

NEWMAN'S ENTOMOLOGIST.

VOLUME IX.

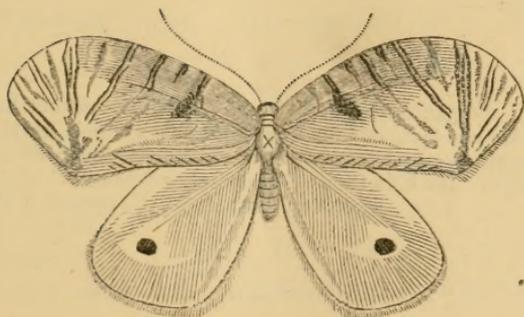
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THE
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VOLUME IX.



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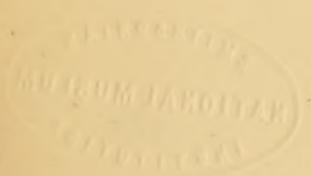
“How many are so regardless,—take so little note of what passes around them, that they would go to their graves without discovering half the beauties of Nature, if no one unfolded its leaves for them; thus losing some of the purest pleasures the embodied soul is capable of enjoying, for want of an interpreter. Such interpreters, while they open to many a new and inexhaustible source of pleasure, are of great utility; and we must love and venerate the man who employs his talents in thus increasing the amount of human happiness.”

EDWARD DOUBLEDAY.

“Reader, our companionship ends here. Should the author have persuaded thee to follow in his footsteps, to tread the paths which he has trodden, to gaze with an inquiring and delighted eye on those things which he has gazed on,—it is enough. He bids thee affectionately—farewell!”

EDWARD NEWMAN, in *‘Grammar of Entomology.’*

“Read his true nature in his works.”



C. F. COLBY,
WATERBURY, D. C.

PREFACE.

It has been the custom in Prefaces to the 'Zoologist' for the Editor briefly to summarise the principal work in Natural History recorded in the pages of the volume; but the author of those pleasant words, after long and faithful service, has at length been called away to his eternal rest. There can be no more appropriate Preface to this, the Thirty-fourth volume, and the last with which he was connected, than some record of a long life heartily devoted to the cause of Nature.

EDWARD NEWMAN was born at Hampstead on the 13th of May, 1801. His ancestors became members of the Society of Friends at the rise of that sect in 1646, and several of them suffered imprisonment on account of their faith, yet they have always remained stedfast to their tenets. His parents, George and Ann Newman, had four children, all sons, of whom Edward was the eldest. Both father and mother had a taste for Natural History, and early inculcated it in their children. One of his brothers writes:—"Edward's love for Natural History was born with him, and this natural taste was fostered by both parents. Our father encouraged us by daily conversation to observe all natural objects: he knew the notes of all the birds of the district, and imparted the knowledge to his children. I well remember him telling us at the breakfast-table that that morning he had heard the chiffchaff for the first time that year, or seen the whitethroat; and we used to record such events in our little note-books. White's 'Natural History of Selborne' was the beloved book of the family; that and 'Bewick's Birds' were referred to almost daily. Our mother taught us the names of all the wild-plants as they came into blossom, and encouraged us to collect and study them." To these books may be added 'Bingley's Quadrupeds,' which was also a great favourite. He himself writes:—"I had a very, very early predilection for butterflies; I may say even from my nurse's arms." And

evidence of early work in Natural History appears in a minute memorandum-book, inscribed in large capitals on the first page:—"Botany. E. Newman," without date, but written in pencil; at so early an age that each letter is formed separately, and occasional pages are devoted to "pothooks and hangers." The following is an extract:—"Of the geranium. The class is Monadelphia. The colour is various, being sometimes white, in others scarlet; its leaf is round, but ragged; there are peppermint-scented and pencil-blossom. There are many other geraniums, but I do not know their names." Then follows a list of the Linnean divisions:—"Dodecandria, Icosandria, Polyandria (many), Didynamia (4), Tetradynamia (6)," &c.

In the year 1812 he was sent to a boarding-school at Painswick, in Gloucestershire, of which Oade Roberts, a member of the Society of Friends, was master, where, in addition to being initiated into classical studies, his love for Natural History was developed. On "10th mo. 29, 1813," he writes home to his mother:—"I take great pleasure in botanizing, but there are not so many flowers as there were when I first came here to school; but still I find some. I shall have great pleasure in showing thee my botanical copy-books when I am at home." This is written in a small neat hand, very different from that in the memorandum-book mentioned above. On "2nd month 3rd, 1815," he is still at Painswick, and writes to a relative:—"I could not give Helen much information with respect to lichens and mosses, as I have only yet studied the first classes; but I am now beginning to study the class Cryptogamia, though the snow has been on the ground ever since I returned." One of his schoolfellows, a cousin, writes:—"We were both initiated into a love for Natural History, which continued to interest us in after years; in his case eminently so. * * * What particularly impressed itself on my mind was the neatness and accuracy of Edward's drawing of a beetle,—so superior to what any of the rest of us could accomplish."

On leaving school, in the year 1817, he went to Godalming, in Surrey,—his mother's birthplace,—to which rural town his father, formerly in business in London as a manufacturer of morocco-leather, had removed on his retirement. The family house is just outside the town, at the corner of the lane

leading to Hatch. The father, however, seems to have been by no means tired of commercial life, for he again entered into business—this time at Godalming—as a wool stapler. This step was probably taken by the good man solely for the sake of his son, in order that on leaving school he might begin a commercial career under parental supervision. For ten years father and son continued in the wool trade; but the study of Nature—for which the neighbourhood of Godalming offered great opportunity—proved a strong counter-attraction to the younger man. He was not energetic in the routine of business, and it is to be feared that his absence from duty was frequent; nevertheless, he was far from idle. Indeed, idleness was foreign to his nature; not only at this period, but throughout life, idleness was in his opinion a positive crime. He held that no man need ever be without work. He knew scarcely any rest: if when he came home there were an interval of only a few minutes before a meal, out would come books, papers, and insect-boxes, and he would at once be deep in scientific work. He was generally in bed by ten o'clock at night, but up again in the very early morning; until his later years he was seldom in bed after six o'clock, and in summer-time he would often be up and at work by five, four, and even three o'clock. After 1840 the greater part of his writing was done before breakfast; he would also write from about seven to nine in the evening; but the greater part of the work was done in the uninterrupted quiet of the early morning.

It was in this spirit of industry that he wandered away from business at Godalming, and sought more congenial pursuits in the lanes and fields, the woods and commons, of the beautiful county of Surrey. Whether shooting blackcock on Hindhead, climbing old hollow trees for owlets, or wandering about the lanes with an insect-net, the mere present pleasure of the occupation was not the principal charm. “When the lengthening days give the first impulse to the feathered tribes to bend their course northward for the breeding season, it is here that I listen for the first notes of the chiffchaff; here I watch for the blackcap, the nightingale, the willow wrens, the garden warblers, the whitethroat; here, hour after hour, have I hunted for their nests,—my object not being plunder, but information. Often

have I covered my hand with scratches, from the prickles of briars and brambles, in my attempts to gain a satisfactory view of a nest and its contents, without causing any disarrangement, well knowing how great was the risk of desertion if the parent birds should discover anything amiss; and, when deserted, if I knew not the builders, a nest was valueless. How well was I repaid for bleeding hands, if I discovered but one point in the history of a species. Eggs strung on bents are rife in all country places; old nests are easy to be seen when the leaves are gone; birds are plentiful in every hedge-row, and their song is the burthen of the passing breeze: but to connect with certainty each bird with its mate; to assign it the proper nest and proper eggs; to learn the exact time of its arrival and its departure;—all this is a study, a labour, rarely undertaken, and affords a pleasure akin to that which must be felt by a traveller exploring countries where man has not before trodden." Let the reader turn to the first chapter of the 'Letters of Rusticus,' from which the foregoing extract is taken, and observe with what microscopic, yet loving and living, detail the natural features of the neighbourhood of Godalming are pourtrayed. No words can give so true an account of these ten years spent at Godalming as the 'Letters of Rusticus.' Extract after extract might be quoted, all to the point, and of exceeding interest; but the short space which can be allowed to this brief memoir does not permit.

It will be noticed that 'Rusticus' is here spoken of as the actual work of Mr. Newman. This brings forward the once-vexed question of the authorship of those charming 'Letters.' To few besides the author's near relatives has the secret been divulged; even Edward Doubleday, his nearest friend and second self, was kept in ignorance of the actual fact, although he, in common with most naturalists, had a shrewd suspicion. When the 'Letters' appeared in the 'Magazine of Natural History' and the 'Entomological Magazine' they caused quite a sensation in Godalming. Written by one who knew Godalming so well, who was so able a writer, as well as so skilled a naturalist; yet no one was able to discover the author. After much discussion they were finally attributed to the late Mr. J. D. Salmon. The veil may now be withdrawn.

revealing Mr. Newman as the author of the whole. Much of the information on the birds and mammals of Godalming was, however, gleaned from his kind friend and frequent companion Waring Kidd, who, now in his eighty-eighth year, still lives at Godalming; and modesty prevented Mr. Newman from assuming the authorship when the facts were not all his own. The 'Letters' having been once begun under a *nom de plume* ('Magazine of Natural History,' 1832, vol. v. p. 601) it was convenient to continue the pleasant fiction. It has probably escaped the notice of many that the last of these 'Letters' were published in 'Chambers' Journal' in 1850, and were on the house sparrow; mice, rats, weasels and stoats; feathered mousers; and squirrels. In one branch of his "Observations," *viz.*, the life-histories of insects injurious to agriculture, Rusticus was a pioneer: no such work had previously been attempted; and, great as is its value, few besides Mr. Newman and the late John Curtis have ever ventured upon it. These chapters on Economic Entomology were continued at irregular intervals in the 'Entomologist,' the 'Zoologist,' and the 'Field,' until towards the close of his life.

In the year 1826 the wool business at Godalming was abandoned. It had never been a very profitable concern; and the parent, now past middle life, was desirous of freedom from commercial occupation. The son had never taken to it kindly.

In the same year Mr. Newman came up to London, and entered into a rope business at Deptford. To a nature such as his—delighting in all the charms of a life in the country—the change to Deptford would have been most distasteful, had it not opened out further opportunities for the cultivation of friendships and society among men of his own tastes. The rope business was to a great extent managed by the foreman, who had held the same post in the wool business at Godalming. It was not allowed to become a drudgery, although to him commerce was never congenial. Only one day in each week was entirely devoted to its affairs; a small part of each of the remaining days sufficed. At the rope-walk he had a large garden, which he subsequently described as a place where everything grew as it liked. A large plot of ground was sown with the common red valerian, because of its attractiveness to insects; and here he

would remain in one spot for an hour or more at a time, mute and motionless, intently studying the habits of some insect, until he had mastered the minutest detail.

At Deptford he had many friends; and of the friendships then formed many ceased only with life itself. Francis Walker, Edward and Henry Doubleday, John and William Christy, Samuel Hanson, and Dr. Bowerbank, were perhaps the most intimate. Not only amongst scientific men, but in the Society of Friends, and indeed in the whole parish, did he find congenial spirits. His keen wit, acute perception, his knowledge, and genial manner, rendered him a general favourite; yet he appeared all unconscious of the charm which he possessed. No one could entertain a greater contempt for shallowness and conceit, for a man possessing knowledge only surface-deep who assumed to be an authority; in fact, for "humbug" in any shape. He scorned to conceal his opinions for fear of giving offence, and did not spare chastisement wherever deserved. His pen was as powerful in caustic satire as in microscopic description; and it was brought to bear with effect in parish affairs, in which he took a keen interest. At one time a part of Deptford was without gas, and, curiously enough, as it seems to us in the present day, there was strong opposition to its introduction. He worked vigorously for the cause of light, and had the satisfaction of success.

