricius.

** Labial palpi with the third joint inserted obliquely on the external side of the second, near to the apex.

654. Heriades. Genus DCLIV. Heriades. Spinola, Latr.
Apis. Linn. Kirby. (** *c.* 2. *γ*).
Anthophora. Fabr. Illiger, Klug.
Anthidium. Panzer.
Trachusa. Jurine.
Labial palpi with the second joint longer than the first. Body very long, cylindric.
This genus, in habit and in economy, resembles *Chelostoma*; the males are often taken asleep in flowers; their abdomen is then doubled, so that the tubercle with which its base is armed fits into the cavity near the anus.

Truncorum. *Sp.* 1. *Truncorum.*
Heriades truncorum. Spinola, Latr.
Anthophora truncorum. Fabr. Illiger.
Inhabits Europe.

655. Stelis. Genus DCLV. Stelis. Panzer.
Apis. Kirby. (** *c.* 1. *β*).
Anthophora. Illiger.
Megachile. Latr. Walck.
Trachusa. Jurine.
Gyrodroma. Klug.
Labial palpi with the second joint not longer than the first. Maxillary palpi two-jointed; the first joint longest. Mandibles strong. Abdomen convex above, smooth below, and scarcely hirsate.

Aterrima. *Sp.* 1. *Aterrima.*
Stelis aterrima. Panzer, Latreille.
Inhabits Europe.

Genus DCLVI. Anthidium. Fabr. Panzer, Klug. Latreille.

Metabolia.

656. Anthidium.

Apis. Linn. Geoff. Schæffer, Kirby. (** *c.* 2. *β*.)
Anthophora. Illiger.
Megachile. Walckenaer, Spinola.
Trachusa. Jurine.
Labial palpi with their second joint not longer than the first. Maxillary palpi one-jointed. Abdomen of the females, below, very hairy; above, convex, incurved; the base broadly truncate. Mandibles broad, multidentate.
The anus of the males of this genus is always armed with spines.

Manicatum. *Sp.* 1. *Manicatum.*
Anthidium manicatum. Panzer, Latreille.
Apis manicata. Kirby, Linn.
Inhabits Europe.
The following interesting account of the economy of *Anthidium manicatum*, is extracted from Kirby's *Monographia*. "Linnæus," says he, "observes, upon this bee, *in arboribus cavis nidos construit*; but he takes no notice of the materials of which the nidi were made. This deficiency has been supplied by Mr James Trimmer and Sir Thomas Cullum. The former of these gentlemen some time since informed me, that having had frequent opportunities of watching the motions of *Anthidium manicatum*, and finding that the female constantly attended *stachys germanica*, *agrostemma coronaria*, and other woolly leaved plants which grew in his garden, he was curious to know the reason of this preference. It was not long before his curiosity was gratified; and he discovered that it was the wool which covers the surface of the leaves of these plants, that was their attraction; for he observed the little animal, with her strong "mandibulæ," scraping it off with great industry and perseverance; and while these were thus employed, rolling it up, with her fore legs, into a little ball; making, all the time, a considerable hum. The use to which she applied the material thus collected, Mr Trimmer could never discover; we only conjectured that she employed it in the construction of her nest. Our conjecture is almost turned into certainty by the following account given by my ingenious friend Sir Thomas Cullum, to Mr Marsham, of a nest which he found made of similar materials. He thus expresses himself, in a letter to that gentleman. "I observed, in a lock of one of my garden gates, that the key did not turn easily round; and upon looking into the keyhole, I saw something white. I had the lock taken off, and it was completely full of a downy substance, containing the pupa of some bee, I conclude. Upon examining the downy substance, I am certain it is the fine pappus or down from the *Anemone sylvestris*, of which I had two plants in my garden. I have preserved the whole as I found it; but the bee has not yet made its appearance in its perfect state. I shall watch their progress, and send them to you or to Mr Kirby." This letter is dated October 10. 1800. Sir Thomas has since had the goodness to send me the nidus; the pupæ are still quiescent, (April 2. 1801), and will probably be not disclosed till after Midsummer. Upon comparing it with the anecdote which I have just related of this bee, I cannot help being of opinion, that it is the nidus of that species. It is with some hesitation that I venture to differ from so accurate an observer as Sir Thomas Cullum; but it appears to me that the wool which envelopes the nest and the cells, is scraped from the leaves of one of the first mentioned plants. I gather-

Metabolia.

ed some leaves of *Agrostemma coronaria*, and with my penknife shaved off some of its down; and upon comparing it with that used in the nest, under a magnifier, I found that they were exactly the same. This, in conjunction with Mr Trimmer's account, persuades me that the material employed in this instance is not the pappus of *Anemone sylvestris*, which is of a more silky texture. There were several cells or cases included in the lock unconnected with each other, except by the wool which was their common covering. These cases were of an oval form, and consisted of an exterior coat of wool; under this was a membranaceous cell of a pale colour, which was covered with a number of vermiform masses of a brown substance, seemingly made of pollen and honey, in shape and size much resembling *Sphæria canaliculata*, and like that fungus distinguished by a longitudinal furrow slightly impressed. These were laid, without any regular order, over the cell, and by means of them the wool, which formed its exterior coat, was made to adhere. It is remarkable that this bee should employ these materials to cover its cells, which others use only as food for their larvæ. At the summit of this membranaceous case is a small chimney, with an orifice; and within it contains another cell, which is rather coriaceous, strong, and of a brown colour, in the inside shining very much, as if covered with tinfoil. This may be the folliculus or coccoon made by the larva, previous to its assuming the pupa. I opened one of these in the autumn, and another in the spring. In both, the animal was still in its larva state, but had no food remaining in its cell. In that opened in the spring, it appeared to be dead. I imagine, when Sir Thomas Cullum first took them, that they were just ready for their first change; but that the alteration produced by removing the nest from the situation the parent insect had chosen for it, was fatal to some, if not all, of its inhabitants. Amongst the wool were masses of sweet pollen paste." He afterwards adds an extract from the Rev. Gilbert White's *Naturalist's Calendar*, (p. 109.) "There is a sort of wild bee frequenting the garden campion for the sake of its tomentum, which probably it turns to some purpose in the business of nidification. It is very pleasant to see with what address it strips off the pubes, running from the top to the bottom of a branch, and shaving it bare with all the dexterity of a hoop-shaver. When it has got a bundle almost as large as itself, it flies away, holding it secure between its chin and its fore legs."

657. Osmia.

Genus DCLVII. Osmia. Panzer, Spinola, Latr.
Apis. Linn. Villers, Kirby. (** *c.* 2. *ϑ*.)
Anthophora. Fabricius, Illiger, Klug.
Megachile. Walckenaer.
Trachusa. Jurine.
Hoplitis. Klug.
Amblys. Klug.

Labial palpi with the second joint not longer than the first. Maxillary palpi four-jointed. Abdomen convex above, hairy beneath in the females. Mandibles broad.

Cornuta.

Sp. 1. *Cornuta.*
Osmia cornuta. Latreille.
Osmia bicornis. Panzer?
Apis bicornis. Kirby?
Inhabits Europe.

This species selects the hollows of large stones for the purpose of nidificating.

Cærulescens.

Sp. 2. *Cærulescens.*
Apis cærulescens. Kirby, Linn.
Apis ænea. Linn.

Inhabits Europe, constructing its nest of argillaceous earth mixed with chalk, upon stone walls. Mr Kirby supposes that it nidificates also in chalk pits.

Metabolia.

658. Megachile.

Genus DCLVIII. Megachile. Latr. Walck. Spin.
Apis. Linn. Villers, Kirby. (** *c.* 2. *a*.)
Anthophora. Fabr. Illiger, Panzer, Klug.
Trachusa. Jurine.
Xylocopa. Fabricius.
Centris. Fabricius.

Labial palpi with the second joint not longer than the first. Maxillary palpi two-jointed, the first rather longest. Mandibles very strong. Abdomen triangular, flat above, very downy beneath in the females.

The insects of this genus are well known by the name of *Leaf-cutters*, *Carpenter-bees*, and *Coupeuses de feuilles*; their interesting economy having attracted the attention of many naturalists. So early as 1670, it was noticed by Ray, Dr Lister, Willoughby, and Sir Edward King. Linnæus in this, as in many other instances, (supposing the economy of a genus to be peculiar to one species only,) has confounded several species under the general title of *Apis centuncularis*, and denoted it by the orange-coloured hairs which cover the under side of the abdomen, a character which it possesses along with a great number of species.

Some of the species nidificate in trees, and others beneath the ground. The following history of the economy of the genus, (and which will apply to all with which we are acquainted,) is given by Reaumur. "The nests they construct are cylindrical, sometimes six inches in length, and composed entirely of the leaves of trees. They usually consist of several cells, each of which is shaped like a thimble, the convex end of the second fitting closely into the open end of the first, the third into the second, and so on with respect to the rest. Although these cells are honey-tight, which is often found within them in a liquid state, yet the portions of the leaves are not glued together, but merely most accurately adjusted to each other. In forming the cell, the pieces of leaf are made to lap over one another, so that the natural margin of the leaf is kept on the outside, and that which has been cut within; thus a tube is first formed, and in this way coated with three or four layers, the exterior covering being made of larger pieces than the interior. In coating, the provident insect is very careful to lay the middle of each leaf over the margins of those that form the first tube; thus the sutures are covered and strengthened. At the closed end, or narrow extremity of the cell, the leaves have a bend given to them, so as to form a convex termination; when a cell is formed in this manner, her next care is to fill it with pollen and honey. When it is nearly filled, she deposits an egg, and closes it with three pieces of leaf," (sometimes with more,) "which are so exactly circular, that a pair of compasses could not define their margin more truly; and these coincide most accurately with the sides of the cell, and are retained in their situation by no gluten, but by the accuracy of their adaptation alone. After this covering is fitted in, there remains still a concavity which receives the convex end of the succeeding cell. In this manner, the patient and indefatigable little animal proceeds, till she has completed her cylinder of six or seven cells. This cylinder is coated externally by other pieces of leaf of larger dimensions than those used in making the cells, and of a different form, for they are nearly oval; those at the ends are bent inwards, to cover each extremity. These nests are usually made in fistular passages, which these indefatigable creatures bore under ground in a horizontal direction;

Metabolia.

their diamater is exactly that of the cylinder, to which indeed, they give its form, and their bend to the pieces which compose it. If by any accident their labour is interrupted, or their edifice deranged, it is astonishing with what persevering patience they set themselves to put all things again in order. Their mode of cutting the leaf, too, requires particular notice. Nothing can be more expeditious; they are not longer about it than we should be with scissars. When the insect has selected a bush furnishing the leaves required, she keeps hovering over and flying round it, until she has discovered the leaf best adapted for her purpose. When she has chosen the leaf, she alights on it, sometimes on the upper surface, sometimes underneath it, or at other times on its edge, so that the margin passes between her legs. As soon as she has made a beginning; (which she usually does near the main nerve,) she continues cutting with her mandibles, until the work be completed. As she proceeds, she keeps the margin of the detached part between her legs, those on one side being above, and the other below it, so that the section keeps yielding to her, and does not interrupt her progress. She makes her incision in a curve line, approaching the rachis at first; but when she has reached a certain point, she keeps receding from it towards the margin, still cutting in a curve. When she has nearly detached the portion she has been employed upon from the leaf, she balances herself, lest its weight should carry her to the ground; and the moment of its parting from the parent stock, she flies off, the detached portion remaining bent between her legs, and being perpendicular to her body. She pursues the same mode, whatever the form or size of the piece necessary for her purpose. The larvæ when arrived at full size, spin a coccoon thick and solid of silk, which they attach to the sides of the cell."

Mr Kirby very justly supposes Reaumur to be mistaken with respect to the mode of forming their cylindric nests. He considers that the nest takes its form, and the leaves composing it their bend from the passage, and that the external coat must be first deposited, as the insect could not get between the side of the cylinder and of the nest.

Centuncularis.

Sp. 1. *Centuncularis.*
Apis centuncularis. Linnæus, Fourcroy, Kirby.
Megachile centuncularis. Latreille.
Inhabits Europe. Builds its cells with the leaves of roses, and of the *Mercurialis annua.*

659. Cælioxys.

Genus DCLIX. Cælioxys. Latreille.
Apis. Linn. Villers, Kirby. (** *c.* 1. *a.*)
Anthophora. Fabricius, Illiger, Klug.
Megachile. Walckenaer.
Trachusa. Jurine.
Anthidium. Panzer.
Heriades. Spinola.
Labial palpi with their second joint not longer than the first. Maxillary palpi two-jointed, the first double the length of the second. Mandibles narrow and strong in both sexes. Scutellum spiny. Abdomen conic or triangular, very little or not at all downy. Anus of the males spiny.