During the period of his residence at Deptford he made many excursions with one or other of his chosen associates. Birchwood, in Kent—for many years the place at which the annual dinner of the Entomological Club was held, or, as he puts it, "duly solemnised"—was frequently visited. In Wales, in Scotland, and in Ireland, he also took long walking tours: in all these rambles he was humbly studying Nature, and carefully adding to his already vast store of information. In 1826 his parents had removed from Godalming to Leominster, in Herefordshire; and thus a fresh country was opened out. It was here that his first fernery was formed, a graphic description of which is given in the Introduction to the 'History of British Ferns.'

Notwithstanding his incessant and unwearying work in Natural History, and that a great part of his life had been

spent in constant scientific study, there was no haste to rush into print, for as he himself says, "What is done prematurely has most commonly to be done twice;" and it was not until the year 1831 that his first paper was published. This appeared in the 'Magazine of Natural History,' then edited by J. C. Loudon, and was entitled—"Polyommatus Argiolus, Melitæa Euphrosyne and Selene." His attention at this time and for some few years later—until 1837—was principally devoted to Entomology; indeed, with the exception of the few short letters of Rusticus, in the 'Magazine of Natural History' (1832 and 1833), on birds, the whole of his published writings up to 1838 are upon entomological subjects. It was in 1832, however, that he was fairly broken to literary harness. In that year the 'Entomological Magazine' commenced its career of usefulness: it emanated from the Entomological Club,—a small body of gentlemen, who met socially at each other's houses on one evening in every month. This, the oldest entomological society in the country, was instituted in 1826 by Mr. Samouelle, author of the 'Entomologist's Compendium;' and he and Messrs. Davis, Hanson, and Newman, were the original members. At this time (1832) the Club consisted of the Rev. C. S. Bird, Messrs. W. Bennett, J. S. Bowerbank, William Christy, jun., John Curtis, A. H. Davis, E. Doubleday, S. Hanson, J. Hoyer, E. Newman, F. Walker, and J. J. Walton. Of these fathers in Entomology all but two have passed away. It was not surprising that such men should feel the need of a journal devoted to their science. The "Introductory Address" is of considerable interest, and sets forth that the projectors anticipate no profit, but have undertaken the work "with a disinterested desire to promote the progress of a science to which they confess themselves zealously attached." Mr. Newman was chosen Editor, and threw himself heartily into the work. In the first volume, out of sixty-three articles fifteen are from his pen,—many written under pseudonyms,—in addition to elaborate editorial notices of new books. Amongst his writings in this volume attention may be called to the beautiful lines "On the Death of Latreille" (p. 320), as well as to the "Entomological Sapphics" (p. 432), professing to be translations from the Persian, Arabic and Greek, but in

reality emanating from his genius alone: entomologists have not often been also poets. Mr. Newman continued to contribute freely in succeeding volumes, writing under various pseudonyms—"Corderius Secundus," "E. N. D.," "Rusticus," and others,—as well as in his own name. The five volumes of the 'Entomological Magazine' give the reader a more intimate personal acquaintance with him than any of his books or subsequent writings. It was, perhaps, a feature in his journalism that he and his readers became at once acquaintances, and after a while actual friends; indeed, many who made his friendship through his writings never saw him, yet have felt his loss as keenly as though they had been constantly in his society. In addition to the members of the Club the following well-known scientific men were amongst the contributors to the magazine:—Messrs. Babington, Dale, Douglas, Haliday, Hewitson, Shuckard, J. F. Stephens, Swainson, Waterhouse, Westwood, and Yarrell, all of whom were more or less personal friends. Edward Doubleday was Editor of the second volume, Mr. Newman of the other four.

It was in 1832 that Mr. Newman's first important publication appeared,—a demy 8vo. pamphlet of 56 pp., entitled, 'Sphinx vespiformis: an Essay;' with the motto:—

"All are but parts of one stupendous whole,
Whose body Nature is, and God the soul."

This clever attempt at classification created a considerable stir, and met with strenuous opposition.

In the year 1833 he was elected a fellow of the Linnean Society; and in the same year he took an active part in establishing the Entomological Society of London, which Society may be said in great measure to have sprung from the Entomological Club, then of the respectable age of seven years. He was elected a member of the first council; Mr. Kirby, honorary President; and Mr. Children, President. During the succeeding years, in addition to editorial work, he wrote occasionally in the 'Magazine of Natural History,' and contributed various papers to the above Societies.

In the year 1835 the 'Grammar of Entomology' was published; a most useful little book. "The author supposes his reader utterly ignorant of Entomology, and endeavours to show

him that it is the History of Insects, and the Physiology of Insects, and the Classification of Insects, and the Art of Preserving Insects." This book soon went out of print.

In 1836 the laws and regulations of the Entomological Club were codified; Mr. Newman was re-elected Curator, and Mr. Walker, Secretary; and an appeal was made for contributions of insects and books. This appeal was most liberally responded to, many gentlemen, Mr. Newman amongst the number, giving their whole collection; and other valuable donations of insects were received. So liberal were the donations that the Club had to choose between building a museum and paying a curator, or disposing of all but the British insects. Eventually the bulk of the collection was presented to the British Museum. The second regulation is—"That the Cabinet and Library be open at the house of the Curator, 21, Union Street, Deptford, on the Friday in every week during the months of January, February, March, April, September, October, November, and December." This practice of throwing open his house to naturalists on one evening in the week was continued until 1841. From that year until 1849 the Club cabinets were under the care of Edward Doubleday and of Francis Walker. On Mr. Newman's removal to York Grove, Peckham, in 1849, he resumed the curatorship, and in 1856 the weekly assemblies. He always looked forward to the company of his friend Mr. Jenner Weir on these occasions; indeed, it was in great measure owing to his kind assistance in after years, when health was failing, that they could be continued. In a letter to him, dated 8th September, 1856, 5.45 A.M., he writes:—"I am re-arranging the Lepidoptera belonging to the Entomological Club, and am doing this solely for the purpose of assisting beginners, who are almost daily applying to me for names. I purpose being at home at six o'clock every Thursday evening for this especial purpose. You will see that the Collection ought to be in better condition than it now is, or I shall not be so useful as I could wish. This idea is not new: I did the same thirty years ago, and continued the practice for many years; but other cares intervened, and the cabinets went to poor Doubleday, whose generous disposition was not qualified for a curatorship, and under him the Collection

became reduced to a mere skeleton,—he gave and lent to everyone whatever they asked of him.” This one night in the week was sacred to its purpose: no engagement—not even illness—was allowed to interfere. It was always a pleasure to him to afford information, especially to young men, and they would avail themselves freely of the opportunity. Older naturalists, too, would often come, and their company was a great pleasure to him. In the earlier days this evening was no great undertaking; but in later years it was almost more than his powers permitted. He would come home weak and tired, and needing rest; or he may have been at home ill during the whole week: but Friday evening always found him at his post, ready to show the Collection, or patiently to name captures even if of no great interest or rarity. Of the many young men who were welcomed, few knew how a kind and courteous manner sometimes concealed bodily suffering. The Entomological Club is now in its fiftieth year; and, with the exception of the eight years mentioned above, its Collection has always been under his care, and much of his time was devoted to it.

In 1837 he abandoned the rope trade, and wrote to a relative as under:—“I am wholly without any definite prospect as regards business, having entirely given up my own, which was a very small affair. * * * I am very indifferent as to any business engagement, as it is always so great a tie, and cannot be abandoned for any length of time without something like a dereliction of duty: moreover, I think that the opportunity for enjoying life will with me shortly expire, and I am desirous, while blest with strength and health, of visiting the country, and breathing the air of mountain-wilds unchecked by the necessity of returning on a certain day.”

In the foregoing a record will be observed of that melancholy which, not only at this period but throughout life, at times beset him: it was not often of long duration, nor had it any real cause. Only a short time before, he had written:—

“To me long life-time, though to thee forbidden,
Perhaps may be granted.”

Thus showing that the erroneous idea that his life would be short had only recently been entertained.

It will be seen that he had already paid a visit to Wales:

this was just prior to the letter, in company with his friends John and William Christy; and of this visit he wrote in the Introduction to the 'History of British Ferns.'

He was now freed from the cares and restraints of business; but no great journey was the result. Having begun to work at ferns he became fairly engrossed with his subject, as was always the case with everything he undertook. But still he was only studying, not writing, or at least not publishing; for, as has been already observed, he never published until his subject had been thoroughly grappled with and mastered. His first paper on ferns appeared, it is true, in 1838; but it was not until 1840 that the 'History' appeared, although the first edition only reached to 104 pages.

In June, 1839, he went to Ireland, whither he had made an excursion with his friend William Bennett a year or two previously. Starting alone from Newry, knapsack on back, he went northward, and so round the entire coast, until the tour finished at Dublin, in August. Throughout the whole trip he had paid especial attention to ferns, and collected a mass of information concerning them. But every natural object, in whatever branch, was of interest to his cultivated mind; and in the "Notes on Irish Natural History" (1840), entomological, ornithological, and botanical observations, generally, are to be found.

December of the same year found him still without a business, but working hard at the 'Ferns;' not only writing the letter-press, but drawing the illustrations; for the whole of the beautiful drawings which illustrate it—figures, tailpieces, and landscapes—are the product of his careful pencil. Especial attention should be called to the fern scutcheon, with the motto, "Elegantia et Humilitate," on the title-page. The book was published early the following year, and was soon out of print. It was printed by George Luxford, the printer of the 'Magazine of Natural History,' which Mr. Newman was then temporarily editing, and thus they were associated. The 'Ferns' having gone off so well there was inducement to publish other books. Mr. Luxford was a botanist and of literary ability, and therefore somewhat of a congenial spirit. Mr. Newman was about to be married, and in want of a business. The idea, therefore, occurred to effect a

partnership, and print his own books. This was done; and he once more commenced business—this time as a member of the firm of Luxford & Co., Printers, Ratcliff Highway, at the sign of the “Bouncing B.” On the accession of an entomological partner the “B” received an insect shape, and was used as a trade-mark. Next year, however, Mr. Luxford was bought out of the business; and the printing-office was removed to Devonshire Street, Bishopsgate, where Mr. Newman conducted it until 1870, when he retired from business in favour of his son.

In June, 1841, the ‘Phytologist’—a monthly botanical magazine—was started, and was conducted with great spirit for some years: Mr. Luxford was editor; but Mr. Newman wrote frequently, and was responsible for the work. It was never commercially successful; and on the death of its editor, in 1854, it came suddenly to an end. Dr. Trimen, writing in the ‘Journal of Botany,’ remarks:—“The thanks of British botanists are due to Mr. Newman for the possession of that valuable repertory of the progress of their department for thirteen years.”

After his marriage, Mr. Newman resided for two years in Welleclose Square, being then a near neighbour of Mr. N. B. Ward, whose beautiful, “closely-glazed” fernery, in one of the worst parts of London, was a constant delight. The “stitching parties” at Mr. Ward’s brought together many botanists.

Mr. Newman having now settled down to a business more congenial than either of the former ones,—namely, printing books on science,—he gave up his former country wanderings, and went to work in earnest. But although thus closely occupied he was by no means debarred from his scientific studies. In 1840 the ‘Entomologist’ had been commenced, taking the place formerly occupied by the ‘Entomological Magazine,’ Mr. Newman being Editor, and contributing freely. In 1841 he published the ‘History of Insects,’ of which he says:—“This little book was observed as a caterpillar, in 1835; in 1837 it disappeared, and remained concealed as a quiescent and lethargic pupa, until, roused by the genial influence of the present spring, it has burst its cere-cloths, and assumed the ornamented wings of a gay and volatile butterfly.”

At the end of 1842 the ‘Entomologist’ was discontinued; but

with January, 1843, commenced the 'Zoologist,' of which the founder lived to conduct an uninterrupted series of thirty-three annual volumes,—a circumstance probably without parallel in the history of journalism throughout the world. He would often look at the row of red volumes on his bookshelves with a quiet pleasure, not unmixed with a certain pride. The following extract from the Preface to the first volume gives, in his own words, an idea of the character and scope of the journal:—"The attempt to combine scientific truths with readable English has been considered by my friends as one of surpassing rashness; and many have been the kind and pressing solicitations I have received to desist from a labour so hopeless; many the supplications to introduce a few Latin descriptions, just to give the work a scientific character. In reply to my friends, I would beg to instance White's 'Selborne.' That most delightful of histories is written in pure, plain, intelligible English, and has found ample favour in the eyes of the public. White is now no more; but his mantle has fallen upon others: a multitude of observers have arisen in the same field, and, what is more to my purpose, have become contributors to the pages of the 'Zoologist.' Nature herself is exhaustless; our field of observation is wider, a thousand-fold, than White ever enjoyed; our capacity for observation is certainly not less. These are the grounds I have for hoping that the 'Zoologist' will succeed." The practice of writing Natural History in simple English, thus rendering it interesting even to those not deeply versed in Science, was one on which Mr. Newman strongly insisted. In the lists of contributors to the pages of the 'Zoologist' appear the names of almost every British naturalist of note.

In 1844 the second edition of the 'Ferns' made its appearance, the first having gone rapidly out of print. In the second edition the work had increased from 104 to 424 pages. The Equisetaceæ and Lycopodiaceæ were added, as was also such a mass of additional information that the work was almost rewritten, and hardly to be called a second edition, deserving to rank as a new book. From this time—with the exception of the collected 'Letters of Rusticus' (1849)—until the publication of a third edition of the 'Ferns,' in 1854, he brought out no new book, his time and thought being sufficiently occupied with

business and with editorial duties. There is no volume of the 'Zoologist' that does not contain numerous articles from his pen: these are upon Entomology, Ornithology, and other branches of Natural History; and many are of considerable importance. With him it was not sufficient to work out only one branch of a science, or even all the various ramifications of that one science: with whatever he undertook he made himself thoroughly familiar. He had taken up the study of Natural History, and everything connected with it was of interest to him,—whether Quadrupeds, Birds, Reptiles, Fishes, Insects, or Plants; he was familiar with every branch of every subject.

In the year 1850 he read before the Zoological Society, an ingenious paper proposing a new Physiological Arrangement of Birds. The new system, however, met with slender support, and considerable opposition.

An essay "On the Employment of Physiological Characters in the Classification of Animals," the result of most careful thought, was published in 1856. These two papers are full of information, and the reasoning is very acute. Some naturalists are still of opinion that Mr. Newman's views have been too much disregarded by modern systematists, especially as to the proposed division of birds into two great groups, *viz.* Hesthogenæ and Gymnogenæ: the former containing those birds which produce their young clothed with down, eyes open, and capable at once of running and feeding themselves; the latter, those birds which produce their young naked, blind, and helpless.

The 'Insect Hunters,' or Entomology in verse, appeared anonymously in 1858: it was written for beginners, and gives an insight into the hidden mysteries of the science in simple language. The author discourses pleasantly to a young friend on "The Four Stages of Insect-life:" "Metamorphosis;" "The Scale Wings;" &c. There is a charming little poetical Preface. Although anonymous, the author was at once suspected. The book was quickly out of print; and a second edition, bearing the author's name, was published in 1860. In this appeared several other poems, written at an earlier date.

In 1858 Mr. Newman became Natural-History Editor of the 'Field,' and continued to hold that post until his death. The Natural-History department of that paper, however, largely

increased, and other editors were added. Amongst his papers in the 'Field,' those on economic entomology are of the greatest value; and there can be no doubt that it will be long before his "life-histories" are superseded. Amongst the master-pieces are those of the goat-moth; gooseberry grub; turnip grub; daddy-longlegs; and pear-tree slug: these valuable contributions were continued to within a month of his death, as a column and a half of the 'Field' for May 13th, 1876, is taken up with his "Life-history of the Sandfly, or Simulium." He wrote of these papers:—"My object in penning these notes is to bring the creature face to face to face with his victims; for unless we know our enemy—his appearance, his ways, and his whereabouts—all our attempts to compass his destruction must be futile." Before his time it was usual to consider all insects found on plants as "blight," and to purchase some proffered nostrum in order to destroy them. No one seemed to consider it possible that some insects might be useful, seeing that others were so obviously hurtful. The articles on the inmates of the Crystal Palace Aquarium—popularly written, yet full of information—are also worthy of considerable attention.

From 1858 to 1861 Mr. Newman was engaged on a series of articles in 'Young England' on Insects and Birds. At the same period he acted as Natural-History Editor of the 'Friend' for about two years, writing a column or two in each month's issue of that newspaper.

In March, 1861, Mr. Newman had the gratification of receiving a Testimonial—consisting of scientific books—from about seventy gentlemen, in "high appreciation of services rendered in the promotion and diffusion of scientific knowledge." Mr. Newman had very properly refused to allow his own journal to be used as a means for advertising the testimonial to himself, and by this action many were led to believe that the project was distasteful, and held aloof. The books, however, besides being of great use and pleasure to the recipient of the testimonial, were highly appreciated by his Friday-night visitors. A full history of the transaction will be found in the 'Zoologist' for 1861 (Zool. p. 7457), but modesty seems to have prevented it being indexed.

Mr. Newman's writings had of late years assumed a more ornithological complexion; and in 1861 his small work, entitled

—‘Birdsnesting, being a complete description of the birds which breed in Great Britain and Ireland,’ made its appearance. Three years later, however, he was once more engaged on the old favourite subject—the ‘Ferns.’ The price of his beautiful book was necessarily comparatively high; and many low-priced fern books, by other writers or compilers, had made their appearance. In order to compete with these, a fourth edition of ‘British Ferns’ was published in 1864: it was of smaller size and considerably lower price, and illustrated with steel-plates instead of by woodcuts, as in the former editions. The Introduction, as well as that to the former editions, may be noticed as among the most charming of Mr. Newman’s writings.

The ‘Zoologist’ had, since 1860, been growing more and more bulky: double numbers were frequently resorted to, and yet space could not be found for all the worthy communications that were received. In order to cope with this *embarras de richesses*, the ‘Entomologist,’ which had been merged in the ‘Zoologist’ in 1843, resumed its separate existence in 1864. A large part of the entomological communications at once went over to it, and the difficulty was at once satisfactorily met. From that time the ‘Entomologist’ has been steadily increasing in public estimation; and its circulation is, for a purely entomological periodical, unprecedentedly large.

Mr. Newman had long felt the want of a book of reference on British birds. Montagu’s ‘Ornithological Dictionary’ was a most valuable book, but it was half a century out of date; it had long been out of print, and was very scarce. The idea occurred that what was a desideratum to himself must certainly be so to others. The fourth edition of ‘British Ferns’ being now completed, and the ‘Entomologist’ fairly launched, he at once set to work. With the help of Selby’s ‘Illustrations of British Ornithology’ (1833), Yarrell’s ‘History of British Birds’ (1856), the ‘Zoologist,’ and the ‘Field,’ he laboriously brought the work up to date, giving a reference to Yarrell’s figure of the bird, and Hewitson’s figure of the egg. The editorial additions are naturally very great, and are separated from the original by editorial brackets. The ‘Dictionary of British Birds,’ a demy 8vo, extending to 400 pages of small type closely printed, was published in 1866.

On its completion, Mr. Newman made preparations for continuing the 'Illustrated Natural History of British Moths,' which was commenced in 'Young England.' Five numbers (80 pp.) had been brought out by Mr. Tweedie, in direct contravention of Mr. Newman's wish, and without his knowledge: for these five numbers, written at a much earlier date than the remainder and not printed under his supervision, he never would hold himself responsible. It will be seen at once that they are incomplete, and stand sorely in need of the care bestowed upon the rest of the work. Mr. Newman was eventually induced to continue the work, and having once consented he, as usual, laboured with all his heart. The descriptions of the perfect insect and of the larva are most careful and accurate, indeed almost microscopic. The figures, of which there are more than eight hundred, were drawn and engraved under his own superintendence. In all his former works the woodcuts had been drawn by himself, and engraved by Mr. Kirchner; but now the allotted span of life was nearly reached, and his artistic powers had failed. The engraver was the same, however; and the beauty and accuracy of the figures are in great measure owing to his care and skill. This book came out in monthly numbers, the last one appearing in June, 1869, when the complete volume was published.

Immediately upon the conclusion of 'British Moths' (486 pp. super-royal 8vo), the companion work was commenced,—'An Illustrated Natural History of British Butterflies' (1871), on which even greater care was evinced, as especial attention was given to geographical distribution. These two works form the text-book of British Macro-Lepidoptera.

'British Butterflies' was written in Mr. Newman's seventieth year, and was his last complete work. Two years previously he had retired from business, but by no means from labour. He was at first actively engaged on the above-mentioned work, and on its completion the 'Zoologist,' the 'Entomologist,' and the 'Field,' kept him fully occupied. He was often to be seen at the Crystal Palace Aquarium, and the result of the visits is to be found in various papers in those journals. In the year 1868 he had built an aviary in his garden, and this was a constant source not only of recreation, but of study. There he would sit, until the birds became so tame as to fly to him on his

entrance and feed from his hand. In "Notes of my Bird Cage" (Zool. S. S. 3157) will be found an account of his success in breeding the little Australian parrakeet (*Melopsittacus undulatus*): he possessed upwards of thirty at one time, all bred in the aviary. A diary of the birds, after the manner of Gilbert White, was carefully kept, and short notes frequently appeared in the magazines. He had a great affection for all living animals, and could not bear to see anything suffer, even for its own good. He frequently visited the Zoological Gardens, always intent on gaining information; and in his later years was earnestly at work on a new classification of birds. One of his friends writes, with reference to these visits to the Zoological Gardens, and to the proposed classification of birds which he did not live to complete, and of which but few fragments remain:—"For forty years a visit to the Zoological Gardens has been one of my greatest enjoyments; but with Mr. Newman, who was my frequent companion, the pleasure was very much enhanced. He would stand to watch the movements of that remarkable bird, the Caviama (*Dicholophus cristatus*); its position amongst birds was to him a puzzle, but he at last, I am inclined to think, regarded it as a Raptorial bird, as classified by Mr. Sharpe, of the British Museum. He attached great importance to the mode by which a bird progressed on the ground, and he exhibited almost a childish delight when he first observed that eagles hopped. Natural History was to Mr. Newman not only an intellectual scientific study, but was also an absorbing passion." He was at this time devoting as much attention to Entomology as to other branches of Zoology, making an especial study of the Gallflies and their productions, of the Sawflies, and the Bees,—the latter chiefly with a view to observations on the fertilisation of plants by their agency. His "Collected Observations on British Sawflies" were laid aside for years, and their revision and publication in the 'Entomologist' was only commenced shortly before his death. It is hoped that further instalments may yet appear, containing his later views on a natural classification of Insects,—a subject which had continuously occupied his thoughts since 1834.

The end was now drawing near. In February, 1873, he had

had a severe illness, from which, although unknown to all but himself, he never entirely recovered: it preyed upon his spirits, and lessened that mental grasp which had hitherto characterized him. Towards the end of May, 1876, he again became seriously ill; and although at first it was thought that with his vigorous constitution he would overcome the disease, as he had done previously, he became worse. Further surgical assistance was called in, but to no purpose; and on the 12th of June, 1876, acutely conscious to the last, he passed peacefully away. In his last illness he was patient, and without care or any anxiety. He was interred at Nunhead Cemetery.

Mr. Newman was a Fellow of the Linnean and Zoological Societies, of the Royal Microscopical Society, and of the Zoologico-Botanical Society of Vienna; he was also an original member and, in 1854, President of the Entomological Society of London; an honorary member of the Entomological Societies of France and Pennsylvania, of the Botanical Society of Edinburgh, and of several minor societies: but the only title on which he set value was that of *Academiae Cæsareæ Naturæ Curiosorum*,—the Imperial Academy of Leopold Charles of Austria, consisting of the forty most distinguished naturalists known to the council throughout the world; each takes the cognomen of one of the original members,—his was that of “Latreille.” Membership of this learned body conferred the title of Doctor, but he was too modest to use the title. Ostentation of every kind was distasteful to him, and he derided it in others; indeed, he prided himself on the opposite extreme, and his manner of life was especially simple and retiring.