Conica.

Sp. 1. *Conica.*
Apis conica. Kirby.
Cælioxys conica. Latreille.
Male.
Apis quadridentata. Linn.
Anthophora quadridentata. Fabr.
Female.
Apis conica. Linn.
Inhabits Europe.

Metabolia.

Subdivision 3.

Labrum remarkably longer than broad, inclining perpendicularly to the mandibles, triangulate, truncate. Mandibles narrow, pointed, unidentate on their internal edge. Body simply pubescent. Superior wings with two submarginal cells complete.

660. Ammobates.

Genus DCLX. Ammobates. Latreille.
Maxillary palpi six-jointed. Superior wings with two submarginal cells.

Rufiventris.

Sp. 1. *Rufiventris.*
Ammobates rufiventris. Latreille.
Inhabits Portugal.

661. Phileremus.

Genus DCLXI. Phileremus. Latreille.
Epeolus. Fabricius.
Maxillary palpi two-jointed. Superior wings with two submarginal cells.

Punctatus.

Sp. 1. *Punctatus.*
Epeolus punctatus. Fabricius.
Phileremus Kirbyanus. Latreille.
Obs. Latreille has a divison of this genus, in which the superior wings have but one submarginal cell, which character is certainly sufficient to constitute a distinct genus.

Subdivision 4.

Labrum a little broader than long, subsemicircular or semioval. Mandibles slender, pointed, unidentate on their internal edge. Abdomen not pollenigerous.

* Lip with the lateral divisions shorter than the palpi. Body simply pubescent.

662. Nomada.

Genus DCLXII. Nomada. Scop. Fabr. Illiger, Klug. Spinola, Jurine, Panzer.
Apis. Linn. Villers, Kirby, (* *b.*)
Superior wings with three submarginal cells complete. Maxillary palpi six-jointed.
The history, economy, and mode of nidification of the insects of this genus (all of whom are remarkable for the gaiety of their colours) as yet remain a secret. Dr Leach has strong reasons for suspecting them to be parasitical, and this seems the more probable from their having no instruments for carrying pollen. Their flight is silent, unattended by any hum; they frequent dry banks. Their eyes, whilst living, exhibit through the external reticulated covering, a surface of hexagons, which keeps shifting with the light.

Ruficornis.

Sp. 1. *Ruficornis.*
Apis ruficornis. Linn. Kirby.
Nomada ruficornis. Fabr. Latr.
Inhabits Europe.

663. Epeolus.

Genus DCLXIII. Epeolus. Latreille, Fabricius, Illiger, Jurine, Panzer, Spinola, Klug.
Apis. Linn. Kirby, (** *b.*)
Superior wings with three complete submarginal cells. Maxillary palpi one-jointed.

Variegatus.

Sp. 1. *Variegatus.*
Epeolus variegatus. Fabricius, Panzer, Latreille.
Apis variegata. Linné.
Inhabits Europe, but is very local, (if not rare,) in Britain.

664. Pasites.

Genus DCLXIV. Pasites. Jurine, Spinola.
Biastes, Panzer.
Nomada. Fabricius.
Anthophora. Illiger.
Superior wings with two complete submarginal cells. Maxillary palpi four-jointed.

Schottii.

Sp. 1. *Schottii.*
Biastes schottii. Panzer.
Nomada schottii. Fabricius.

Metabolia. *Pasites schottii.* Latreille.
Inhabits Europe.

** Lateral divisions of the lip almost as long as the palpi. Body very villose in parts. Scutellum spinose. Superior wings with three submarginal cells.

663. Oxæa. Genus DCLXV. Oxæa. Klug. Latreille.
Maxillary palpi one-jointed, very short.

Flavescens. *Sp.* 1. *Flavescens.*
Oxæa flavescens. Klug. Latreille.

666. Crocisa. Genus DCLXVI. Crocisa. Jurine, Latreille.
Thyreus. Panzer.
Melecta. Fabricius, Illiger, Klug.
Nomada. Rossi.
Maxillary palpi three-jointed.

Histrio. *Sp.* 1. *Histrio.*
Melecta histrio. Fabricius.
Melecta histrionica Illiger.
Crocisa histrio. Latreille.
Inhabits Europe.

667. Melecta. Genus DCLXVII. Melecta. Latreille, Panzer, Fabricius, Illiger, Spinola.
Apis. Linn. Kirby, (** *a.*)
Crocisa. Jurine.
Symmorpha. Klug.
Maxillary palpi six-jointed, with five very distinct.
The insects of this genus are supposed to be parisitical.

Punctata. *Sp.* 1. *Punctata.*
Melecta punctata. Latreille.
Crocisa atra. Jurine.
Apis punctata. Kirby.
Inhabits Europe. Is common near Swansea in South Wales.

Family II. *Apida.*

Lip with the apex generally hirsute, not inflected.

Division I.

Hinder feet of the females, with their tibiæ externally, and the first joint of the tarsi very hairy.

Subdivision 1.

Maxillary palpi with more than four joints. Lip with its lateral divisions as long or longer than the labial palpi. Antennæ of the males very long.

668. Eucera. Genus DCLXVIII. Eucera. Scopoli, Fabricius, Latreille, Panzer, Spinola, Klug.
Apis. Linn. Kirby, (** *d.* 1.)
Maxillary palpi distinctly six-jointed. Superior wings with two submarginal cells, complete.

Longicornis. *Sp.* 1. *Longicornis.*
Eucera longicornis. Fabricius, Panzer, Latreille.
Apis longicornis. Kirby, Linn.
Inhabits Europe.

669. Macrocera. Genus DCLXIX. Macrocera. Latreille.
Eucera. Panzer.
Maxillary palpi distinctly five-jointed, the sixth joint very obsolete, or wanting. Superior wings with three submarginal cells complete.

Antenuata. *Sp.* 1. *Antenuata.*
Eucera antenuata. Panzer.
Macrocera antenuata. Latr.
Inhabits Europe.

Subdivision 2.

Maxillary palpi with four joints or more. Lip with the lateral divisions shorter than the palpi. Superior wings with three submarginal cells complete.

* Labial and Maxillary palpi alike.

Genus DCLXX. Melitturga. Latreille. Metabolia.
Maxillary palpi six-jointed. Labial palpi filiform.
Sp. 1. *Clavicornis.* 670. Melitturga, Clavicornis.
Melitturga clavicornis. Latreille.
Inhabits France.

** Labial palpi setiform.

Genus DCLXXI. Anthophora. Latr. Spinola. 671. Anthophora.
Lasius. Jurine.
Apis. Linn. Geoff. Kirby, (** *d.* 2. *a.*)
Podalirius. Walckenaer.
Centris. Fabricius, Panzer.
Megilla. Illiger, Klug. Fabricius.
Mandibles unidentated within. Maxillary palpi six-jointed.
Sp. 1. *Retusa.* Retusa.
Apis retusa. Linn. Kirby.
Lasis pilipes. Jurine.
Megilla pilipes. Fabricius.
Anthophora hirsuta. Latreille.
Inhabits Europe.

Genus DCLXXII. Saropoda. Latreille. 672. Saropoda.
Megilla. Illiger, Panzer.
Heliophila. Klug.
Apis. Kirby.
Mandibles unidentate within. Maxillary palpi five-jointed.
Sp. 1. *Rotundata.* Rotundata.
Megilla rotundata. Panzer.
Saropoda rotundata. Latreille.
Inhabits Europe.

Genus DCLXXIII. Centris. Fabricius. 673. Centris.
Apis. Linn.
Megilla. Illiger.
Labius. Jurine.
Trachusa Klug.
Hemisia. Klug.
Mandibles quadridentate. Maxillary palpi four-jointed.
Sp. 1. *Hæmorrhoidalis.* Hæmorrhoidalis.
Centris hæmorrhoidalis. Fabr. Latr.
Inhabits Europe.

Subdivision 3.

Maxillary palpi one-jointed.

Genus DCLXXIV. Epicharis. Klug. Illig. Latr. 674. Epicharis.
Apis. Olivier.
Centris. Fabricius.
Xylocopa. Fabricius.
Bombus. Illiger.
Acanthopus. Klug.
Superior wings with three submarginal cells.
Sp. 1. *Dasypus.* Dasypus.
Epicharis dasypus. Klug. Illiger, Latreille.

Division II.

Hinder feet with the tibiæ and first joint of the tarsi shortly hairy.

(Social bees.)

Subdivision 1.

Hinder tibiæ terminated by two spurs or heels. Superior wings with three submarginal cells in all, complete, the last neither linear nor oblique.

Genus DCLXXV. Euglossa. Latreille, Fabricius, Illiger, Klug. 675. Euglossa.
Centris. Fabricius.
Bremus. Jurine.
Apis. Linn.
Labrum almost perfectly quadrate. Promuscis as long as the body. Ocelli disposed in a triangle.

Metabolia.

Sp. 1. *Dentata.*
Englossa dentata. Fabr. Latr.
Dentata.
Sp. 2 *Dimidiata.*
Dimidiata.
Centris dimidiata. Fabr.
Englossa dimidiata. Latr.

677. Bombus.

Genus DCLXXVII. Bombus. Latreille, Fabricius, Illiger, Panzer, Spinola, Klug.
Apis. Linn. Kirby, (** *e.* 2.)
Bremus. Jurine.
Labrum transverse. Promuscis shorter than the body. Ocelli disposed in a transverse, straight line.
The *Bombi* usually nidificate in cavities beneath the ground, but many of the species, (especially those of a fulvescent colour,) construct their nest of moss, on the surface. The females appear early in the spring, when the salices or willows are in bloom. The males are most abundant in the autumn.

Terrestris.

Sp. 1. *Terrestris.*
Bombus terrestris. Fabr. Latr.
Apis terrestris. Linn.
Inhabits Europe.

Muscorum.

Sp. 2. *Muscorum.*
Bombus muscorum. Fabr.
Inhabits Europe.

Subdivision 2.

Hinder tibiæ without spurs or heels. Superior wings with two or three complete submarginal cells, the last oblique or linear.

678. Apis.

Genus DCLXXVIII. Apis of authors.
Hinder tarsi with their first joint long. Superior wings with three submarginal cells complete, the last oblique and linear.

Melifica.

Sp. 1. *Melifica.* (Hive bee.)
Apis melifica of authors.
The interesting economy of the hive bee has engaged the attention of Swammerdam, Reaumur, Huber, Wildman, &c. to whose works we must refer the reader, as the history of this curious animal would suffice to fill a bulky volume.

679. Melipona.

Genus DCLXXIX. Melipona. Illiger, Klugellan, Latreille.
Apis. Fabr.
Trigona. Jurine.
Hinder tarsi with their first joint obtrigonate. Superior wings with two complete submarginal cells. Mandibles without any remarkable process.

Favosa.

Sp. 1. *Favosa.*
Apis favosa. Fabr.
Melipona favosa. Latr.

680. Trigona.

Genus DCLXXX. Trigona. Jurine, Latreille.
Melipona. Illiger, Klug.
Apis. Fabricius.
Centris. Fabr.

Amalthea.

Sp. 1. *Amalthea.*
Apis amalthea. Fabr.
Trigona amalthea. Latr.

Spinipes.

Sp 2. *Spinipes.*
Centris spinipes. Fabr.
Trigona spinipes. Latr.

Order DIPTERA.

Order Diptera. Linn. Latr. &c.
Class Antliata. Fabr.
The insects composing this order are distinguished from all other insects by the following characters:
Wings two, naked, unprotected. Haltares, (poisers or balancers,) placed behind, and generally beneath the wings. Metabolia.
Besides these characters, may be noted some others which are common to almost all dipterous insects. The mouth is for the most part furnished with a rostrum having no articulations. Thorax composed of but one segment, always distinct from the abdomen.
The *Diptera* are at this time undergoing investigation by some very eminent entomologists, and as the Editor is desirous of rendering every part of this work as complete as the nature of the publication will admit, he has resolved to defer giving the arrangements of this order, until the article Insecta goes to press, when the most approved system of *Diptera* will be given; in the mean time, we shall merely give a tabular view of the arrangement of Latreille, the terminations only being altered, and the term *tribe* being used for *family*.

Section I. Proboscidea.

Head distinct from the thorax by an evident interval. Proboscis (rarely wanting) univalve. Tarsi with two simple nails.

Division I.

Antennæ with many joints.

Tribe I. Tipularides.

Division II.