The following extracts, from kindly letters written by Mr. Cordeaux, Captain Hadfield, Mr. Frederick Smith, and Dr. Bowerbank, may fittingly be appended to this memoir, and are but types of many. In writing this sketch of a useful life, difficulty has been felt in condensing the material that has offered: much that would have added to its interest has been reluctantly omitted for want of space.

“His loss is no common one, for all who have known him for so many years, through his writings and as a correspondent, can testify to the invariable and ready way in which he imparted information: he has done more in his long life of usefulness

than any of his contemporaries to foster and encourage a love of natural science. The 'Zoologist,' alone, will ever remain a monument of his indefatigable industry; and, as a storehouse of facts for the working naturalist, will be continually quoted in all future works bearing on its special branches of English Zoology."

"We, his friends and admirers, have lost one whose equal we may vainly seek, for he was a man of wonderful power of mind, of great judgment, a profound thinker, an able writer; and, from his great experience in editorship, better qualified than any of our naturalists for conducting a popular journal like the 'Zoologist.' Ever ready to instruct and encourage, too, the student of Nature; never censorious or dictatorial, though his patience at times must have been sorely tried."

"The name of Edward Newman is inseparably associated with the list of those who have themselves advanced natural science, and who have done all in their power to help and encourage others in the field in which they have so successfully laboured."

"He was esteemed and valued by all who knew him. His life was usefully and honourably spent in the pursuit and dissemination of knowledge; and the results of his labours, as published, are a more durable and honourable monument than either bronze or marble."



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[PRICE 6d.

Descriptions of Oak-galls. Translated from Dr. G. L. MAYR'S
'Die Mitteleuropäischen Eichengallen' by E. A. FITCH, Esq.
(Continued from vol. viii. p. 291.)

Fig. 34.



APHILOTHRIX GLANDULE.

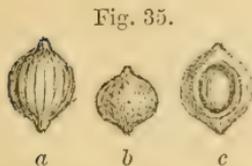
- a.* Natural size of gall in situ. *b.* The same magnified.
c. Section of the same.

34. *Aphilothrix Glandule*, Hart.—The gall is conical, swelling out at its base, and assuming a turban-like form; the lower part of this base is surrounded by the scales of the axillary bud, while the upper part projects from the bud. This gall attains a longitudinal diameter of six millimetres, and has the same length at the base. When fresh the gall is green, and covered with snow-white, silky, recurved, smooth hairs. The top of the gall carries a mastoid process, yellow and naked. The section generally exhibits two cavities:

the upper one—the larger of the two—is egg-shaped, and surrounded by a thin whitish layer (of the inner gall); the lower cavity—extending in a horizontal direction—is either empty or filled with a spongy reticulation.—*G. L. Mayr.*

Dr. Mayr gives no *Synergus* as inhabiting this gall, but undoubtedly there is one, as in a letter from Mr. Rothera relating to this gall, which he has found at Ollerton, near Nottingham, he says:—"On making a longitudinal section of a third gall, I found at the base the same irregular decaying space as before; but in the neck of the gall three chambers, separated by septa, and each containing a well-developed maggot." This clearly points to *Synergus*. As Dr. Mayr does not give the time of appearance of the gall, I may say Mr. Rothera found it first on the 27th of August, and later immature specimens on the 28th of September, but in a different year; so the immature gall is probably to be met with throughout the autumn.—*E. A. Fitch.*

35. *Aphilothrix Clementinæ*, Gir.—This spherical gall is about the size of a pea (five millimetres). Its base is insignificantly elongate, and has at its summit, exactly opposite, a short conical projection. It is of a brownish yellow colour, and several small, flattened, conical projections are irregularly scattered over its surface, which is slightly rugose and sprinkled with hairs, which are recurved in the direction of the base of the gall.



APHILOTHRIX CLEMENTINÆ.

a, b. Galls of *A. Clementinæ*.

c. Section of the same.

Near the top, however, and especially below the more or less distinctly-marked point, the growth of these hairs is more abundant. The section exhibits two layers of the consistency of leather: the exterior one is thin and yellow; the interior also thin and red-brown, enclosing a large spherical cavity, in which the yellow spherical inner gall lies loosely. Director Tschek informed me by letter that he had found this gall lying on the ground under high trees of *Quercus sessiliflora*, on the topmost branches of which tree it appears to grow. The gall seems to fall late in the autumn, generally after the first frost. Director Tschek noticed in those galls which had recently fallen that they still retained the bud-like scales at their base. Frauenfeld

and Tschek succeeded in breeding some flies as early as February and March, the greater number, however, not appearing before the following October and November.—*G. L. Mayr.*

In a subsequent note Dr. Mayr has the following (second half, p. 68):—"On the 2nd October, 1870, I found, near Gutenstein, in North Austria, the still green galls of this species, in great numbers, on the ground under high trees of *Quercus sessiliflora*, some of which were surrounded by the bud-scales. From hundreds of these galls a single gall-fly emerged on the 23rd March of this year (1871), so that I may expect a great number in the autumn." Again, in the 'Verhandlungen' for 1872 (vol. xxii.), he tells us that "from the Gutenstein galls of this species I bred at the end of February, and particularly in March (1872), a great number of the gall-maker. On the 8th October, 1871, I also found in an oak wood, near Vienna, some galls under large trees of *Quercus sessiliflora*." *Synergus melanopus* and *S. vulgaris* were bred from the galls by Dr. Mayr. Curiously, the gall from which the original description was taken by Giraud was found under a tree by a very young person at Wiener-Neustadt.—*E. A. Fitch.*

Life-histories of Sawflies. Translated from the Dutch of Dr. S. C. SNELLEN VAN VOLLENHOVEN by J. W. MAY, Esq.

(Continued from vol. viii. p. 125.)

CIMBEX FEMORATA, L.

Larva and imago:—*Brischke und Zaddach, Beobachtungen über die Arten der Blatt-und Holzwespen (in Schriften der K. physikalisch-ökonomischen Gesellschaft zu Königsberg, 3er Jahrgang, 1862), p. 252, and the authors quoted.*

Cimbex (mas) violaceo-nigra, antennis tarsisque luteis; (fœm.) lutea, thorace fusco-piloso, abdominis basi cingulo nigro-violaceo.

The indigenous Cimbeices form four groups:—*C. humeralis, Fourc.*, stands by itself, and *C. Amerinæ, L.*, is equally distinct; *Lucorum, Vitellinæ* and *Betuleti, Kl.*, form the

third group (if one may say of the two former that they each separately form a group); and there remain in addition *C. connata*, *Schr.*, *Sylvarum*, *F.*, *Femorata*, *L.*, and perhaps *Fagi*, *Zadd.*, respecting which it is not yet proved, not only whether it be indigenous, but also whether it be a species.

This last group was regarded by Klug and subsequently by Hartig, following the first-named author, as forming *one* species, *Cimbex variabilis*, which name I adopted in my first catalogue. It is, however, quite certain, and has been shown by repeated observations of its metamorphosis, that *C. connata*, the first species in my new catalogue, is a distinctly separate species; its metamorphosis is described and figured in the seventh volume of this publication* (p. 59 *et seq.*, pl. 1 and 2). With about equal certainty, chiefly relying on the different coloration of the female, it may be taken that *Sylvarum*, *F.* (*Betulæ*, *Zadd.*), is a true species. Perhaps *Fagi* will have to be referred to this last species; this is, however, doubtful, if, as *Brischke* considers, the larva displays fixed distinguishing characteristics, and feeds exclusively on beech. There remains, lastly, one other species, feeding on willows, and which will form the subject of this paper. There is, however, another difficulty with regard to this species. *Brischke*, who found these insects in great numbers, divides them into two groups: the one, which remains of a sordid green colour during the whole of its larval existence, lives, according to this author, on smooth-leaved willows; the other, which at the latter period of its larval state becomes reddish, or even flesh-coloured, lives on the leaves of the goat-willow (*Salix capræa*). I have never seen these red larvæ, but, at the same time, I have never met with *Cimbex* larvæ on the goat-willow. This being so, we are not much concerned with the question whether this larva, which is only known to us by description, really represents a species or not. Nevertheless, should the pale variety *Pallens* be produced from it, and, as *Brischke* asserts, from it alone, it would occur in the neighbourhood of *Arnhem*.

Although willows are very numerous in our well-watered country, the larger insects inhabiting this species of tree are never met with in large quantities. Perhaps excursions,

* 'Tijdschrift voor Entomologie'; translated in 'Zoologist' for July, 1869.

undertaken at the right times, along our rivers, on the banks of which scarcely anything but various species of willow is to be seen, would amply repay the trouble. I have not as yet tried this method of search, and have but seldom met with *Cimbex* larvæ on willows growing along the roads or ditches. I am thus by no means able to say as regards our country, as Brischke says of the environs of Dantzic, that the present species is numerously represented in it; on the contrary, I am bound to state that it is of very infrequent occurrence. Besides having been taken by me, the larva has been found by C. B. Voet, the celebrated Lyonet, and Messieurs H. Gerlach and F. J. M. Heylaerts, jun.

The following are the observations of the first-named writer in his manuscript work, dedicated to the stadholder, William III.:—"I found this larva on willow trees. In crawling it principally makes use of its six sharp anterior claws; for the rest it has, besides these, sixteen very short, blunt feet or processes, with which it attaches itself very strongly to the leaves, according to my notion, in the same way as boys lay hold of the stones by means of pieces of leather; but, as far as I have observed, it only makes use of the eight feet immediately following the sharp claws, simply dragging along the rest of the body bent round underneath. It very seldom moves or crawls about, lying almost always curled up, with the tail against the anterior feet and the head. It fed on willow-leaves up to late in September, and then crept into the refuse of rotting leaves," &c.

Lyonet writes as follows, in his work, '*Recherches sur l'anatomie et les métamorphoses de différentes espèces d'Insectes*, pp. 168, 169:—"La mouche dont on va parler naît d'une fausse-chenille encore à vingt-deux jambes et dont le onzième anneau est le seul qui en est dépourvu. Elle vit de feuilles de saule et a un pouce et sept lignes de longueur. Je suis porté à croire que c'est la même dont parle Goedaert, tom. i., expér. 64, et qu'il prend pour une chenille véritable. Il dit pareillement que la sienne vivoit des feuilles du même arbre, mais il ajoute qu'elle ne faisoit qu'un repas par jour, et vécut chez lui deux ans et vingt-quatre jours sans manger ni agir: aussi ne marque-t-il pas qu'elle ait changé de forme, ce qui pourroit bien n'être provenu que de ce qu'elle ne se portoit pas bien, ou avoit été gardée dans un lieu trop froid;

car le froid, ainsi qu'il est connu, retarde les fonctions animales des insectes, et les suspend même entièrement quand il parvient à un certain point; de sorte qu'un animal peut rester ainsi des années dans un état d'entière léthargie et de parfaite inactivité, sans mourir, et peut reprendre ensuite toutes ses fonctions lorsqu'on le transporte dans un air tempéré. Quoi qu'il en soit, les miennes firent leurs deux ou trois repas par jour; et après s'être repues, elles se courbèrent en hélice ou limaçon, comme la sienne, ainsi qu'on la voit représentée fig. 22, en se tenant couchées sur la feuille dont elles vivoient et accrochées par les six pates antérieures, avec une force suffisante à pouvoir braver les vents assez violens. En juillet, mes fausses-chenilles de cette espèce, sans que j'aie remarqué qu'elles eussent premièrement quitté leur peau comme le font grand nombre de celles de leur classe, entrèrent en terre. Elles s'y firent des coques ovalaires, passablement unies, dont la forme, un peu rétrécie vers le milieu, se voit fig. 23, et qui, pour la couleur, ressembloient à du cuivre rouge mat, et par la dureté pouvoient résister à une pression de quelque force. L'insecte s'y changea en une nymphe blanchâtre, à yeux noirs, dont tous les membres se distinguoient aisément, et étoient arrangés ainsi qu'on le voit par devant fig. 24, et de côté fig. 25. Il n'y avoit que les ailes, qui ramassées en tas, et appliquées contre les côtés de la nymphe, se terminoient entre la seconde et la troisième paire de jambes, qui ne se reconnoissoient pas si bien. J'eus en juin de l'année suivante des mouches mâles et femelles de ces fausses-chenilles, et ainsi après moins d'une année de jeune."