Antennæ with not more than three joints.

Subdivision 1.

Antennæ with the last joint having at least four rings or annulations.

Tribe II. Stratiomydes.

Haustellum with two setæ.

Tribe III. Tabanides.

Haustellum with many setæ.

Subdivision 2.

Antennæ with the last joint having not more than three rings.
A. Haustellum with four setæ at least.
a. Proboscis (when at rest) entirely or partially prominent.
* Proboscis terminated by two large lips.

Tribe IV. Rhagionides.

Palpi prominent, cylindric-conic. Wings divaricating. Antennæ generally moniliform.

Tribe V. Dolychipodes.

Palpi prominent, lamelliform. Wings incumbent. Antennæ patelliform.

Tribe VI. Mydasides.

Palpi not prominent.
** Proboscis terminated by very small lips.

Tribe VII. Asilides.

Body long. Wings incumbent. Antennæ three-jointed.

Tribe VIII. Empides.

Body long. Wings incumbent. Antennæ two-jointed.

Metabolia.

Tribe IX. Anthracides.

Body short. Wings divaricating. Antennæ distant, three-jointed. Head as high as the thorax.

Tribe X. Bombylides.

Body short. Wings divaricating. Antennæ contiguous, three-jointed. Head lower than the thorax.

Tribe XI. Acrocerides.

Body short, as if inflated. Wings divaricating. Antennæ three or two-jointed.

b. Proboscis (when at rest) retractile within the cavity of the mouth.

Tribe XII. Syrphides.

B. Halteres with two setæ.

Tribe XIII. Conopsides.

Proboscis prominent, nearly cylindric or conic, without any remarkable dilatation.

Metabolia.

Tribe XIV. Muscides.

Proboscis retractile, terminated by a very remarkable dilatation.

Tribe XV. Œstrides.

Proboscis wanting.

This tribe is considered by Dumeril as forming a distinct division from the tribe Muscides, and in this opinion we most thoroughly concur.

Section II. Eproboscidea.

Head divided from the thorax by a suture at least. Proboscis provided with two valves. Nails of the tarsi double or treble.

For a farther arrangement of the *Diptera*, see Insecta.

INDEX OF AUTHORS NAMES.

Index of Authors Names.

INDEX.

Index.

Entre-Douro-e-Minho.

ENTRE-DOURO-E-MINHO, the name of one of the most populous provinces of Portugal, and so called from its situation between the rivers Douro and Minho. It is bounded on the north by Gallicia, a province of Spain; on the east by Trales Montes and Spain; on the south by the Portuguese province of Beira, from which it is separated by the Douro; and on the west by the Atlantic Ocean. It extends from 40° 50′ to 42° of North Latitude, and from 8° 55′ to 7° 55′ of West Longitude. It is about eighteen leagues long, and eleven broad; and the whole province is a collection of granite mountains, the eminences consisting of bare granite sand, and the vallies alone being fertile. As the inhabitants are extremely industrious, the soil is well cultivated, and a system of irrigation is carried on to such an extent, that the numerous wells obtained by digging, give the country an appearance of being covered with shafts of mines. The principal article of produce is maize, though rye, barley, and wheat, are sometimes cultivated. The vine yields a bad wine resembling vinegar, the grapes being shaded from the sun by the tops of trees.

The principal vallies in this province are those of Villanova, of Braga, Ponto de Porto, and of Villar de Veiga.

The valley of Villanova is extremely beautiful. Small fields of maize, and even of rye and barley, and rarely of wheat, are encircled with lofty oaks, chesnuts, and poplars, every tree supporting a vine, which spreads over its summit, and often reaches the top even of the highest oaks. The fields are watered by artificial brooks, which communicate an agreeable freshness to the air even in the heat of summer.

Arid mountains, covered with heath, separate the valley of Villanova from that of Braga. The city of Braga, of which we have already given a full description in that article, is situated in a broad open vale, shaded by trees, and well cultivated, and abounding with cork trees.

The valley of Ponto de Porto, where there is a stone bridge over the Cavado, and a village of the same name, is about a league from Braga. This valley is extremely beautiful, appearing like a thick wood of high trees, though the houses, fields, and gardens, are embosomed among the trees. At the distance of two leagues from that valley, and at the foot of the mountain, stands the rich and extensive Bernardine monastery of Bouro, situated about 500 feet above the level of the sea. On a mountain, at a great distance, is the church of Nossa Senhora de Abbadia, where there is a miraculous figure of the Virgin, which is visited by numerous pilgrims.

Into the valley of Villar de Veiga, which is the name of a large village, the rapid stream of the Rio das Caldas pours itself over rugged rocks; and, after climbing the mountains for about a league, the traveller reaches the village of Caldas de Gerez, celebrated for its warm baths. The valley is here extremely narrow. To the eastward, the houses lean against the rocks, a stream waters them to the west, and also the foot of another mountain. The valley to the northward rises rapidly up the heights; and an eminence to the southward, before it descends, incloses this dell. The mountains are steep, lofty, and rocky, trees being found chiefly on the banks of the river, consisting of oaks, berry bearing alders, azereiros, and olives. The mountains are covered with thick bushes, especially along the brooks, and consist of strawberry trees, erica arborea, azereiros, and two new varieties of cytisus, which render the mountains impassable. Single oaks of a remarkable kind, grow on the highest summits.

The village of Caldas de Gerez consists of 40 stone houses, which are ill built, and have but one story. The apartments are small and inconvenient, the windows have in general no glass, and the floors are so bad that one can see through them. Their only furniture consists of a rough wooden table and coarse chairs. A small square, about 200 paces in length, serves as the promenade; but there is no place where the company can ride; ladies, and feeble patients, being carried in litters borne by two horses. The warm springs rise to the eastward from a wall of granite rock, at the foot of a high mountain. They are four in number, and over each a square house is built, in the middle of which is a bath walled round. One person only can bathe at a time; and a curtain is the only screen for protecting the bathers from view. One of the springs contains hepatic gas. The heat of the warmest does not exceed 40° of Reaumur; and the hottest may be used as a bath. The bathing season continues from June till August. The company, which consists of the English from Oporto, and of the inhabitants of the small towns of the Minho, rise at four in the morning, bathe or drink the waters immediately, and then walk till near seven. They dine at 12, and then take a long sleep; at four they again bathe or drink the water; after sunset they take a second walk, and, after assembling at a tea or card party, they sup at 10.

The mountains of Serra de Gerez, which separate this province from Spain, extend in general from east to west, but send out many arms to the south. The valley where Caldas lies, stretches in the same direction, rising continually to the north, till it again sinks towards the frontiers of Gallicia, which are only three leagues distant from Caldas. The valley rapidly narrows, becomes more woody and rocky, till the traveller enters a thick shade of lofty oaks. Lofty walls of rugged rocks now appear, and the mountain assumes an appearance of sublimity. Near Gallicia, the river Hosnem intersects the valley obliquely, and flows into another. In this place are the ruins of a Roman bridge and a Roman road, which the mountain torrents have in vain endeavoured to destroy. From this spot a narrow footpath leads into Spain, which commences in a pass called Portela de Homem. The highest of the mountains of Gerez is to the eastward of Caldas, towards Montalégre; the highest peak, which is between 3000 and 4000 feet high, is named *O Murro de Burrageiro*, and consists of rocks heaped together. The view to the west is extensive, commanding the greater part of the province of Minho and the sea. The horizon in other quarters is bounded by mountains. The granite of which this range of mountains consists, often contains bar-shœrl, and, in the clefts, mountain-crystals and smoke topazes, and sometimes a fine rose-coloured quartz. The flora consists of Biscayan and Pyrenean plants, and of several nondescript species. Wolves are here so numerous, as to render this range dangerous for travellers. The Caucasian goat abounds here; it is found in the northern part of the peninsula: its flesh is much esteemed; the skin is used as covers for mules, and the horns for household ornaments. Great numbers of lizards and snakes abound in this range; these are generally the *Lacerta agilis* of Linnæus, and the *Vipera Redi*.

Between Caldas and the village of Covide, appear the remains of an old mountain fort, which the inhabitants affirm are the ruins of an old city called *Chalcedonia*. No inscription occurs among these ruins.

The chief towns of this province are Braga, Oporto, Viana, Amarante, Guimaræns, Ponte de Lima, and Pe-

Enydra | Epaminondas.

zo de Regna. The principal rivers are, the Minho, the Douro, the Lima, the Neiva, the Cavado, the Ave, &c. all of which run westward into the Atlantic.

The province contains three cities, 25 towns, 223,495 houses, and 900,000 inhabitants. (w)

ENYDRA, a genus of plants of the class Syngenesia, and order Polygamia Segregata. See BOTANY, p. 312.

EPACRIS, a genus of plants of the class Pentandria, and order Monogynia. See BOTANY, p. 141, 170.

EPACT. See CHRONOLOGY, vol. vi. p. 411.

EPAMINONDAS, a celebrated Grecian general, was born at Thebes in Bœotia; and was descended, by his father Polymnis, from the ancient sovereigns of his country. He was educated in his father's house, along with Philip of Macedonia, under the Pythagorean philosopher Lysis; and, from an early age, devoted himself to the study of philosophy. Nor was he inattentive to the more ornamental accomplishments; and particularly applied himself to those athletic exercises, which at that time formed the chief amusement of the Grecian youth. While he was distinguished by the most amiable dispositions, and mingled freely with young persons of his own age, he was remarkably reserved in his manners. He spoke seldom, even to his intimate friends; but the few words which he occasionally uttered were so uniformly pertinent and judicious, that, when he was only 15 years of age, it was said of him by Spintarus of Tarentum; "I never knew a man who understood so much, and spoke so little.' Though thus accomplished and admired, he was one of the poorest citizens of Thebes; and no solicitations of his friends could ever prevail upon him to accept of riches, or to alter his frugal mode of life. Anxious to correct the luxurious manners of his countrymen, and to inspire them with that virtuous spirit, which might enable them to maintain their public liberties, he omitted no opportunity of resisting their dissipated habits; and, when once questioned, at a public festival, why he had appeared in so plain a dress, and with so pensive an aspect, he sarcastically replied, "because I wish, that one person may remain to watch over the safety of the city, when you are all drowned in wine and debauchery." Having attracted the esteem and affection of Pelopidas, one of the wealthiest and most illustrious of the Thebans, he inspired his friend with similar sentiments; and, by their united influence and example, they revived among their fellow citizens that love of sobriety and virtue, which laid the firm foundation of their future eminence. These two friends, having been appointed to join the troops, which were sent to the assistance of the Lacedemonians, in the war against the Arcadians, gave the first signal proof of their own military spirit, and raised the character of their country among the neighbouring states. At the battle of Mantinea, they sustained with heroic courage the hottest of the fight, and Pelopidas, having fallen covered with wounds upon heaps of slain, the desperate exertions of Epaminondas for his rescue, restored the victory to the routed Lacedemonians. When the Spartans, a few years afterwards, jealous of the rising power of the Thebans, had treacherously made themselves masters of their city, and when Pelopidas, with the other exiles, had formed a scheme for the liberation of their country, Epaminondas, whose obscure station and love of study had saved him from banishment, privately seconded the enterprize with the utmost sagacity, and after the execution of the plot, openly appeared among the assertors of the independence of Thebes. Sacrificing his love of retirement and philosophy to the interests of his country, he came forward with his friend to share all the burdens of government, and the dangers of war. By their prudence, vigilance, and activity, they baffled all the exertions of the renowned Agesilaus in several campaigns; prevented him from gaining any other advantage than that of laying waste their country; and gradually taught the Theban soldiers to face, and even to vanquish, on equal terms, their hitherto triumphant invaders. Artaxerxes Mnemon, the Persian monarch, having convoked an assembly of the Grecian states at Sparta, for the purpose of accomplishing a general pacification, Epaminondas was placed at the head of the Theban deputation. Here, while the other deputies were overawed by the haughty Agesilaus, he alone asserted the independence of his country, and recommended a general resistance to the overgrown power of the Lacedemonians. The Spartan king excluded the Thebans from the league, and war was declared against them as the enemies of Greece. Epaminondas was unanimously chosen to conduct the affairs of Thebes; and, having selected six of the principal citizens as his associates, to whom he gave the appellation of Beotarchs, or governors of Bœotia, he marched with 6000 infantry and a small body of cavalry, to oppose the Lacedemonian king, Cleombrotus, at the head of 10,000 foot and 1000 horse. The hostile armies met at Leuctra, a small town in Bœotia, B. C. 371. Epaminondas, by the courage with which he inspired his troops, and the new plan of attack which he adopted, gained a complete victory over double his numbers; and cut off the Spartan commander with the flower of his army. The victorious chief rejoiced in the exaltation of his country; but declared that his highest personal gratification consisted in having acquired so great glory while his parents were alive. Two years after this memorable success, he entered the territories of the Lacedemonians, where, for the space of 600 years, an enemy's camp had never been pitched; and, at the head of 70,000 troops from different states, overran all Laconia with fire and sword; advanced to the very walls of Sparta, which on one occasion he had it in his power to destroy; laid waste its suburbs in the sight of its kings, and, having completely humbled that formidable power in the sight of all Greece, returned to Thebes with an army crowned with victory, and loaded with the spoils of the enemy. Entering his native city, which he had raised from the lowest humiliation to the height of political greatness, he found a factious party prepared to accuse him and his colleague of treason against the state, for having retained their office as Beotarchs four months beyond the term prescribed by law. An assembly of the ungrateful people was ready to condemn the two friends to capital punishment, when Epaminondas, anxious to save the life of Pelopidas, acknowledged the breach of the law which he had committed, and took upon himself the whole of the guilt in having advised the measure; "The law condemns me," he exclaimed before his judges, "and I consent, if it must be so, to suffer as an example; but permit me to make this single request. I suffer for having led you into Laconia, where no enemy before you had dared to penetrate; I suffer for having carried into their towns and territories, the desolations which they first brought upon our miserable country; I suffer for gaining your victories and enlarging your power. Behold the crimes for which I am condemned! let them be engraved upon my tomb, that, when posterity shall hear of my punishment, they may also be informed of the cause." This speech

Epaminondas.