After these two quotations I can considerably shorten my description. I never observed the egg: this is probably inserted by means of the robust ovipositor of the female in a cut made by her saw in a twig of the willow. The larvæ which I found had already moulted for the second or third time: they then resembled, except as to size, the full-grown larva represented at fig. 1. The head and body are of a gray greenish yellow; a bright blue stripe extends along the back, beginning just behind the head and terminating very near the anus; this stripe is of a darker tint between the folds. The whole body is transversely divided into folds, on which are fine white grains or points. There are twenty-two

legs. The spiracles are bordered with black, the margins being somewhat expanded on the under side, so that they present the outline of a hart's hoof; above them are the orifices of the glands.

This larva differs from that of *Connata* in the absence of the yellow lines on the back next to the blue stripe; also in the ground colour being less green, and in having no row of darker dots above the spiracles; the skin below these is also less verrucose. From the larva of *Sylvarum* it differs in being less yellow and more of a gray tint; the head also is darker, and the dorsal stripe begins higher up and extends further; it is also more verrucose below the spiracles.

As regards food, *Femorata* eats the leaves of the willow, while *Connata* feeds on alder, and *Sylvarum* on birch.

Femorata lives in the larva state from June to August or September. It does not pass the pupa state on the branches, but makes its cocoon in the mould or at the roots of the trees. The cocoon is of a dark colour. The insect only enters into the pupa state a fortnight or three weeks before its emergence as an imago, which, like the other species, gnaws off a piece of the cocoon. Some larvæ remain two winters or, more accurately, a year and a half in the cocoon.

The only difference between the male of this species and that of *Connata* is that the wings do not exhibit any blue tinge. I do not consider it necessary to give a detailed description of this insect; a comparison of figs. 4 and 5 with fig. 16 of plate 2, vol. vii., first series, will suffice. I should only say that the colour of the body appears to me to be darker, while the antennæ are more entirely red. I cannot, however, state confidently that these characters always prevail.

The female also differs very little from that of the species mentioned. The thorax, which is more of a bronze colour in *Connata*, is, together with the head, in this species more thickly covered with woolly, brownish yellow hairs. The purple of the abdomen is in this species much blacker, has less of a coppery tint, and generally does not extend so far backwards: for example, in *Connata*, segments 1 and 2 and a triangle on segment 3 are of that colour; in *Femorata* only the first segment, with triangles on the centre of two or more succeeding segments.

At fig. 6 I have represented the tarsus of one of the posterior legs enlarged, in order to show more clearly the singular little soles which are found on the under sides of the joints, and consist of a flat disk with a thick projecting muscular border. In the catalogue I named this species *Cimbex lutea*: this is the Linnean name of the female. I adopted this name on the authority of Zaddach. I see, however, that Linnæus first described the male, which he called *Femorata*; and I therefore think it is more reasonable to adopt this latter name, unless one were to drop both names as being collective names of certain species which he regarded as *one*; in which case precedence would have to be given to the name adopted by Brischke and Zaddach, namely *Cimbex Saliceti*.

The female variety Pallens, which, according to the above-mentioned authors was also reared from larvæ feeding on willows, differs in the following particulars:—The dorsum of the thorax is of the same loamy yellow as the margins of the prothorax, and has only a wedge-shaped brown spot on the mesothorax; the abdomen, in the two examples with which I am acquainted, is entirely yellow, without any dark purple band or spots; lastly, the legs are entirely yellow, and the outer margin of the anterior wings is clouded with brown. There is no record of the place where these two examples were taken, so that I cannot confidently assert that they are indigenous.

An Attempt to Arrange the British Eupithecidæ by their Larval Characteristics. By C. S. GREGSON, Esq.

At present, look where we will, we find this genus so muddled and mixed in our various books and lists that it seems evident our authors were, or are, little more than mere compilers, not one of them having shown any knowledge of the relationships of these most interesting groups of Lepidoptera. Thus we see in one list *Togata*, which is not an *Eupithecia* at all, placed between *Juniperata* and *Pumilata*, the larvæ of which differ much from each other; whilst in another work we have *Assimilata*, with its long, slender larva, placed between *Minutata* and *Tenuiata*, two larvæ which I think almost as far removed from each other as it is

from either of them; and again, in another list, we have the long, slender, cylindrical larva of *Subfulvata* of Haworth preceding the stout, swelled-out larva of *Succenturiata* of Linn., followed by the long, slender larva of *Centaureata*, which is followed again by the short, broad larva of *Linariata*. Here, I think, we see how utterly chaotic our *Eupithecidæ* are placed; and in order to clear up the British species, and place them somewhat more naturally, I have annexed a list, drawn up and arranged entirely from my own knowledge of the larvæ of this genus. Had I obtained any assistance from any of my friends the arrangement might have been more perfect; but they might have had to share the blame of any shortcomings. As it is, I alone am blameable; but as I am not acquainted with the larvæ of more than six or eight of the forty to fifty European *Eupithecidæ* which are not British, I make no pretence of placing the British species as I might do had I bred nearly the whole of them, as I have bred the British species. I may say, I treat one or two species, now in our list, as mere aberrant forms of good species, and I also reject *Venosata* and *Togata* as not being true *Eupithecias*: it may be that some of the continental *Eupithecidæ* might connect them with Curtis's genus in my mind if I knew these larvæ; but, in the absence of such knowledge, I prefer to reject them, or at best to place *Venosata* before the true pugs. Its larva being so different from any other European pug-larva I know, and utterly unlike any British pug-larva, I shall then for perspicuity group our British species from the form of the larva; and as I have found, during many years pug breeding, that this is a pretty general guide to markings also, though not absolutely so, I shall follow the annexed plan.

Larva shortish, broad from head to anus.—*Venosata*.

Larva short-attenuate.—*Plumbeolata*, *Isogrammata*, *Pygmeata*, *Helveticata* = *Arceuthata*, *Tenuiata*, *Rectangulata*, *Pumilata*, *Debiliata*, *Valerianata*.

Larva medium and stout.—*Trisignata*, *Pulchellata*, *Linariata*, *Succenturiata*, *Satyrata*, *Expallidata*, *Albipunctata*, *Companulata*, *Knautiata*, *Minutata*, *Absynthiata*, *Subnotata*.

Larva long, cylindrical, generally tapering to head.—*Consignata*, *Castigata*, *Virgaureata* = *Pernotata* (*var.*), *Iringuata*, *Vulgata*, *Abbreviata*, *Dodoncata*, *Exiguata*, *Pimpinellata*, *Centaureata*, *Subfulvata*, *Nanata*.

Larva slender.—Lariciata, Pusillata, Fraxinata, Innotata, Indigata, Constrictata, Assimilata, Coronata.

I have placed Coronata last in the arrangement, because I hardly know a better place for it. I may say of Togata I know nothing of its larva, though I spent a jolly day at Black Park, Bucks, with my old friend the late Edward Hopley, after the perfect insect, in July, 1862; and the description given in Ent. Mo. Mag. vol. ix. p. 114, being without size or shape, does not help me to place it. The author, it is true, gives some characters, but these only confound confusion; he says, "central," "dorsal," "subdorsal," &c.; and as I have always thought the dorsal line or marking was the central line or marking (on the back), I begin to think "things is getting mixed," when we have both central and dorsal, especially as further on he says: "An odd, internal-looking animal, strongly resembling a miniature *Cossus ligniperda*"! but as I fail to find any remarks about the red marks or blotches so conspicuous upon the larva of *C. ligniperda*, I cannot connect them, or see any resemblance from this vague description. I purpose placing this insect in a new genus; and with one more remark shall close this paper. Egenata is another form, which I treat as a variety of Innotata; hence have omitted it from the list of species.

I am aware that some of my friends will differ from me in this, but, nevertheless, I hold to my opinion at present. When I am shown I am in error, I shall gladly admit that I did not know as much to-day as I may to-morrow; and nothing will give me more pleasure than to be corrected, if, trusting to my memory of our pug larvæ (some of them not having been bred or even seen by me for nearly twenty years), I have misplaced or malplaced them, my object being simply to place them less incongruously than they at present stand in our books and in our cabinets.

C. S. GREGSON.

Rose Bank, Fletcher Grove, Edge Lane,
Liverpool, October 3, 1875.

Notes upon Sugaring, during September and October, 1875.
By WILLIAM W. KEYWORTH, Esq.

THE following notes upon sugaring I have taken during last September and October, with the object of finding out,

if possible, some data which can be relied upon with some sort of certainty as to what sort of night is likely to produce a good haul of Lepidoptera. The sugar I used was always about one half-pint of common black treacle, with about a tablespoonful of rum; and I always sugared the same trees.

1. Day fine, towards evening cloudy, with slight south-west wind and heavy dew. A very fair number.

2. Day dull and close, with very heavy thunder-storm in the middle of the afternoon, after which there was a brisk wind from the west. A great number before the moon rose, after which I found very few.

3. Day fine, with wind from the west, sky clear, and no dew. Only three very common species.

4. Day fine, with no wind, cool in the evening, and no dew. Nothing at all except a few earwigs.

5. Day fine, but dull towards evening, no dew, and a good deal of wind. Very few of any kind.

6. Very fine day, cloudy towards evening, with a slight dew and gentle south-west wind. A moderate number.

7. Very windy day, with alternating cloud and sunshine; the wind dropped towards evening, and there was a slight dew. About twenty specimens of common species.

8. Very fine day, cloudy and close in the afternoon and evening, with a slight west wind and dew. A great many of all sorts.

9. Very stormy and wet morning, which cleared up about noon, and the wind dropped to a light breeze from the west; the vegetation very wet with the rain in the morning. Numerous species.

10. Day rather cold and windy, but warmer towards evening, with a slight dew. A very large number of common species.

11. Very close day, with a light west wind, and a slight dew in the evening. A great number.

12. Magnificent day, without a cloud, but extremely windy, and a very slight dew. Nothing at all.

13. Very warm day (with a good many butterflies about), with hardly any wind and no dew. Very fair number.

14. Very fine day, but rather misty, which increased towards evening, and the grass very wet. Only four common ones.

15. Very fine day and close, with a moon in the evening, no dew. Nothing at all.

16. Day fine, with two or three slight showers, and very misty at night, with no wind. Ten or twelve common species.

17. Windy day, with a few showers in the morning: in the evening the wind subsided, and the grass remained wet from the rain in the morning. A great number before the moon rose.

18. Morning very wet, with strong west wind. It cleared up in the afternoon when the wind dropped. A very fair number.

19. Day cloudy and close, with wind from the west, which increased about eight o'clock. Very fair for about twenty minutes, after which there was hardly anything.

20. Dull day, with rather a strong wind from the south, which abated towards evening; very cloudy, and a slight dew. Very great number.

Judging from the above notes, I find that as a rule fine or showery days—with a west or south wind and some sort of moisture on the grass, either rain or dew, and no, or at least a very young, moon—are good, if the wind is not too strong; whereas a dry night, or when the wind is north or east, is usually bad.

WILLIAM W. KEYWORTH.

Alderley Edge, near Manchester.

Notes on Oviposition. By the Rev. P. H. JENNINGS.

(Continued from vol. viii. p. 218.)

I SEND you a few more notes on oviposition, which will bring what I have to say to a close till next season.

A. scutulata.—A female, taken August 12th, laid thirty-seven eggs: twenty-five on the 13th and twelve on the 14th. Of these thirty-one were deposited on the under surface of the leaves, four on the upper, and two on the stem of food-plant, *G. Mollugo*; some were laid singly and some in batches, varying in number, the largest seven: oval, slightly flattened on both surfaces; attached to the leaf or stem by the small end; cream-coloured, not glossy; surface covered

with minute, circular, convex markings. Signs of fertility began to appear in reddish specks on the sides, together with a deepening of colour throughout. The young larvæ appeared on the seventh day, August 25th.