Epaminondas.

was received with shouts of applause, and the judge pronounced a sentence of acquittal. Epaminondas, stripped of authority, returned without a murmur to the station of a humble citizen; and when, a few years afterwards, an army was sent against Alexander the tyrant of Pheræ, he enrolled himself to serve as a common soldier. In that capacity he saved the army from destruction, and was instantly, by the unanimous voice of the soldiers and citizens, reinstated in the command. During the intervals of peace, he laboured to introduce order and integrity into the management of the public finances; and, in his enlarged views of policy, he adopted the most effectual plans for rendering his country as powerful by sea as it was by land. He persuaded the people to vote a large sum for building a fleet; and succeeded in gaining possession of the maritime stations at Rhodes and Chios. But the growing power of Thebes having excited the jealousy of the other states, he was called to make head against a formidable confederacy of the Mantineans, Athenians, and Lacedemonians. With his usual promptitude in warlike expeditions, he made a sudden attempt upon the city of Sparta; but, after having penetrated to the forum, he was compelled to retreat by the desperate resistance of Agesilaus and his son Archidamus. He then hastened to make a similar attack upon Mantinea; but, contrary to his calculations, found it prepared against a surprise. Anxious to retrieve his own fame, and to raise the courage of his army, which had suffered some depression by the failures of these enterprises, he determined to risk a general engagement. He had an army of 30,000 infantry and 3000 cavalry, while the united forces of the Lacedemonians and of their allies did not exceed 20,000 foot and 2000 horse. But, though superior in numbers, he omitted no advantage which it was possible to derive from military skill; and never exerted his talents more than on this occasion, to deceive and to disconcert the enemy by his manœuvres. His order of battle is considered as the most simple and best concerted, that has been recorded in the annals of ancient tactics. Pretending to pass the Lacedemonians, as if upon a march, he suddenly formed his line of attack, charged their centre with a strong column in an oblique direction, and routed their main body with immense slaughter. To gain a complete victory, he had only to collect his Thebans, and fall upon the wings of the enemy, which were ready to give way; but hurried along by his desire of victory, and his inveteracy against the enemy, he advanced almost alone into the midst of the fugitives. Recovering from their panic, they assailed him with the utmost fury, overwhelmed him with a shower of darts, and one of them at length plunged a lance into his breast, the iron head of which, broken off by the force of the blow, was left in his body. Carried to his tent, he heard without emotion the declaration of the surgeons, that his wound was mortal, and that his death must follow the extraction of the weapon. He first asked his attendants if his buckler had been saved; and when it was brought, he clasped it to his breast as the companion of his exploits. He next inquired concerning the event of the battle; and, having been informed that the Thebans were victorious, he exclaimed, "it is enough; I die unconquered; advise my countrymen to conclude a peace!" One of his intimate friends, lamenting his death, and his want of any offspring to revive his name; "you mistake," he replied, "I leave behind me two immortal daughters, the victory of Leuctra, and that of Mantinea." Having said this, he directed the iron to be extracted, and instantly expired, B. C. 363. The glory of his country perished along with him, and his distinguishing greatness consists in this, that he inspired an obscure and oppressed people with his own exalted sentiments. He has justly been regarded as one of the most distinguished characters that any age or nation has ever produced; and was equally eminent as a philosopher, a statesman, a commander, and a virtuous citizen. See *Corn. Nepos*; Plutarch's *Lives*, Agesil. and Pelop.; *Justin*, b. ix.; Pausanias and Xenophon's *History of Greece*; *Polybius*, b. ix.; *Diod. Sic.* b. xv. and xvi.; *Anacharsis*, vol. ii.; *Univ. Hist.* vols. v. and vi.; and particularly M. de Folard's *Life of Epaminondas, &c.* vol. ii. (*q*)

Eperua ‖ Ephesus.

EPERUA. See Panzera, Botany *Index*.

EPHEDRA, a genus of plants of the class Dicœcia, and order Monadelphia. See Botany, p. 339.

EPHEMERA. See Entomology *Index*.

EPHESUS, a celebrated city of Ionia, and once the metropolis of Asia Minor, is affirmed by Pliny, Justin, and Orosius, to have been built by an Amazon, whose name also it is supposed to bear. It was then possessed by the Carians and Leleger; but was occupied by Androclus, the son of Codrus king of Athens, who conducted the first colony of Ionians into Asia. This prince and his immediate descendants continued, during several generations, to exercise the regal power in the new colony; but afterwards, a change, of which the date and the occasion are unknown, took place in the form of government; and the city remained under the administration of a senate, till the time of the tyrant Pythagoras, who usurped the sovereign power, and who flourished before the birth of Cyrus the Great. Under his successor Pindarus, who ruled with an authority equally absolute but with greater moderation, Ephesus was besieged by Crœsus king of Lydia, who, from respect to the tutelary goddess of the place, restored to the citizens their former liberty, and conferred upon them numerous marks of his favour. Pindarus, who, according to Ælian, was the nephew of Crœsus, being obliged to resign his power, retired to Peloponnesus; but the city, which was successively subject to the Persians and to the Grecian states, seems to have again fallen under the dominion of tyrants. Of these, history has mentioned Athenagoras, Comas, Aristarchus, and Hegesias, the last of whom was expelled by Alexander, when he defeated the Persians on the banks of the Granicus, and a democracy established in the city. After his death it passed into the hands of several of his successors, and particularly of Lysimachus, who caused the ancient city to be destroyed, and built a new town in a more commodious situation, and nearer to the temple of Diana, which was about seven stadia from the walls of the former. From this period the Ephesians were subject to the kings of Syria, till the Romans, when they gave liberty to the Greek states in Europe, extended the same privileges to the Greek colonies in Asia. Reinstated in their ancient rights, they became the allies of Rome; but were afterwards persuaded by Mithridates of Pontus to take part with him against their protectors, and even to massacre, without distinction, all the Roman citizens within their gates. For this barbarity they were severely punished by the victorious Sylla, who suffered his soldiers to live upon them at discretion, and almost reduced them to beggary by the heavy contributions which he imposed; but by the favour which they experienced from the future emperors of Rome, they regained, in a great measure, their former splendour, and enjoyed for many

Ephesus. years some show of liberty. The city suffered severely from the earthquake, which desolated the principal cities of Asia in the reign of Tiberius; but was completely repaired by that emperor, and ornamented with many magnificent edifices. The games, originally instituted in honour of Diana, appear to have been much attended so late as the reign of Caracalla. It is celebrated as having been the seat of the most flourishing of the first Christian churches, where the apostle Paul preached for three years, where the evangelist John resided during the latter part of his life, and where Timothy was the first bishop. Under the auspices of Constantine and Theodosius, the Christian faith made rapid progress, and numerous churches were erected on the ruins of the Pagan temples. Under the reign of the emperor Alexis, the father of Anna de Comnena, it first fell under the power of the Saracens, from whom it was retaken by the Greeks in 1206, but was again lost in 1288, and from the commencement of the 14th century has formed a part of the Turkish dominions. Long before the extinction of the Greek empire, Ephesus had fallen into general decay; and a new town and citadel having been founded at Aiasoluk or Ajasoluk, about two miles distant, the ancient city was soon totally deserted.

Ephesus was known in ancient times by a variety of names, Alopes, Ortygia, Morges, Smyrna, Trachæa, Samornion, and Ptela; and is described by ancient geographers as at once the ornament of Asia, and the most frequented emporium of that continent. Its citizens, in addition to their mercantile eminence, were liberal patrons of the fine arts, and their temples possessed many of the most celebrated productions of ancient genius. Their architecture was conducted principally by Pharax, whom Vitruvius mentions with much commendation. Agasius the son of Dosotheus was one of the most eminent sculptors. Parrhæsius, Apelles, and Ephorus, (the master of the latter,) all holding the first rank as painters, were natives of Ephesus. Artemidorus the historian and geographer, and Heraclitus the melancholy philosopher, were also born within its walls. The Ephesians were equally noted for their luxurious and licentious manners; and are said to have banished one Hermodorus solely on account of his virtue. (See Dr Goodwin's Works, vol. i. p. 7.) They were much addicted to superstition, sorcery, and magical arts; whence arose the proverbial expression, "Ephesian letters," to denote those spells or sentences, which they used to write upon their girdles, or to imprint upon different parts of their bodies, as charms against evil, or as sources of supernatural power.

But the great boast of the Ephesians, and the principal ornament of their city, was the celebrated temple of their tutelary goddess Diana. The original object of their worship was a small statue of elm or ebony, made by one Canitias, though commonly believed in those days to have been sent down from heaven by Jupiter; but, what is more remarkable, it had no resemblance to the elegant huntress Diana, and was merely an Egyptian hieroglyphic, with many breasts, representing the goddess of Nature. As the original figure became decayed by extreme age, it was propped by two rods of iron like spits, which, even after its renewal, were religiously adopted in the substitute. It was at first placed upon a block of beach or elm wood, but in later times was preserved in a shrine adorned with all that wealth and genius could contribute. As the veneration for the goddess increased among the inhabitants of Asia, a magnificent temple was constructed on the spot where the elm had stood, and the sacred image placed within it. Ephesus. This temple seems to have been several times (Pliny says seven times, lib. xvi. c. 40.) ruined and rebuilt, a circumstance which may help to reconcile the discrepancies which occur in ancient writers, as to the dates and descriptions of these successive erections. One of them is expressly affirmed by Livy (lib. i. c. 45.) to have been completed in the reign of Servius Tullius, who flourished at the latest 570 years before Christ. Another is described which was originally designed by Ctesiphon, a Cnossian architect, 541 years before the Christian era, whose plan was continued by Demetrius, a priest of Diana, and the whole at length completed by Daphnis of Miletus, and a citizen of Ephesus. This temple is said to have been partially destroyed by fire on the day when Socrates was poisoned, 400 years B. C. and again 356 B. C. by the philosopher Herostratus, on the day when Alexander the Great was born, Diana, says Timæus the historian, being then absent at the delivery of Olympias. The incendiary confessed, upon being put to the torture, that his only motive for the sacrilegious act, was a desire to immortalize his name; and though an assembly of the Ionian states passed a decree condemning his name to oblivion, the prohibition served only the more to perpetuate its remembrance. According to some accounts, nothing but the four walls and a few columns escaped the fury of the flames; while others relate, with greater probability, that only the roof, and some other parts constructed of timber, were destroyed. The Ephesians had begun its reparation, when Alexander, in his expedition against the Persians, offered to appropriate his spoils to the completion of the work, upon condition that his name should be inscribed, as its restorer, upon the front of the edifice. This proposal they accounted it disgraceful for them to accept; but secured the forgiveness of the conqueror by the flattering style in which their refusal was conveyed: "It is not suitable for one divinity," said the Ephesian deputy, "to decorate the temple of another." The women of Ephesus, besides working at the materials intended for its ornament, devoted their jewels to its restoration; and all Asia contributed to its progress. Cheiromocrates, who assisted in building Alexandria, and who had proposed to cut Mount Athos into a statue of Alexander, was the architect employed at its commencement; but 220 years (says Pliny, lib. xxxvi. c. 14.) or even 400 years (says the same author, lib. xvi. c. 40.) were spent in completing the building. It is difficult to determine whether the description of the temple given by this writer applies to its appearance prior or posterior to the conflagration in 356; and it is impossible to make it in any measure intelligible, except by supposing, with the Marquis de Poleni, that its dimensions were exactly the same both before and after the time of Herostratus, and that it was merely restored, though with greater magnificence and taste, to its former state. It was built on a marshy spot, that it might be more secure from the effects of earthquakes; and under its foundations was laid a bed of charcoal firmly rammed, and above that another of wool. The whole building was 425 feet in length, and 220 in breadth, supported by 127 pillars of Parian marble, and of the Ionic order, each 60 feet high. Those pillars were furnished by so many princes, and 36 of them were curiously carved by Scopas, while the rest were finely polished. Along the flanks of the cell was a double row of columns, 15 on each side. It is considered as the first instance in which, according to the Ionic style, the fluted column and