S. vetulata.—Three females, taken the first and second weeks in July, laid a number of eggs on the ground, without any adhesive property: oblong, equally rounded at both ends; whitish, with the faintest yellow tinge, partially glossy. The deposition of the eggs did not take place till some time after the females had been taken. They were fed, and survived till the month of August. The eggs are now, November 18th, of a light brown.

S. rhamnata.—Two females, having been fed about a fortnight, laid twenty eggs on August 3rd and thirty-two on August 4th: oblong, equally rounded at both ends; bright yellow; became orange-coloured on the fourth day, of which colour they still remained on November 18th.

C. picata.—A female, taken July 16th, laid thirty eggs: a few on the under surface of the leaves of the food-plant (*G. Mollugo*), the rest pressed closely amongst the stems of the blossoms and the leaflets springing up around them: oblong, equally rounded at both ends; white, with faintest greenish tinge, partially glossy.

P. H. JENNINGS.

Longfield Rectory, Gravesend,
November 18, 1875.

Entomological Notes, Captures, &c.

Description of the Larva of Cidaria populata.—As there is such a slight description of the larva of this species in 'British Moths,' I think a more complete one will not be considered out of place in the pages of the 'Entomologist.' I may say here, that although I have reared a large number of these larvæ, I have never seen any of the "green-tinted" forms mentioned by Mr. Newman. This year I fed up two broods from eggs obtained from moths captured last season, and from them the following notes were taken. The eggs were deposited about July, 1874, and began to hatch on the 3rd of April of the present year. The newly-emerged larvæ

were dark greenish brown, the sides yellowish green, and the head dark wainscot-brown. They fed up well on bilberry; and on the 3rd of June, being full grown, their description was taken as follows:—Length about an inch and a quarter, and of average bulk in proportion. The head has the lobes rounded, but is rather flat in front, and is slightly broader than the 2nd segment. Body tolerably, but rather unevenly, cylindrical, tapering a little towards the head; there is a slight lateral ridge, which on the 3rd segment takes the form of a distinct swelling. The skin has a tough appearance and is rather rough; there are a few exceedingly minute hairs upon it; the segments slightly overlap each other, rendering the divisions distinct. The ground colour varies in different specimens from a median shade of brown to almost black, the great majority, however, being of the paler type. In these the head is of the same colour, with two median pale lines, and a reddish brown mark on the side of each lobe. On the dorsal surface is a series of large, pale, almost diamond-shaped whitish marks, each of these marks being more or less mottled with brown spots and streaks; those on the posterior segments are the largest and most conspicuous; those on the others indeed vary very much both in size and distinctness, in some being confused and not so noticeable. The pale whitish subdorsal lines are distinct only on the 2nd, 3rd and 4th segments, being a continuation of the two pale lines on the head; the space between these pale lines is filled up by a short black stripe, and on the 3rd segment (the swollen one) is a transverse black collar. Along the spiracular region, on the lateral ridge, are a few dull reddish brown marks. The ventral surface and claspers are of the same shade as the ground of the dorsal surface, but there is a distinct, narrow, dark brown central line, rather broadly bordered with pale grayish white. Legs brown. The cocoon is very slight, and is formed by drawing together with silken threads a few old leaves. The pupa is about five-eighths of an inch in length; the eye-, leg- and wing-cases prominent; the anal tip pointed. Colour pinkish brown, the wing-cases streaked with dark brown; dorsal line broad, dark brown; behind the head it divides into a V-like mark; there is also a dark brown ventral stripe from the base of the wing-cases to the anal tip. The first imago emerged on the 21st of June.—*Geo. T. Porritt; Huddersfield, November 2, 1875.*

Exportation of Humble-bees to New Zealand.—Some months ago I was waited upon by a gentleman who gave me to understand that he called by desire of Mr. Frank Buckland to ask my advice as to the best method to be adopted in order to introduce some species of our humble-bees into New Zealand, the object being the fertilisation of the seeds of red clover, there being no bee in the colony whose tongue is long enough to effect that purpose. After some consideration of the matter I gave my opinion, and I still adhere to it. I have been greatly surprised by reading an extract from 'Nature' of the 14th of October last, by which I learn that Mr. Frank Buckland has sent two nests of humble-bees, packed in their own nests in two boxes, under the charge of a member of the New Zealand Council,—I suppose of the Canterbury Acclimatisation Society. I should be glad to hear of the success of this undertaking, but for several reasons I am of opinion that the result will prove an utter failure: be that as it may, I wish it to be distinctly understood that the method adopted is not one of my recommending. On reading that "the bees were packed in their own nests," I conclude the species was one of the surface-builders—"moss-builders" they are usually erroneously called, since the majority of the nests of these bees have little or no moss used in their construction. The species is not particularised, but I may, I think, safely conclude that it was *Bombus Muscorum* or *B. senilis*. These are not such hardy species as some of those that construct their nests under ground, and therefore not species I should recommend for exportation. The surface-building bees found in Great Britain are seven in number, and all these finish their labours and disappear several weeks before the hardier species. The nests sent would, I presume, contain male, female, and worker bees. My observations of humble-bees have extended over thirty-five years, and I believe that the impregnation of females never takes place in the nest; I also believe that it always takes place in the open air, and that no impregnated female ever returns to the nest. When this act has taken place, the female, in my opinion, at once seeks for a suitable hybernaculum in which to pass the winter. I therefore conclude that none of the females in the nests sent are impregnated, and I anticipate that the broods will perish on the voyage; or, if by great care any arrive at New Zealand, it will only

be a few unfertile females. Having expressed somewhat reluctantly my opinion,—so adverse to the desired success,—I will state what I believe to be the only plan that can be adopted with any hope of success. In the first place, I should not think of attempting to introduce any surface-building species. I should select two or three of the hardiest ones,—such as *Bombus terrestris*, *B. Lucorum*, *B. Hortorum*, and *B. subterranea*. In order to make the chance of success as great as possible, I should take care to send only impregnated females: these can now be obtained, all the humble-bees having retired to their winter-quarters. A number of such females were required some years ago for scientific purposes: a collector was employed, who searched under my own instructions. The result was that he obtained in a few days over fifty females, all in a torpid state. My plan would be to get a number of such torpid bees, and, by some of the best-known means of refrigeration, keep them in a state of torpidity during the voyage. This once accomplished, success would be certain. Humble-bees survive four or five months of torpidity, and they can now be exported in a much shorter time than five months. This is the plan I recommended when applied to, and I should certainly not have thought of trying an experiment which I fear will prove a total disappointment.—*Frederick Smith*. [From the 'Field.']

Additions to the List of Macro-Lepidoptera inhabiting Guernsey.—*Sesia Megillæformis*?—Having noticed that the *Sesia* mentioned in a previous list (Entom. viii. 30) as *Ichneumoniformis* seemed somewhat different from the usual type, as figured in Newman's 'British Moths,' I sent it to the late Mr. H. Doubleday, with an enquiry as to whether it had been correctly named. The following was Mr. Doubleday's reply:—"I do not possess a *Sesia* exactly like the one you sent. It is very closely allied to *Ichneumoniformis*, but the yellow bands on the abdomen are fewer, and the caudal tuft is not exactly the same. I never saw the *Megillæformis* of Hübner; but Dr. Staudinger gives it as a variety of *Ichneumoniformis*, and says there are only three yellow bands on the abdomen." *Nonagria geminipuncta*.—One specimen taken, flying to the light of my lantern at the Grande Mare, Vazon, on September 1st. *Xylina petrificata*.—One specimen taken at ivy-bloom, October 14th.—*W. A. Luff*; *Guernsey*.

List of the best Insects captured at or near Whittlesford during the past Season.—(Those marked * I had not previously taken here).—**Sesia formiceformis*.—Nine taken amongst osiers, July 27th. *S. apiformis*.—Thirty or more bred from pupæ dug. **Hepialus hectus*.—Very common in one wood. **Nudaria senex*.—Forty taken by myself and friend flying over rushes, July 10th, from 8 to 8.30 P.M. *Orgyia fascelina*.—One male bred from larva.—*Lasiocampa quercifolia*.—One full-fed larva found. *Epione apiciaria*.—A few amongst sallows. **Selenia illustraria*.—One fine male netted. *Amphydasis prodromaria*.—One at rest and one at light. *Geometra papilionaria*.—One attracted by light. *Iodis vernaria*.—Five or six netted over clematis. *Corycia taminata*.—Two netted in June. *Eupithecia isogrammata*.—Very common over clematis. **Lobophora sexualisata*.—One at rest on a hawthorn-stem. **L. hexapterata*.—Two males netted in May near aspen. *Ypsipetes impluviata*.—One bred from pupa under alder-moss. *Melanthia albicillata*.—One only, taken by a friend. *Anticlea sinuata*.—Six bred from the six larvæ recorded last year; none this year. *A. rubidata*.—Two netted in June. *A. derivata*.—One netted in May. *A. berberata*.—Seven or eight over a barberry-bush. *Coremia quadrifasciata*.—Two worn ones netted. *Phibalapteryx tersata* and *P. vitalbata*.—Three or four netted over clematis. *Scotosia certata*.—Seven flying round a barberry-tree. *Platypteryx unguicula*.—Three females bred, and two males netted. **Cymatophora duplaris*.—One at sugar in garden. **C. ocularis*.—Two bred, and two more pupæ dug. *Acronycta strigosa*.—Two at rest and one at sugar in garden. **Leucania pudorina*.—One at sugar in garden. *L. comma*.—Four at light. *L. straminea*.—Fifty-five bred from larvæ found in May. *Nonagria typhæ*.—Two bred from pupæ. *N. geminipuncta*.—Fifteen bred from a large number of pupæ. *Calamia phragmitidis*.—Saw traces of larvæ; also one larva. *Neuria saponariæ*.—Three at light in June. *Cerigo cytherea*.—Common at light, sugar, &c. **Miana literosa*.—Five at sugar in garden. *Agrotis saucia*.—One at sugar. *A. ravida*.—Common at sugar and light. *Tryphæna interjecta*.—Common, flying very swiftly. *Noctua rhomboidea*.—One at sugar in garden, August 17th. **Tæniocampa populeti*.—

Three at sallow-bloom, March 31st. *T. munda*.—Seven at sallow-bloom, March 30th. **Xanthia citrigo*.—Two at sugar in garden. **X. cerago* and **X. silago*.—Very common at sugar. **X. gilrigo*.—Sixty or seventy at sugar in garden. **Cirrædia xerampelina*.—Twelve bred from larvæ found in May. **Tethea subtusa*.—One at sugar in garden, July 21st. *Eremobia ochroleuca*.—Two larvæ feeding on darnel, and one bred; they would not touch cock's-foot grass. *Hecatera dysodea*.—Three at light and one at rest. **Epunda lutulenta*.—Twelve fine ones at sugar in August. **Agriopsis aprilina*.—One bred from pupa dug. *Xylina semibrunnea*.—Forty at ivy-bloom and sugar. *Dysthymia luctuosa*.—Several seen and one taken. *Toxocampa pastinum*.—About a dozen taken, more common than usual, and very much earlier. *Aventia flexula*.—One fine female at sugar.—*A. Thurnall*; *Whittlesford, Cambridgeshire, Nov. 17, 1875*.

Captures of Lepidoptera.—I have the pleasure to inform you that I have been fortunate enough to add to my collection during the past season a fine specimen each of *Noctua flammatra* and *H. scutosa*. They were both taken near Norwich on July 10th and August 11th respectively. They were captured at light by a young friend who was collecting for me, and came into my possession while quite limp. Unfortunately, I had provided my friend with some rather long pins amongst others, and one of these he passed through the thorax of *N. flammatra*, not knowing the rarity of the insect. In order that the insect should go into my cabinet, which, being home-made, had very shallow drawers, I was foolish enough to remove about one-tenth of an inch from the head of the pin with a pair of pliers, and thereby cause a suspicion as to its being a genuine English specimen. This should prove a word of warning to fortunate captors of scarce insects. I have, however, not the slightest doubt as to its capture in Norfolk; though the fact of it having been taken within twenty miles of the North Sea goes towards establishing your theory that the majority of our greatest rarities have been blown over from the Continent. To *H. scutosa* the same remarks apply, though fortunately it is properly pinned. I may mention that these insects form a most valuable addition to the list of Norfolk Lepidoptera, and should be very pleased at any time to show them, by appointment, to

Mr. Barrett, or any other entomologists from that county. I have taken during the past and preceding seasons about a dozen specimens of *H. armiger* from the same locality, though they, with few exceptions, are by no means in good condition. This also is an addition to the Norfolk Fauna. In conclusion, I would advise collectors never to call a locality unprofitable until they have tried the attraction of light. The following are among the captures I have lately made by its employment:—*S. Convolvuli*, *L. quadra*, *E. dolobraria*, *A. prodromaria*, *N. dictæa*, *N. dictæoides*, *N. trepida*, *N. chaonia*, *N. dodonæa*, *C. ridens*, *L. cespitis*, *A. saucia*, *C. xerampelina*, *E. ochroleuca*, *C. chamomillæ*, &c.—*W. H. Thornthwaite*; 416, *Strand, W.C.*, November 19, 1875.