Ephesus. capital with volutes were introduced; it is calculated that each pillar, with its capital and base, contained 150 tons of marble. The doors and panneling were made of Cypress wood, polished and shining; and the staircase of vine wood. Its internal decorations were heightened by the lustre of gold, and especially by the most perfect productions of the artists of antiquity. It contained a statue of Hecate, by Scopas; a picture of the goddess Diana, by Timarete, the first female artist upon record; a painting, by Apelles, of Alexander grasping a thunderbolt, purchased for 20 talents of gold. The shrine was adorned by Praxiteles and his son Cephisodorus; and the walls by Parrhasius and Apelles. The priests who served in the temple suffered emasculation, and the sacred virgins were devoted to inviolable chastity. They were eligible only from the higher classes of the citizens, and enjoyed a great revenue with numerous privileges, in addition to the presents received from the crowds of worshippers who flocked to the annual festivals. Their luxurious mode of living, and particularly the cost of their dyed vestments, are described by ancient writers in the most extravagant terms. The Asiarchs mentioned by Luke, (*Acts* xix. 31.) were the principal officers chosen by the community of the Asiatic cities, to preside over the games celebrated at Ephesus in honour of Diana, some of whom might also have been priests of the temple. Among other privileges, the sacred edifice afforded an asylum to those who sought its protection. The inviolable space at first extended one furlong, and was afterwards increased, first by Mithridates, next by Mark Antony, so as to include a part of the city; but, in consequence of the disorders which attended the exercise of such a privilege, it was entirely revoked by Tiberius, who declared, that even the altar itself should not protect a criminal from justice. This celebrated edifice, after suffering various partial demolitions, was finally burnt by the Goths in their third naval invasion, A. D. 260; and travellers are now left to conjecture even as to its scite and its foundations; but the confused heaps of architectural fragments which still remain, sufficiently testify the ancient grandeur of Ephesus. A part of the aqueduct which conveyed water into the city from the spring of Halitæa, still subsists; and the pillars which support the arches are of fine marble; but this structure is generally believed to have been raised by the Greek emperors, out of the ruins of Ephesus. A high wall, at the circular end of the stadium, is perfect, constructed of heavy rough stones; and the gate of the left wing, built of white marble, is nearly entire, but is also made up of fragments of former buildings, and must have owed its origin to a later age. Two vast gateways of a theatre or a Naumachia, and some walls of brick, faced with large marble slabs, supposed to have been either a part of the temple of Diana, or of the church of St John, form the other principal objects of any magnitude. At Aiasoluk or Ajasoluk, once the rival of the parent city, and the residence of the Saraconic princes in the 14th century, is a large portal, formerly leading to the citadel, wholly built with Roman tiles, and faced with polished marble. Over the gateway, and above a very rich frieze, are three pieces of exquisite sculpture, one of which, in alto relievo, represents the bringing of the body of Patroclus to Achilles. For some unknown reason, the Greeks call it the Gate of Persecution, and believe that it represents the martyrdom of Christians. Aiasoluk itself is a miserable village of mud cottages, and about a dozen small square buildings of brick, the ruins of oratories or baths, inhabited by 30 or 40 families of Turkish herdsmen. Its name is considered by some as a Turkish word, signifying the temple of the moon, in reference to the temple of Diana; but is supposed, by others, to be a corruption of Aiaseologos, the modern Greek of Ἅγιος Θεολογος, referring to the residence there of the evangelist John. Even the vale of Ephesus has undergone a total change; and the town could never be supposed, by an observer ignorant of its history, to have had a free communication with the sea. The Cayster, formerly navigable, is now choked with sand, and flows through sedges, which render it almost invisible. Attalus Philadelphus, king of Pergamus, in order to improve the port, which was shallow and incommodious, was persuaded by an architect to construct an extensive mole; but, by the interruption thus given to the current, the earth brought down the river has destroyed the port, and even encroached some miles on the dominion of the sea.

Ephesus || Epicurus.

When the city was taken by the Turks in 1300, "the desolation was so complete," says Rycaut, "that the temple of Diana, and the church of Mary, will equally elude the search of the most industrious traveller." See *Ancient Univ. Hist.* vol. vii. p. 416; Anacharsis' *Travels*, vol. vi. p. 188; Vitruvius, l. viii.; Plin. *Nat. Hist.* l. xvi. c. 40, and l. xxxvi. c. 14; Strabo, lib. xiv; Pococke's *Travels*; Sandy's *Travels*; *Voyage Pittoresque de la Grece*, p. 177; Dallaway's *Constantinople*, p. 209, 211. (*q*)

EPHORI. See Sparta.

EPHIELIS. See Botany, p. 199.

EPIBATERIUM. See Botany, p. 325.

EPIBLEMA. See Botany, p. 317.

EPIC Poetry. See Poetry.

EPICURUS, a celebrated philosopher of ancient Greece, and the founder of that sect which flourished under his name, was born at Gargettus, a village of Attica, in the 109th Olympiad. He was the son of Neocles and Chærestrata, of the illustrious family of the Philaides at Athens. At the age of eighteen, he commenced his philosophical studies in this central seat of learning; during the period when Xenocrates and Aristotle were engaged in exploring the most profound mysteries of science, and extending the circle of human knowledge.

Having acquired an high reputation for natural genius, extensive learning, and patient investigation, when about thirty years of age, he instituted, at Athens, a new philosophical school, and propounded to crowded audiences the peculiar tenets of a system of physical and moral science, which was different, in many essential points, from the doctrines that were taught by the most popular sages of those times. For the grand outlines of his theory of the universe, indeed, he was indebted to the previous labours of Leucippus and Democritus, the most ancient atomic philosophers; but from the sublime conceptions and plastic genius of Epicurus, these broken and discordant features first acquired such a rational form and consistency, as entitled them to the name of a system.

His theory of morals was as much opposed to the rigid maxims of the Stoics, as his life and conversation contrasted with the ascetic habits of the disciples of that celebrated school. In the umbrageous walks of a delightful garden, Epicurus enjoyed the society of his friends, and delivered his instructions to his numerous pupils; whence the institution was denominated *the School of the Garden*, as that of Plato was called the *Academy*, that of Aristotle the *Lyceum*, that of Zeno the *Porch*, and that of Antisthenes the *Cynosargum*.

Epicurus. His manners were easy and affable; his life temperate and virtuous. Having devoted his days to the propagation of science, he died of an inflammation, occasioned by a stone in the bladder, after suffering the most excruciating pain with admirable composure and patience, in the 127th Olympiad, and the seventy-second year of his age.

It is unnecessary for us, in this place, to enter into any discussion respecting the physical principles inculcated by Epicurus, as we have already exhibited a view of his cosmological hypothesis in a former article: (See Atomical Philosophy.) But whatever objections the combined lights of reason and revelation may have afforded us against the principles of that system, it must still be acknowledged to have been the offspring of a bold, vigorous, and scientific mind; and it is, perhaps, the only rational profane theory, on the subject of cosmogony, which has had sufficient merit to attract respectable disciples in modern times.

The moral principles promulgated by Epicurus have afforded a theme of reprehension to the ascetic philosophers of all ages; and, by a singular misconception of the nature and tendency of his opinions, the very name of that illustrious sage has been converted into an epithet expressive of every thing that is unprincipled, licentious, base, and grovelling, in human conduct and manners. Having assumed, as the basis of his ethical system, the principle, that pleasure is the chief good of man, it has been unwarrantably supposed, that his doctrines give countenance to habitual intemperance, and even recommend the unrestrained gratification of every illicit passion. Nothing, however, can be more unjust than such a representation of the moral theory of Epicurus. His system, indeed, as we have already observed, was directly opposite to that of the Stoical school. He rejected the absurd doctrine of fatality, which constituted the foundation of the philosophy of Zeno, and boldly contended for the free agency of man: a principle, without the admission of which it were vain to attempt to erect any rational system of morality. Disclaiming the external aid of gravity in speech, and of any singular austerity in dress and demeanour, and being himself naturally endowed with an affable and cheerful disposition, he deemed it not necessary for a wise man to be morose, but taught his disciples, on the contrary, to look for pleasure in the pursuit of wisdom, and to consider happiness as the concomitant of virtue. "Wisdom," says Epicurus himself, in his epistle to Menæceus, "is the chief blessing of philosophy, since she gives birth to all other virtues, which unite in teaching us, that no man can live happily who does not live wisely, conscientiously, and justly; nor, on the other hand, can he live wisely, conscientiously, and justly, without living happily; for virtue is inseparable from a life of happiness, and a life of happiness is equally inseparable from virtue." Such principles, whether resulting from correct views of human nature or not, cannot surely be considered as holding out any encouragement to intemperate conduct, or indulgence in illicit pleasures. "Those," says one of his disciples, "whom we call lovers of *pleasure*, are real lovers of *goodness* and *justice;* they are men who practise and cultivate every virtue: for no true pleasure can exist without a good and virtuous life. When we assert, then, that pleasure is the chief good, the prime felicity of man, we do not mean the pleasures of the luxurious and the libidinous, the pleasures of the taste, the touch, or any of the grosser senses, as the ignorant, or those who wilfully mistake our opinions, maliciously assert; but what constitutes pleasure with us, is the possession of a body exempt from pain, and a mind devoid of perturbation," &c. The *summum bonum* of Epicurus, therefore, was nothing else than the *mens sana in corpore sano* of the Roman poet; he proposed to conduct mankind to happiness, not through the deceitful labyrinths of sensual gratification, but along the pleasant paths of knowledge and of virtue. Epicurus.

Among those, indeed, who controverted the doctrines of Epicurus, there were some who ventured to arraign his personal character, and who had recourse even to falsehood and forgery, in order to vilify and degrade him in the opinion of the people. These attempts, it must be confessed, however unjustifiable, have been too successful; as the vulgar prejudices of mankind, from the age of that philosopher down to the present times, sufficiently evince. But the malicious libels, which were industriously circulated, and too readily believed, against the moral character of Epicurus and his disciples, are abundantly refuted by the concurrent testimony of the most respectable authorities,—of men who, although they might dissent from his principles, yet bore witness to the virtuous tenor of his life, and to the purity and excellence of his precepts.

In reality, both the Stoic and the Epicurean professed temperance and virtue, though from opposite principles. According to the former, virtue consisted in a total subjection of the passions, and in the constant and habitual practice of austerity and discipline. The Epicurean, on the other hand, assumed pleasure as the chief good, but, at the same time, sought this pleasure in a proper restraint of the desires and passions, and in the attainment of wisdom, and the exercise of virtue. Pain, according to the Stoic, ought to be considered as an object of indifference, beneath the regard of a wise man; with the Epicurean, on the contrary, it was a great evil, and to be avoided by all means. The theory of the latter sect preserved the influence of the social and moral affections entire; while that of the former evidently tended to produce ascetic apathy and indifference. We shall have no reason, therefore, to quarrel with the ethical system of Epicurus, if its principles be only understood in the same sense in which he seems to have inculcated them. To teach mankind the true road to happiness, has been the professed object of almost every theory of morals; and of all those means by which we can promote our happiness, it will be readily admitted, that there are none more efficacious than the cultivation of temperate and virtuous habits, and the exercise of our intellectual faculties, and benevolent affections.