Lepidoptera at Newcastle-on-Tyne.—I have few novelties in Lepidoptera, the capture of which to report during the past season. Those most worthy of note are one *Ennomos erosaria* in Thornley Woods, in September; a fine male, just escaped from the pupa. Three *Oporabia filigrammaria* came to light near the town; no heather grows within two or three miles of the place of their capture; without doubt the larvæ feed on willows or sallows. Also one specimen of the pretty little *Pyralis fimbrialis*. Notwithstanding the cold and wet summer we experienced in the North, insects were rather plentiful, more especially Noctuæ; the common species appeared in swarms. Also Tortrices seemed more abundant than usual; the best of my captures were three or four *Peronea umbrana*. Butterflies were very scarce, with the exception of *Pieris Brassicæ*; the second brood being more abundant than I have noticed for several years.—*W. Maling.*

Sphinx Convolvuli near Newcastle, Staffordshire.—A very fine *Sphinx Convolvuli* was brought to me this autumn (end of September), which had been knocked down in this parish, and captured by a working man. Having fallen into inexperienced hands it had unfortunately got a good deal rubbed. It was a very large specimen. I fancy North Staffordshire is an unusual locality for this fine moth.—*[Rev.] Thomas W. Daltry; Madeley Vicarage, Newcastle, Staffordshire, November 23, 1875.*

Sphinx Convolvuli and Epunda nigra at Rugby.—I have had three specimens of *Sphinx Convolvuli* brought to me this season, taken at rest here; others have been seen, but

unable to get them. I also took at sugar one stormy night, about the end of September, a specimen of *Epunda nigra*; it was on a post in some gardens; I have not found another. I believe this is a new locality.—*Walter S. Edmonds*; 28, *Lawford Street, Rugby, November 20, 1875.*

Acronycta Alni and *A. pyrophila* at *Stratford-on-Avon*.—I have taken a caterpillar of *Acronycta Alni*. Is it a very great rarity? I have also taken several specimens of *Agrotis pyrophila* at sugar; they were never taken here before.—*Charles Marée*; *Stratford-on-Avon, October 4, 1875.*

Agrotis saucia at *York*.—I have pleasure in recording the capture of a fine specimen of *Agrotis saucia* on the 6th of October. Also a rather worn one of *Xanthia gilvago*. *Calocampa vetusta* came to sugar on the 16th, one specimen, along with numbers of *C. exoleta*.—*T. Wilson*; *North View, Holgate, York, October 20, 1875.*

Answers to Correspondents.

J. Parker.—"Are there Two Broods of *Papilio Machaon* in a Season?" (Entom. viii. 301.)—This question does not yet appear to be satisfactorily decided. The time of emergence of this species from the chrysalis state seems to be very uncertain. If I may judge from experience those produced from eggs laid in May do not *always* emerge the same year, as one is given to understand by Lewin, but the majority producing imagos the following May or June. On the 3rd of August, 1874, I procured, at Ranworth, four dozen chrysalides of *Papilio Machaon*, one of which emerged on the 6th and two on the 7th of the same month; all the rest made their appearance as imagos in May and June, 1875. In previous years I have noticed the same circumstance. In July, 1875, I brought from the Norfolk fens a quantity of larvæ of this species, which in due time reached the chrysalis state, one of which emerged about three weeks afterwards, and a perfect specimen from the same stock came out on November 26th, the temperature of the room being 36° Fahr. It lived six days in an apparently dormant state. Is not this rather extraordinary?—*Robert Laddiman*; *Norwich.*

Alfred Aspincall.—*Names of Moths*.—Would you kindly name the three moths enclosed? No. 3 seems to me greatly

to resemble *Barrettii*, the general colour and the white spot at the anal angle of the under wing leading me to this conclusion.—*A. A.*

[(1) *Amphipyra Tragopogonis*, (2) *Hydræcia nictitans*, (3) *Hadena dentina*.—*Edward Newman*.]

G. B. Corbin.—*Cnethocampa pityocampa* and *Argynnis Niobe*.—Where is *Cnethocampa pityocampa*? I am led to make this enquiry from the fact of having been somewhat surprised last season at the very common occurrence of this species in Kent, and the silence which has prevailed this year with regard to its occurrence. Is the species so thoroughly British that no question can be raised as to its authenticity, or has my isolated position as a collector prevented me from recognising the well-known fact? Surely if the species was so common as represented upon fir-trees, they have not been exterminated in one season's collecting, assiduously as that might have been carried out; or did the continued rains and floods of spring and early summer destroy the hopes of this season with this particular species? Again, has *Argynnis Niobe* been taken this season at the bottom of that particular "huge rent" amongst the rushes in Kent, or has that also disappeared with *Cnethocampa pityocampa*? If I mistake not, it was stated in the 'Entomologist,' at the time of the occurrence of *Argynnis Niobe*, that a pair were to be figured in its pages; but the non-appearance of these portraits seem to point to the fact that some doubt existed as to the thoroughly British origin of the specimens in question. Did such a doubt exist? To persons like myself, who live away from the great marts of entomological specimens and information, the news of a new species added to our native Fauna is regarded with perhaps greater interest than we should otherwise experience; and with regard to the two species, *Cnethocampa pityocampa* and *Argynnis Niobe*, I must say my interest and curiosity were awakened, but it certainly has not been satisfied; possibly, however, I have felt some bias from the doubts expressed about the thorough genuineness of all these specimens at the time of their capture. I understand that *Argynnis Niobe* has unquestionably been taken in England once or twice, which is perhaps sufficient to establish its identity as a British insect; but I had hoped that this season would have recorded its further occurrence in that particular locality in Kent,

which county seems to have become quite an emporium for entomological rarities.—*G. B. C.*

[I am much obliged to Mr. Corbin for these enquiries. I cannot believe in the Kentish captures of these two species, in this respect differing from my lamented friend Henry Doubleday, who was so honest and truthful in all his statements that he was ever willing to credit those of others. When I penned the paragraph to which Mr. Corbin alludes, I certainly intended to figure *Argynnis Niobe* as British; but the specimen in my possession on further information proved so questionable that I postponed the drawing and engraving *sine die*. I have received records of the capture of twenty-six specimens of *Daplidice* and a round dozen of *Podalirius*, which I suppress for the same reason.—*Edward Newman.*]

Extracts from the Proceedings of the Entomological Society of London.

NOVEMBER 3, 1875.

Sir Sidney Smith Saunders, C.M.G., President, in the chair.

This being the first meeting of the Session, the President read the following address:—

Gentlemen,—On the opening of our new Meeting Room and Library, at the commencement of the present Session, it may be fitting to inaugurate our reunion and installation here by a few introductory remarks. Your Council has long been conscious of the many inconveniences experienced from the former inaccessible position of our Library at Bedford Row and its disconnection with our Meeting Room, conceded to us by favour of the Linnean Society at Burlington House. The numerous additions, moreover, to our bibliographical collection having superadded want of space to other exigencies, it has been deemed expedient to provide for these requirements in combination with some other Society capable of affording us adequate accommodation. By the unremitting exertions of our Secretary, Mr. Grut, this has finally been accomplished; and although the advantages of bringing our Library and Meeting Room into juxtaposition in a more central site must necessarily involve a certain increase in our annual expenditure, it may not unreasonably be anticipated

that the beneficial influences resulting therefrom will not be confined to those only who now muster in our ranks, but will also constitute a source of attraction to others. Arrangements have likewise been made whereby, as already intimated in convening this meeting, our Library will be open to Members and Subscribers every Monday from two to seven o'clock, as heretofore, and on every Wednesday and Friday from two to five o'clock, instead of one day in the week. I must also bring under your notice that we are indebted to the liberality of one of our Members for a further proof of the interest which he has on several occasions exhibited on behalf of this Society, in providing for the entire expense of transferring our Library to this locality, as well as of the glazed book-cases and fittings requisite for its reception. In connection with these ameliorations it has been found necessary to alter the days hitherto appointed for our meetings from Monday to Wednesday, the former day in each week being already appropriated to the meetings of the Medical Society. Our Anniversary Meeting, however, will still be held on the third Monday in January, as prescribed by the Bye-Laws, but at an earlier hour,—namely, five o'clock in the afternoon. It has also been deemed opportune to revert to the former custom, as originally provided by the founders of this Society, of holding our meetings in the first week of each month throughout the year, instead of having certain bi-monthly meetings to obviate the difficulty arising from the closing of the rooms at Burlington House during the summer recess. Having thus adverted to the changes, made with a view to promote the interests of this Society and the convenience of its Members, I would further draw your attention to the expansion which it has been deemed advisable to give to the usual custom of introducing friends at our meetings, by throwing open our doors to all entomologists indiscriminately on this occasion as appertaining to one and the same system, actuated by corresponding impulses, and influenced by similar attractions in common with ourselves. Our policy is not one of exclusiveness, but rather that of fostering and developing new sources of emulation from within and from without, which can best be effected by cultivating a closer intimacy with those who are fellow-labourers in the same field. To all such we tender a hearty welcome. I would venture, in conclusion, to suggest to some few of our most

esteemed Members, who are habitual absentees, the benefits which they might be enabled to confer by returning to our horizon from their remoter orbits in the realms of ether, and shedding new lustre upon our discussions. We are each of us more or less liable to be called upon in various ways to satisfy the importunities of conventional obligations; and in looking forward to the future as fraught with propitious augury, we must rely upon the zealous co-operation of all to improve our vigour and efficiency. We will now proceed, Gentlemen, to the ordinary business of the evening.

On the proposal of Mr. Sheppard, seconded by Mr. Bates, it was agreed that the thanks of the meeting be given to the Members of Council and the Secretary for the trouble they had taken on behalf of the Society in making arrangements for the new Meeting Room and Library, and in removing and entirely re-arranging the collection of books. Also, that the thanks of the meeting be given to the Member who had so generously aided the Society by undertaking to provide the expenses of removal to Chandos Street.

Mines of Heliozela sericiella.—Mr. Boyd exhibited specimens of the mines of *Heliozela sericiella*. He had succeeded in rearing the insects, by confining them with a young oak-plant, and thus was enabled to discover their habits, of which nothing had hitherto been known. The mines were formed in the foot-stalks of the leaves.

Female of Enoicyla.—Mr. M'Lachlan exhibited a living apterous female of a Trichopterous insect, *Enoicyla* (probably *E. pusilla*, *Burm.*). He had recently bred it, with others, from cases forwarded to him by Mr. Fletcher, of Worcester, the discoverer of the insect in this country. Mr. M'Lachlan gave an account of its structure and singular habits. The perfect insects emerge in November, the males being furnished with ample wings.

Coleoptera.—Mr. Champion exhibited examples of the following Coleoptera recently captured by himself, *viz.*, *Cryptophagus Populi* (varying greatly in size and colour), taken from the burrows of *Colletes Daviesana*, near Farnham, Surrey; *Orchestes semirufus*, *Gyll.*? from Woking; *Epuræa neglecta*, beaten from faggot-stacks at Darenth Wood; and *Psammodyus porcicollis* from Whitsand Bay. The last-named had been taken by Mr. S. S. Walker.