The doctrines of Epicurus long continued to be favoured by the Romans; and his school was found to flourish under the emperors, after other institutions had begun to decay. The most celebrated adherents to this system were the elder Pliny, Celsus, Lucian, and Diogenes Laertius. The Epicurean theory, however, was not encouraged at Alexandria, which, after the decline of Grecian learning, became the chief seat of literature and science; where the eclectics, who still continued to call themselves Platonists, superseded every other school. In the earlier ages of the Christian church, it fell into utter neglect and obscurity; but, during the 15th century, the doctrines of Epicurus again began to receive some encouragement; and they were subsequently revived in the 17th century, by the writings of Gassendi, Du Rondelle, and others. See Diogenes Laertius X. Gassendi and Rondellius, or Du Rondelle, *de Vit. et Mor. Epicuri.* Des Couturis, *Sur la Morale d'Epicure.* Le Blanc de Guillet's French Translation of *Lucretius*, Paris, 1788, 2 vols. 8vo. Brucker, Cudworth, Bayle, Mason Good's *Lucretius.* (*z*)

Epicycloid. EPICYCLOID, in Geometry, is the curve generated by any point in the plane of a moveable circle, which rolls either on the inside, or the outside of the circumference of a fixed circle. If the circles be both in the same plane, the curve generated will be the *plane* epicycloid.

If again the moveable and fixed circles be in different planes, and the former be the base of a right cone, that rolls on the surface of another right cone, the base of which is the latter, so that the vertices of the cones are at the same point; then, in this case, the curve generated by any point on the plane of the moveable circle is called a *spherical* epicycloid; because the generating point being always at the same distance from the common vertex of the cones, the curve described by it will be on the surface of a sphere.

If a circle roll along a straight line, any point in the plane of the circle will generate a curve, which is called a *cycloid*. The three classes of curves evidently belong to the same family; for if we suppose the cones by which the spherical epicycloid is generated to change to cylinders, by their axes becoming infinitely long; then, the spherical will change to a plane epicycloid: and if again we suppose one of the cylinders to change to a plane, by the radius of its base becoming infinite, the epicycloid will be changed to a cycloid.

Galileo appears to have been the first that noticed particularly the cycloid, about the year 1599. From the elegance of its form, he was led to regard it as a proper figure for the arches of a bridge: he endeavoured to find its area, but did not succeed, on account of the imperfect state of mathematical analysis at that time. It was he that gave the curve the name by which it is now commonly known.

Mersennus, a learned Frenchman, also turned his attention to the cycloid, about the year 1615; but neither was he able to square it. Happening, however, in the year 1628 to become acquainted with Roberval, he proposed the problem of squaring the curve to him; but he also was unable to accomplish it. However, this circumstance led Roberval to study the works of the Greek mathematicians, particularly the writings of Archimedes, and about six years afterwards, when Mersennus again proposed the problem to him, he effected its solution. His success was communicated by Mersennus to Descartes, as a thing of importance, but he did not think there was much merit in the discovery. He was not made acquainted with the demonstration; but in his answer to Mersennus, he sent a sketch of one. Afterwards, when Roberval, mortified by the opinion of Descartes, retaliated by saying, that he had discovered his demonstration by his knowing beforehand what ought to be the result, the latter investigated the method of drawing tangents to the curve, and sent his solution to Mersennus, challenging Roberval, and also Fermat, with whom he then had a dispute, to resolve the same problem. Roberval made various vain attempts, and sent five or six different solutions; and it is even supposed that in the end he availed himself of the true solution of Fermat, which had come into the hands of his friend Mersennus, as Descartes called on him, but in vain, for a demonstration.

Galileo having been informed by Mersennus about the year 1639, that the question of the area of the cycloid was then greatly agitated among the French mathematicians, but, as it appears, without having been made acquainted with what had been found, he requested Cavallerius to attempt its solution. Cavallerius tried it, but did not succeed; however, after the death of Galileo, which happened in 1642, his disciples Torricelli and Viviani, were more successful; the former found the area, and the latter the method of drawing tangents to the curve. The claim of Torricelli to the honour of his discovery was contested by Roberval; but the charge of plagiarism, which he brought against the Italian mathematician, has not been believed by his countryman Montucla, who has discussed the controversy in the second volume of his History of Mathetics, second edition. Epicycloid.

The cycloid, the source of so much contention, and on that account compared to the golden apple thrown by Discord among the gods, was again brought into notice by Pascal. This philosopher, not less celebrated for his piety and zeal in defence of the Christian religion, than his mathematical invention, took the cycloid as the subject of his meditation in those sleepless nights which he passed, in consequence of bad health; and he soon extended his discoveries beyond what was then known. He was not of a disposition to boast of his discoveries in geometry; but some of his pious friends supposed that it would be useful to have it known, that the man who had defended religion and Christianity against infidelity, was perhaps the most profound thinker, and the greatest geometer in Europe. They therefore requested that he would try the skill of the mathematicians his cotemporaries, by proposing publicly his problems on the cycloid. He took their advice; and, under the assumed name of *A. Dettonville*, he addressed a circular letter to the geometricians, in 1658, inviting them to resolve his problems, and promising forty pistoles to the author of the first solution, and twenty to that of the next, requiring them also to be sent to Paris by an assigned time. Only two contended for the prize; Lalouére, a French mathematician, and our countryman Dr Wallis. As the former had merely made a partial attempt to resolve the problems, and had failed, his claims were immediately set aside. Dr Wallis, however, had been more successful, yet he had committed some mistakes, and, on this account, the prize was not awarded to him. There were others, who, without aspiring to the prize, sent solutions of one or other of the problems to Pascal. Of this number were, Slusius; the prelate Ricci; the celebrated Huygens; and Sir Christopher Wren, who discovered the rectification of the curve. Pascal published his own solutions in the beginning of the year 1659, in a work entitled *Letters from A. Dettonville to M. de Carcavi.* In the same year, Dr Wallis published a work on the cycloid, and other curves, in which he resolved some of Pascal's problems by his *Arithmetic of Infinites*; and, in the year following, Lalouére also published a treatise on the cycloid; and another work appeared about the same time from the pen of P. Fabri, the jesuit.

The cycloid is remarkable, as well on account of its mechanical as its geometrical properties; and Mr Huygens discovered some of the most interesting of both kinds. To the latter class belongs the property, which we shall demonstrate in this article, by which he shewed how a pendulum may be made to vibrate in an arc of a cycloid; and to the former, the very beautiful property, that all vibrations of a pendulum in arcs of a cycloid, are performed in equal times. See MECHANICS.

The very curious problem proposed by John Bernoulli, viz. "to find the path along which a body may roll from one given point to another, in the shortest time possible, the points being supposed neither in the

Cycloid. same vertical nor the same horizontal plane," on account of its elegance, engaged the attention of the most celebrated mathematicians in Europe, who found, that the curve required, or the line of swiftest descent, as it is called, must be a cycloid. See MECHANICS.

Epicycloids appear to have been first invented by Roemer, the Danish astronomer, celebrated for having first discovered the progressive motion of light. He turned his attention to the theory of epicycloids, while at Paris, about the year 1674, not as a speculation purely geometrical, but with a view to improve mechanics, because he found that, by giving to the teeth of wheels the figure of these curves, the action of the moving power on them would be uniform; and that on this account their friction would be diminished.

There are other branches of mechanics connected with the theory of epicycloids. Huygens found that, supposing the force of gravity to act uniformly in the direction of parallel lines, a pendulum moving in a cycloid would perform all its vibrations in equal times, whether it described a greater or a lesser arc. But, by extending the hypothesis, and supposing the force of gravity to be directed to the earth's centre, and to be in all places as the distance from the centre, it became a question what curve a pendulum ought in this case to describe, so as to perform unequal vibrations in equal times? Sir Isaac Newton shewed that the curve ought to be an epicycloid. See *Principia*, lib. i. prop. 51.

The subject of spherical epicycloids was treated by Herman, in the first volume of the Commentaries of the Petersburgh Academy. It appears that a mathematician, named Offenburg, had proposed this problem, "to pierce a spherical roof with oval windows, the perimeter of any one of which may be absolutely rectifiable." Herman believed that he could resolve the problem by spherical epicycloids; having supposed that, in general, they admitted of an algebraic rectification. He had, however, committed a mistake in his reasoning, and thus was led to a wrong conclusion, as was afterwards shewn by John Bernoulli, in a paper on the rectification of these curves, given in the Memoirs of the Academy of Sciences of Paris, 1732, where he shews that the rectification of the curve proposed by Herman requires the quadrature of the hyperbola.

We shall now give a brief view of the properties of cycloids and epicycloids.

I. OF THE CYCLOID.

Definitions.

Of the Cycloid. PLATE CCLIII. Fig. 1. 1. If a circle, EPF, roll along a straight line AB, (Plate CCLIII. Fig. 1.), so that every point of the circumference may touch the line in succession; and if P be that point of the circumference which was in contact with the straight line at the beginning of the motion, when the circle has made a complete revolution, the point P will have described a curve line APDB, which is called a *common cycloid*, also sometimes simply a *cycloid*.

Figs. 2, 3. 2. If, as before, a circle roll along a straight line *a b*, (Fig. 2. and 3.), and Q be that point of its circumference which was in contact with the straight line at the beginning of the motion; and P be a given point in OQ, the radius of the circle, (Fig. 2.), or in the radius produced (Fig. 3.), when the circle has completed a revolution, the point P will have described a curve line APDB, which is called a *prolate* or *inflected cycloid*, if the point P be within the circle (Fig. 2.); and it is called a *curtate cycloid*, if the point is without the circle. Cycloid.

3. In each of the three cycloids, the circle EF is called the *generating circle*.

4. The straight line AB, which joins the points in each cycloid, where the motion of the point that describes the curve begins and ends, is called the *base* of the cycloid.

5. A straight line CD which bisects the base at right angles, and terminates in the curve, is called the *axis*; and the point D, in which it meets the curve, is called the *vertex* of each kind of cycloid.

6. A straight line drawn from any point in the curve, perpendicular to the axis, is called an *ordinate* to the axis; and the segment of the axis between the vertex and an ordinate, is called an *abscissa*.

Corollary to Def. 1. and 2. If the generating circle be supposed to continue to roll along the base produced, in each case the generating point will describe other cycloids, exactly like the first. In fact, they may be considered as forming with it a continuous curve, which never returns into itself, but goes on indefinitely.

PROPOSITION I.

In any cycloid, the base is equal to the circumference of the generating circle.

In the *common* cycloid APB, (Fig. 1.) every point in the circumference of the generating circle will manifestly touch the base, without sliding along it, while the circle makes a complete revolution: therefore, the base of the cycloid is equal to the circumference of the circle. PLATE CCLIII. Fig. 1.

In the *prolate* and *curtate* cycloids, (Fig. 2. and 3.) Q being the point of the circumference of the generating circle, which touches the line *a b* at the beginning and end of the motion; and P being the point in the revolving radius OQ, which generates the cycloid APDB, it is manifest that at the beginning of the motion, the line QP will have the position *a* A, a perpendicular to *a b*; and at the end, it will have the position *b* B, another perpendicular to *a b*; therefore *a* A, *b* B are equal and parallel, and consequently AB is equal to *a b*, which again is manifestly equal to the circumference of the generating circle (Def. 2.). Figs. 2, 3.

PROP. II.

In the three kinds of cycloids, the axis is equal to twice the straight line drawn from the point that generates the curve to the centre of the generating circle.

It is evident from the generation of the curves, that as the circle rolls along the base AB of the common cycloid (Fig. 1.) or along the line *a b* of the curtate and prolate cycloids, (Figs. 2. and 3.) which is parallel and equal to the base AB, the centre advances in a straight line parallel to AB; and that the part of the line described by the centre from the beginning of the motion is equal to the arc of the circle that has been applied to AB (Fig. 1.), or to *a b* (Fig. 2. 3.) Therefore, when the circle has completed half a revolution, its centre O will be in CD, the axis, and the point P that generates the curve, will be at D, the vertex; so that the distance between the centre and the vertex is equal to the line OP: but the height of the centre of the circle above the base is the same as it was at the beginning and end of the motion, that is, it is equal to the same line OP; therefore the distance of the vertex from the base is equal to twice OP, that is, to twice the distance between O, the centre of the circle, and the point P that describes the curve. Fig. 1. Figs. 2, 3.

Cycloid.

Cor. A circle described on the axis of the common cycloid, as a diameter, is equal to the generating circle.

Prop. III.

If a circle be described on the axis of a common cycloid as a diameter, and an ordinate be drawn to the axis; the segment of the ordinate between the circle and the cycloid is equal to the arc of the circle between the ordinate and the vertex.

Plate CCLIII. Fig. 4.

Let DHC (Fig. 4.) be the circle described on the axis DC as a diameter, and PHG the ordinate; the straight line PH is equal to the circular arc HD.

Let FPE be the position of the generating circle when the point in the circumference that describes the cycloid is at P. The circles CHD, EPF are equal, and the lines HG, PI are manifestly the halves of chords equally distant from the centre; therefore PI, HG are equal, (See Geometry,) and PH=IG=EC. Now the semicircumference CHD, or EPF, is equal to the straight line CA (Prop. 1.), and the arc CH or EP is equal to AE, the part of that line to which it has been applied by the revolution of the circle; therefore the remaining arc HD is equal to EC, that is to PH.

Cor. Let the abscissa DG be denoted by the letter z, and the ordinate PG by y; then, if the radius of the generating circle be expressed by a, and the arc DH by z; the nature of the common cycloid will evidently be expressed by the equations

$$x = a - \text{cos. } z,$$
$$y = z + \text{sin. } z.$$

By exterminating z, and its functions cos. z and sin. z, the relation of x to y will be found, which, however, cannot be expressed in finite terms; therefore the curve is transcendental. The relation of the abscissa and ordinate may, however, be expressed in infinite terms, by a fluxional equation. See Fluxions.

Prop. IV.

If a circle be described on the axis of a prolate or curtate cycloid as a diameter, and any ordinate be drawn to the axis, the arc of the circle between the vertex and the ordinate will be to the segment of the ordinate between the cycloid and circle, as the axis to the diameter of the generating circle.

Figs. 5. 6.

Let DHC be a circle described on the axis DC as a diameter, and PG an ordinate meeting the circle in H; and let dc be the diameter of the generating circle; the arc DH is to the straight line PH, as DC to dc.

Let EQF be the position of the generating circle when the point that describes the curve is at P; and let FE, its diameter, which is perpendicular to ab, meet the ordinate in I: draw PO to the centre, and on O, with PO as a radius, describe a semicircle MPN. The semicircles MPN, DHC, being equal (Prop. 2.), and their centres at the same distance from ab, and consequently from AB and PG; the lines PI, HG, which are the halves of chords at equal distances from the centres of equal circles, are equal; also, the arc PN is equal to the arc HC; and the arc PM to the arc HD. Now, the semicircumference EQF of the generating circle being equal to AC, half the base; and the arc EQ equal to the straight line aE, along which it has rolled; that is to AN, a part of the base, the remaining arc QF is equal to NC, the remainder of the base; but because PI=HG, therefore PH=IG=NC; therefore the arc QF is equal to the straight line PH. Now, from similar figures, OP: OQ:: *arc* PM (=*arc* DH): *arc* QF (=straight line PH), therefore CD: cd:: *arc* DH: PH.

Cor. 1. The arc DH is to the straight line PH as the circumference of the circle DHC to the base AB. For the base is equal to the circumference of the circle FQE.

Cycloid.

Cor. 2. Let DG=x, PG=y, arc DH=z; and let a be the radius of the circle described on the axis, and b the radius of the generating circle; then because by the theorem $HP = \frac{b}{a} z$, the nature of the prolate and curtate cycloids will be expressed by the two equations

$$x = a - \text{Cos. } z,$$
$$y = \frac{b}{a} z + \text{Sin. } z.$$

Prop. V.

Plate CCLIII. Fig. 7.

In the common cycloid, if a circle be described on DC, the axis, as a diameter; and from any point P in the curve, an ordinate PG be drawn to the axis, meeting the circle in H; a tangent PV to the cycloid shall be parallel to HD, the chord of the arc between the vertex and the ordinate.

At the points H, D draw the tangents HR, DR, the latter of which will be parallel to the ordinate PG: draw also another ordinate phg indefinitely near to the former, so that the indefinitely small arcs Pp, Hh may be considered as coinciding with the tangents VP, RH; lastly, draw Pq parallel to Hh, and join Dh meeting PG in m.

Because PH=*arc* DH, and ph=*arc* DHh; therefore ph — PH=*arc* DHh — *arc* DH, that is, pq=Hh; but the triangles hHm, hRD being similar, and hR=RD, therefore hH=Hm; hence pq=Hm, and ph=Pm; the figure Pphm is therefore a parallelogram, and consequently pV is parallel to hD, or to HD.

Prop. VI.

Fig. 7.

The arc DP of the common cycloid is double the chord DH of the corresponding arc of the generating circle.

Let the ordinate phg be indefinitely near to PHG; join Dh, meeting PG in m, and draw Hn perpendicular to hm

Because the arcs Pp, Hh are indefinitely small, as in last proposition, they may be considered as coinciding with tangents to the curves. And because Pp is parallel to DH, or Dh (Prop. 5.) the figure Pphm is a parallelogram; hence Pp=mh; but Hm=Hh, as was shewn in Prop. 5; and therefore nm=nh, and mh=2hn; therefore Pp=2hn. Now Pp and nh are evidently the increments which the cycloidal arc DP and the chord DH receive by the ordinate changing its position from PG to pg; therefore the increment of the arc is always double the increment of the corresponding chord.

Suppose now the arc and chord to be generated by the ordinate moving parallel to itself from the vertex along the axis, then because the arc and chord begin together, and the increment of the one is double that of the other, the arc will always be double the corresponding chord.

Cor. The whole cycloid ADB is four times the diameter of the generating circle, or four times the axis.

Prop. VII.

Fig. 8.

If DM be drawn from the vertex of the cycloid parallel to the base, and from any point P in the curve an ordinate PHG be drawn to the axis, meeting the generating circle in H; and PL be drawn perpendicular to DM; the external cycloidal area DLP is equal to

Cycloid. the area contained by the circular arc DH, and the straight lines DG, GH.

Take a point p in the curve, indefinitely near to P; and draw the co-ordinates phg and pl: join DH, and complete the indefinitely narrow parallelograms G v, L r. Because the indefinitely little arc Pp may be considered as a straight line, which is parallel to DH, (Prop. V.), the triangles Prp, HGD are similar; hence rp: Pr:: GD: HG; that is, Gg: rP:: PL: GH; since then the rectangles G v, L r have their sides reciprocally proportional, they are equal. (See Geometry). Now the rectangle G v may be considered as the increment of the circular space DHG; and the rectangle L r as the increment of the cycloidal space DLP, corresponding to a change in the position of the ordinate from PHG to phg; for as to the triangles hHv, pPr, they vanish in respect of these rectangles: therefore the increments of the spaces DHG, DLP, are equal, and consequently the spaces themselves are equal.

Cor. If AM be perpendicular to DM, the whole cycloidal space ADM is equal to the semicircle DHC.

Prop. VIII.

Plate CCLIII. Fig. 8. If PHG, an ordinate to the axis, meet the generating circle in H, and the chord HC be drawn to the middle of the base, and PK parallel to HC, meeting the base in K; the space bounded by the cycloidal arc DP and the straight lines PK, KC, CD, shall be triple the corresponding space bound by the circular arc DH, and the straight lines HC, CD.

Draw HN, a tangent to the circle, meeting the base in N; also draw the ordinate phg indefinitely near to PHG, meeting HC in m; join hc; draw pk parallel to hc, and ks parallel to CH or KP. Because the triangles CNH, mhH, are similar, and NC=NH; therefore hm=hH; and because ph=hH+arc HD=hH+PH=hm+tm; that is, because pt+th=2hm+th; therefore pt=2hm. And because ks is parallel to cm, and kp to ch, therefore ps=hm, and pt=2ps; hence the parallelogram sK is double the triangle pks; and the quadrilateral pkKt is triple the triangle pks, that is hcm. Now the former of these is manifestly the increment of the space PKCD corresponding to a change of position of the chord from CH to Ch, and the latter is the increment of the space HCD; therefore the space PKCD is triple the space HCD.

Cor. 1. The cycloidal area DAC is triple the semicircle DHC.

Cor. 2. The interior cycloidal space PDG, is the excess of three times the space contained by the arc HD, and the lines HC, CD above the trapezoid PGCK.

Prop. IX.

Fig. 9. Let AB be the base of a cycloid, ADB and CD its axis: In DC produced take CV=CD; and let a semicycloid, the same as DB, be put in the position AV; and another semicycloid, the same as DA, in the position BV: Suppose now that a thread is fastened at V, and applied along the curve, so as to terminate at A; then, if it be unfolded, beginning at the point A, its extremity P will describe the cycloid ADB.

Draw AR perpendicular to AB, and equal to CD; and describe the semicircle AYR. Let PX, the part of the thread which has been unwrapped from AX, meet AC in T; draw XZ perpendicular to AR, meeting the circle in Y; and PG perpendicular to DC, meeting the circle in H; and join AY, CH.

Because XTP, the part of the thread unfolded, is a tangent to the curve, it is parallel to AY (Prop. 5.); and because it is equal to the arc XA, it is double AY (Prop. 6.), that is double TX; therefore TX= TP; and as, on this account, perpendiculars from X and P on AC will be equal; AZ is equal to CG: Now, the circles AYR, CHD are equal, therefore the arcs AY, CH will be equal, and the chords AY, CH equal and parallel; hence PT is equal and parallel to HC, and PH is equal to CT: But AC being equal to half the circumference CHD, and AT or YX equal to the arc AY (Prop. 3.), that is, to the arc CH; therefore TC, or PH, is equal to the arc DH: Hence the point P is in a cycloid, of which CHD is the generating circle (Prop. 3.), and therefore it is in the cycloid ADB. Epicycloid.

Note. The property of the cycloid described in this proposition was discovered by Huygens, and applied to the motion of a pendulum. Suppose the line VD to be perpendicular to the horizon, and two thin plates of metal to be bent into the form of semicycloids, and fixed in the positions VA, VB; then, if a pendulum were formed by fixing a weight to the end of a thread PXV, and made to vibrate between the plates, the weight P will, by its motion, describe the cycloid ADB.

This manner of describing a curve by the extremity of a thread which is unfolded from another curve, has given rise to the theory of *involutes* and *evolutes*, one of the most elegant speculations of modern geometry. See Fluxions.

For the application of the properties of the cycloid to mechanics, see Mechanics.

II. Of Epicycloids.

Definitions.

Of Epicycloids. Plate CCLIII. Figs. 10, 11. 1. Let AEB be a given fixed circle, and EPF a moveable circle, which rolls either on the outside of the former (as in Fig. 10.), or on the inside (as in Fig. 11.), and in the same plane; also let p be a given point in a line drawn from O, the centre of the moveable circle through P, a given point in its circumference; and at the beginning of the motion, let P be at A, the point of contact of the two circles, and the point p at a; then, while the circle makes one complete revolution, by rolling along the arc AB, the line Op will revolve about O as a centre, and the point p will describe a line $apdb$, which is called an *epicycloid*.

2. When the generating circle revolves on the outside of the circumference of the fixed circle, the line described is the *exterior* epicycloid; and when the generating circle rolls on the inside of the circumference, the line described is the *interior* epicycloid.

3. The circle EPF is called the *generating circle*, and the point p the *generating point*.

4. A straight line drawn through the centre of the fixed circle, and H, the middle of the base, is called the *axis;* and the point d in which the axis meets the curve, is called the *vertex*.

Corollaries to the Definitions.

Cor. 1. The points a and b, the extremities of the epicycloid, are in CA, CB, the radii of the circles drawn to the extremities of the base.

2. The base of the epicycloid is equal to the circumference of the generating circle.

Scholium. It is evident from the manner of describing the epicycloid, that after the generating circle has made a complete revolution, if it be supposed to continue its motion, a series of epicycloids will be described

Epicycloid. exactly like the first. Indeed, they may be considered as forming a continuous curve, which will go on continually, if the circumferences of the generating and fixed circles, or their radii, are incommensurable, because, in that case, the two circles will never come twice into contact at the same point. If, however, the radii are commensurable, it is evident that, after a certain number of revolutions of the generating circle, the points P and p will come again to the points A and a, from which they set out; and thus the curve will return into itself.

If the point that describes the epicycloid be without the generating circle, as at p, the curve $a\,p\,d\,b$ will be analogous to the curtate cycloid; but if it be within the circle at p', then the curve $a'\,p'\,d'\,b'$ will correspond to the prolate cycloid; and lastly, if the generating point be at P, the curve APDB will be more simple, and will correspond to the common cycloid.

PROP. I. *Problem.*

PLATE CCLIII. Fig. 12. To find the equations which express the nature of any epicycloid described on a plane.

Let HEX be the fixed circle, and C its centre; also let F′H be the generating circle when it has made exactly half a revolution. Then its centre O′ will be in the axis CH; and the generating point will be at D, the vertex of the curve.

Suppose now that the generating circle has rolled along the arc HE, so that its centre has advanced from O′ to O, and the revolving radius from the position O′D to the position OP, while the generating point P has described, by its motion, the epicycloidal arc DP. Draw PK and OG perpendicular to CD, and OM perpendicular to PK, and produce PO to meet the generating circle in L, then L will be the point of the generating circle that was in contact with H, and therefore the arcs LE, HE are equal.

Taking the centre of the fixed circle as the origin of the co-ordinates,

Put CK, the abscissa, ... $=x$,
KP, the ordinate, ... $=y$,
Arc HE=arc LE, ... $=z$,
CE, the rad. of fixed circle, ... $=c$,
OE, the rad. of gen. circle, ... $=a$,
OP, the dist. of gen. point from the centre, . $=b$.

Then $\frac{z}{c}$ is the arc of a circle, whose radius is unity, which measures the angle ECH=FOM; and, in like manner, $\frac{z}{a}$ is the measure of the angle LOE, or POF; hence $\frac{z}{c}+\frac{z}{a}=\left(\frac{1}{c}+\frac{1}{a}\right)z$ is the measure of the angle POM: Hence

$$CG=CO\times\text{Cos. ECH}=(c+a)\text{ Cos. }\frac{z}{c},$$

$$OG=CO\times\text{Sin. ECH}=(c+a)\text{ Sin. }\frac{z}{c},$$

$$OM=PO\times\text{Cos. POM}=b\text{ Sin.}\left(\frac{1}{c}+\frac{1}{a}\right)z,$$

$$PM=PO\times\text{Sin. POM}=b\text{ Cos. }\left(\frac{1}{c}+\frac{1}{a}\right)z;$$

Now $x=CG+OM$, and $y=OG+PM$; therefore

(A)

$$x=(c+a)\text{ Cos. }\frac{z}{c}+b\text{ Cos. }\left(\frac{1}{c}+\frac{1}{a}\right)z,$$

$$y=(c+a)\text{ Sin. }\frac{z}{c}+b\text{ Sin. }\left(\frac{1}{c}+\frac{1}{a}\right)z.$$

These two equations express generally the nature of all epicycloids, whether *exterior* or *interior*; because, although in investigating them, we have supposed the generating circle to be without the fixed circle. By a well known principle in mathematical analysis, we have only to change the sine of a and b from + to —, thereby indicating, that the lines which these letters represent, are to be considered as having a contrary direction to that which they had in the former case, and the equations will be adapted to the case of *interior* epicycloids. Epicycloid.

In the preceding equations, the co-ordinates are expressed in terms of the arc, which the generating circle has rolled over, reckoned from H, the middle of the base, (Fig. 12.) but it will be convenient to have them also expressed by the arc described from the beginning of the motion. Draw a straight line from C through A, (Fig. 13.) the first point of contact of the two circles, and let us suppose, that the generating circle has rolled along the arc AE, while the generating point, which was at first at A′, has described the epicycloidal arc A′P. Let Pc meet the circle in N, then the arcs EN, EA will be equal. Produce PO, CO to L and F; draw PQ, OR perpendicular to CA; and OT perpendicular to QP. Put the abscissa CQ=x', the ordinate QP=y', the arc AE=z'; and, as before, put CE=c, OE=a, PO=b. Then the angle OCR, or FOT, is $\frac{z'}{c}$, radius being unity, and the angle NOE, or FOL=$\frac{z'}{a}$, therefore TOL=$\frac{z'}{c}+\frac{z'}{a}=\left(\frac{1}{c}+\frac{1}{a}\right)z'$. PLATE CCLIII. Fig. 13.

$$\text{Hence CR}=(c+a)\text{ Cos. }\frac{z'}{c},$$

$$\text{OR}=(c+a)\text{ Sin. }\frac{z'}{c},$$

$$\therefore\text{TO}=-b\text{ Cos. }\left(\frac{1}{c}+\frac{1}{a}\right)z',$$

$$\text{PT}=b\text{ Sin. }\left(\frac{1}{c}+\frac{1}{a}\right)z';$$

and since $x'=CR+TO$, and $y'=OR-PT$, we have

(B)

$$x'=(c+a)\text{ Cos. }\frac{z'}{c}-b\text{ Cos. }\left(\frac{1}{c}+\frac{1}{a}\right)z$$

$$y'=(c+a)\text{ Sin. }\frac{z'}{c}-b\text{ Sin. }\left(\frac{1}{c}+\frac{1}{a}\right)z'$$

From this solution we may deduce the following consequences:

1. These two sets of formulæ (A) and (B), enable us to find as many points in any epicycloid as we please, by the help of the trigonometrical tables. To do this, we must give particular values to the angle $\frac{z}{c}$, then we must find from the tables the values of the sines and cosines of $\frac{z}{c}$, and of $\left(\frac{1}{c}+\frac{1}{a}\right)z=\frac{c+a}{a}\frac{z}{c}$, and from these, the values of x and y, the co-ordinates of points in the curve may be found; and, in these calculations, regard must be had to the signs of the sines and cosines, as is explained in our article ARITHMETIC *of Sines.*

2. If c and a be commensurable, the indeterminate arc z may be eleminated from either of the formulæ (A), (B), and thence an equation may be found, which shall express the relation of x to y in finite terms. For example, if $c:a::3:2$, so that $\frac{1}{c}+\frac{1}{a}=\frac{5}{2c}$, then, from formula (A),

Epicycloid.

$$x=(c+a)\,\text{Cos.}\frac{z}{c}+b\,\text{Cos.}\frac{5z}{2c},$$

$$y=(c+a)\,\text{Sin.}\frac{z}{c}+b\,\text{Sin.}\frac{5z}{2c}.$$

Put $\text{Cos.}\frac{z}{2c}=p$, and $\text{Sin.}\frac{z}{2c}=q$. Then, by the ARITHMETIC *of Sines*, (Art. 14.)

$$\text{Cos.}\frac{z}{c}=2p^2-1,\qquad \text{Sin.}\frac{z}{c}=2pq,$$

$$\text{Cos.}\frac{5z}{2c}=p(1-12q^2+16q^4),$$

$$\text{Sin.}\frac{5z}{2c}=5q-20q^3+16q^5;$$

Therefore

$$x=(c+a)(2p^2-1)+bp(1-12q^2+16q^4),$$
$$y=2(c+a)pq+b(5q-20q^3+16q^5):$$

by these equations, and the equation $p^2+q^2=1$, p and q may be eleminated; and the result will be an algebraic equation, involving x and y only, which will be the equation of the curve.

Hence it appears, that if the ratio of a to c can be expressed exactly by numbers, the epicycloid will be an algebraic curve, which returns into itself, (*Scholium* to Def.) If, however, a and c be incommensurable, the elemination of z produces an equation of an infinite number of terms, and therefore in this case the curve is transcendental; and in this case also it never returns into itself.

3. As the order of the curve depends upon the ratio of the radii of the fixed and generating circles, it may be worth while to examine some of the more simple cases.

PLATE CCLIII. Fig. 14.

First let us take the case of a circle EPC, (Fig. 14.) which rolls on the inside of another AEH, so as always to pass through its centre C. In this case, $b=a=-\frac{1}{2}c$, because a lies now in a contrary direction; therefore, referring the co-ordinates to the line CA, drawn through A, the first point of contact of the two circles, we have by the formula (B),

$$x=\frac{c}{2}\,\text{Cos.}\frac{z}{c}+\frac{c}{2}\,\text{Cos.}\left(-\frac{z}{c}\right)$$

$$y=\frac{c}{2}\,\text{Sin.}\frac{z}{c}+\frac{c}{2}\,\text{Sin.}\left(-\frac{z}{c}\right)$$

Now, if in the formulæ for the cosine and sine of $a-b$, a and b being any arcs, (ARITHMETIC *of Sines*, Art. 10.) we suppose $a=0$, and observe that then Cos. $a=1$, Sin. $a=0$, we shall have Cos. $(-b)=$ Cos. b, Sin. $(-b)=-$ Sin. b, and therefore $\text{Cos.}\left(-\frac{z}{c}\right)=$ Cos. $\frac{z}{c}$, $\text{Sin.}\left(-\frac{z}{c}\right)=-\text{Sin.}\frac{z}{c}$; therefore

$$x=c\,\text{Cos.}\frac{z}{c},\ y=0.$$

This value of y shews, that the generating point is always in the axis CA, and since the value of x is evidently the cosine of the arc z, or AE, the distance of the generating point from the centre at any time, is the cosine of the arc that has then been gone over. The epicycloid in this case is therefore AB, that diameter of the fixed circle which passes through the point A where the motion begins.

This conclusion is easily proved synthetically. For if upon O, the middle of any radius of the fixed circle, a circle be described to pass through the centre, and meet a diameter in P, and OP be joined, the angle POE is manifestly double the angle ACE; but POE $=\frac{\text{arc PE}}{\text{PO}}$; and $2\,\text{ACE}=2\,\frac{\text{arc AE}}{\text{AC}}=\frac{\text{arc AE}}{\text{PO}}$; therefore arc PE=arc AE, and so P is a point in the line, that would be described by the circle EPC rolling on the inside of the circle AEH.

Epicycloid.

4. Next, let us suppose that the circle EP rolls on the outside of another AEH, of the same magnitude, (Fig. 15.) and that the generating point departs from A, the first point of contact of the two circumferences. In this case, $b=a=c$, and we have by formula (B),

PLATE CCLIII. Fig. 15.

$$\text{CR}=x=2c\,\text{Cos.}\frac{z}{c}-c\,\text{Cos.}\frac{2z}{c},$$

$$\text{PR}=y=2c\,\text{Sin.}\frac{z}{c}-c\,\text{Sin.}\frac{2z}{c}.$$

Let $v=\frac{z}{c}$, then observing that Cos. $2v=2$ Cos.^{2} $v-1$, and Sin. $2v=2$ Sin. v Cos. v, (ARITHMETIC *of Sines*, Art. 14.) we have, after substitution, &c.

$$x-c=2c\,\text{Cos.}\,v\,(1-\text{Cos.}\,v)\quad\ldots\ldots\ldots\ldots\ldots\ldots\ (1)$$
$$y=2c\,\text{Sin.}\,v\,(1-\text{Cos.}\,v)$$

$$\text{Hence}\ \frac{y^2}{(x-c)^2}=\frac{\text{Sin.}^2\,v}{\text{Cos.}^2\,v}=\frac{1-\text{Cos.}^2\,v}{\text{Cos.}^2\,v}\quad\ldots\ldots\ (2)$$

Let us put $x-c=x'$, so that instead of making C the beginning of the abscissæ, we are now to reckon them from A; and let Cos. $v=p$, and we have from equations (1) and (2),

$$x'=2cp-2cp^2,$$
$$x'^2=(x'^2+y^2)\,p^2.$$

From these two equations, let p be eliminated by the usual method, (ALGEBRA, Sect. 13,) and the result will be

$$4c^2\,(x'^2+y^2)=(x'^2+2cx'+y^2)^2,$$

the equation of the curve; which shews it to be a line of the fourth order.

This curve has been called the *cardioide*; it has several remarkable properties: For example, if any straight line be drawn through A, to meet the fixed circle again in V, and terminate in the curve at P and P′, then VP and VP′ are each equal to AH; and, consequently, all lines drawn through the given point A, and terminating in the curve, are equal. By this property, any number of points in the curve may readily be found. Again, if tangents be drawn to the curve at the points P, P, they will form a right angle at X their intersection.

5. As a third particular case, let us suppose the generating point to be in the circumference of the generating circle, and its radius indefinitely great. In this case (Fig. 16.) PE, the part of the circumference of the generating circle between P, the generating point, and E, the point of contact, is to be reckoned a straight line, which being equal in length to the arc AE, the epicycloid is the same curve as would be described by P, the end of a thread PEH, while it was unwrapped from a cylinder or circle AEH, round which it was wound.

Fig. 16.

In this case, we have $b=a=$ an infinitely great quantity; and because, in general, $\text{Cos.}\left(\frac{z}{c}+\frac{z}{a}\right)=$ Cos. $\frac{z}{c}$ Cos. $\frac{z}{a}-$ Sin. $\frac{z}{c}$ Sin. $\frac{z}{a}$; and $\text{Sin.}\left(\frac{z}{c}+\frac{z}{a}\right)=$ Sin. $\frac{z}{c}$ Cos. $\frac{z}{a}+$ Cos. $\frac{z}{c}$ Sin. $\frac{z}{a}$ (ARITHMETIC *of Sines*); when a is infinitely great, then $\text{Cos.}\left(\frac{z}{c}+\frac{z}{a}\right)$