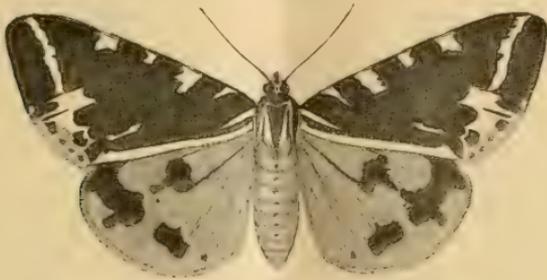
THE ENTOMOLOGIST.

No. 152.]

FEBRUARY, MDCCCLXXVI.

[PRICE 6d.

Variety of Callimorpha Hera. By EDWARD NEWMAN.



CALLIMORPHA HERA (the upper figure represents a variety).

I AM indebted to the kindness of Mr. Luff for the opportunity of figuring this beautiful variety of a species which is but little known to English collectors. An illustration of the normal form of Hera has already appeared in the pages of the 'Entomologist,' and is reprinted here in order to afford

readers an opportunity of comparing with the variety. It will be observed that the oblique cream-coloured stripes which adorn the normal insect are in this aberration partially or altogether wanting. In the normal insect six such stripes are present, five of these reaching the costa, and the sixth being situated at the base of the wing, immediately in contact with the body. I will try to make my meaning intelligible.

To begin with calling the basal stripe No. 1, it will be observed that it is slender and pointed, and intermediate between the costal and inner margins; in some examples it is continued almost as a thread-like line towards the anal angle. No. 2 is on the costa only, is parallel to No. 1, and much resembles it, but is rather less. No. 3 is variable: it generally extends obliquely from the costa to the anal angle; at the costa it is broad, but gradually diminishes to a point before reaching the angle; in the variety it generally ceases almost immediately below the costa, but reappears as a slender line near the anal angle. No. 4 is costal only, and smaller; a mere spot, almost square. No. 5, in the normal insect, extends from the costa obliquely downwards, until it meets No. 6, also oblique, but tending in another direction; they unite in forming a letter V; in the variety this ceases immediately below the costa: the hind wings present but small difference in the distribution of their markings; their colour is scarlet, with black spots.

After taking all this trouble in trying to describe the differences that exist between the normal insect and the aberration, I feel that I have not expressed those differences nearly so well as Mr. Willis has done in the drawing, which Mr. Kirchner has engraved with such consummate skill.

EDWARD NEWMAN.

Descriptions of Oak-galls. Translated from Dr. G. L. MAYR'S 'Die Mitteleuropäischen Eichengallen' by E. A. FITCH, Esq.

(Continued from vol. viii. p. 291.)

36. *Synophus politus*, Hart.—This more or less spherical gall grows out of the axillar and terminal buds of the Turkey oak, and varies much in shape. I shall first of all describe the one that is commonest and most regularly developed.

It is generally about the size of, and has very much the appearance of, a large gall of *Cynips lignicola*. At first it is greenish, but when mature of a yellowish clay-colour, sometimes almost black. It is sprinkled all over with small

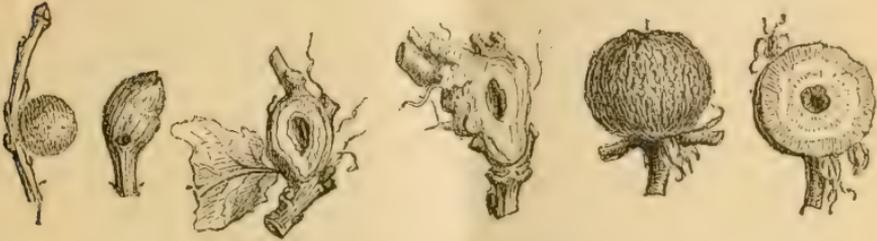


Fig. 36.—GALL OF *SYNOPHUS POLITUS*.

whitish warts, and covered with short hairs, which are only visible with the aid of a magnifying-glass (sometimes the base, which generally retains the bud-scales, is fixed to, and grown into, the branch). At the point opposite the base either a small umbilicate cavity or a small conical tubercle is often found. The section shows that the gall consists of two layers: the exterior one is green when fresh, and consists of bark substance; the interior one, however, which contains the larva-cell, is formed of true wood substance. As the second variation, I might mention that form which bears crippled leaves on its surface, but in all other respects perfectly agrees with the former variety. From this second variation a third form is very often developed: in this case the gall appears to have so long a continuity that it could easily be mistaken for a mere swelling of the stem (consequently it does not look like a bud-gall); this delusion is all the more easy if the fly is not developed the first year, and the following year the gall continues to grow as a twig. A fourth variety is interesting on account of the constancy of its size and shape; we often meet with an oak on which we only find this variety in great numbers: it is spherical, and is about five millimetres in diameter; the small white warts are wanting, or are far less conspicuous than in the first-described form; the umbilic or conical projection at the top is also wanting. In section it exhibits a much thinner layer of bark and wood substance, while respectively the larva-cell is very

large. From this form a *Synophus* is developed, which perhaps is generally smaller, but differs in no way from specimens bred from the normal form: as an important fact, I must mention that I have bred from these galls some specimens which do not in the least differ even in size. The normal flight-time of the gall-fly is March and April; I have, however, extracted living specimens from a gall I cut open the following autumn. With those galls which have been collected some time before the flight-time of the fly, it is certainly advisable to soak them for some hours in water, as the gall-fly is often unable to bite through the wood-layer, which gets very hard and dry from being kept in a room. On the 9th April of this year I found a leaf of the Turkey oak, of which only one half was developed: to the midrib adhered a mature gall of *Synophus politus*, from which a fortnight later a fly emerged.—*G. L. Mayr.*

Dr. Mayr records *Synergus variabilis*, *Syntomaspis Cerri*, *Callimome regius*, *Megastigmus Synophri*, and *M. dorsalis*, as having been bred from the galls of this species. Will they follow the introduction of *Quercus Cerris* into Britain?—*E. A. Fitch.*

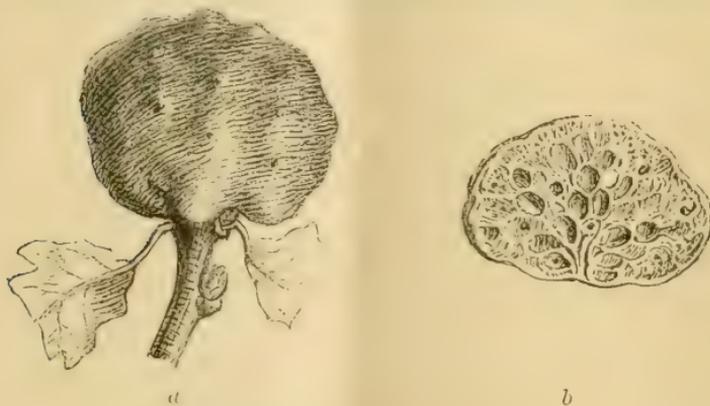


Fig. 37.—*ANDRICUS TERMINALIS.*

a. Gall of *Andricus terminalis*.

b. Section of the same, showing the numerous larva-cells.

37. *Andricus terminalis*, Fabr.—This well-known, quick-growing fungus-gall is developed from the terminal, rarely from the axillar, buds of *Quercus sessiliflora*, *Q. pedunculata*, and *Q. pubescens*. It is generally spherical, a little broader

than long (two to four centimetres in diameter). It is fully developed about the middle of May, when it is of a pale yellow or brownish yellow colour, but where exposed to the sun it assumes a rosy tinge. This fungoid gall exhibits in the interior a great number of egg-shaped, yellowish white larva-cells, which are closely surrounded by the spongy parenchyma. At the end of May or beginning of June the gall-makers, as well as the inquilines and some parasites, make their appearance. In June the rose-chafers (*Cetonia*) eat their way into these galls in such a manner that the spongy tissue is either partly or entirely consumed, and the galls become resinous. If we look for the galls of this species in the following winter or spring, on the twigs, we shall find the fungoid substance entirely destroyed by efflorescence, and only the inner galls remaining, adhering to one another. From these inner galls, however, parasites are often produced, even in the second year.—*G. L. Mayr.*

The gall of this species is the well-known oak-, or King Charles', apple, and is probably one of the best-known insect-productions of Britain, but not so generally is the production connected with the producer; it is very widely distributed. The galls, which vary greatly in size—more so than in the dimensions given by Dr. Mayr—are, or were formerly, in great request upon the anniversary of the Restoration, the 29th of May. Respecting life in these galls, I cannot do better than reprint two notes of the late Mr. Francis Walker on the subject, one published as long ago as 1846, in the 'Zoologist' (iv. 1454—7); the other recent (*Entom.* v. 432), but referring as it does in a great measure to the previous paper, it is as well they should appear consecutively.

“List of Insects inhabiting Oak-apples.

“The well-known oak-apples are inhabited by a great variety of insects, which constitute a little world, and derive their nourishment either immediately or indirectly from those galls. The insects in the following list have emerged from a considerable number of oak-apples collected in the neighbourhood of Southgate during the summer of 1845.

“*June, 1845.*—*Nitidula grisea*, 1. *Balaninus glandium?* 149 during this and the following months of summer. *Forficula auricularia*, a few in the summer; some of them were

larvæ. *Psocus subocellatus*? a few in the summer and autumn. *Atropos* —? abundant till the winter. *Teras Quercus-terminalis*, 495. *Synergus socialis*; a few specimens of two or three other species of *Cynipites* appeared in the summer. *Pteromalus Naubolus*, 7 females. *Pteromalus* —? 2 males; nearly allied to the preceding species. *Pteromalus semifascia*, 1 female. *Pteromalus ovatus*, 5 males. *Pteromalus domesticus*, 6 or 7 females during the summer. *Eupelmus urozonus*, 4 females. *Eulophus gallarum*, *Nees*, 1 (*E. Euedoreschus*, *Walker, Mon. Chal. i.*). *Cecidomyia* —? 1. *Cecidomyia* —? 2. *Tortrix viridana*, 2 or 3.*

“*July.*—*Physoevria* —? 2 or 3. *Nitidula grisea*, 1. *Latridius lardarius*, 1. *Corticaria transversalis*, 2. *Carpalimus fuliginosa*, 1. *Aleochara* —? 2. *Ochestes Quercus*, 4. *Pimpla* —? 1. *Pimpla* —? 1. *Hemiteles areator*, 1. *Teras Quercus-terminalis*, 29,110. *Synergus socialis*, 516. *Decatoma immaculata*, 8 females. *Megastigmus dorsalis*, 109 males and 12 females. *Callimome cingulatus*, *viridissimus*, *parellinus*, *inconstans*, *confinis*, *minutus*, *exilis*, *chlorinus*, *mutabilis*, *latus*, *leucopterus*, *abdominalis*, *leptocerus*, *autumnalis*, 496 males and 443 females. *Pteromalus Naubolus*, 218 males and 164 females. *Pteromalus dilectus*, 4 males and 4 females. *Pteromalus fuscipennis*, 8 males and 2 females. *Pteromalus fasciiventris*, 1 female. *Pteromalus* —? 4 males; nearly allied to *P. Naubolus*. *Pteromalus ovatus*, 35 females. *Pteromalus hilaris*, 2 females. *Eupelmus urozonus*, 2 females. *Tetrastichus Diaphantes*, 1 male and 45 females. *Eulophus gallarum*, 174. *Eulophus Agathyllus*, n. s., 1 female. *Inostemma Boscii*, 1. *Ceraphron* —? 1. *Drosophila* —? about 20; it is nearly allied to *D. cellaris*. *Lozotænia Xylostæna*, 1. *Zeiraphera communana*, 3. *Chætophilus sylvellus*, 1. *Pentatoma lûrida*, 1 larva. *Anthocoris Nemorum*, 20 and upwards in all stages of growth, during this month and August. A few *Arachnida* and *Acari*, of such species as dwell under the bark of trees, appeared in this month and in August.

“*August.*—*Dromius 4-maculatus*, 1. *Cryptophagus cellaris*, 1. *Corticaria transversalis*, 10. *Microgaster* —? 1. *Aphidius* —? 1. *Teras Quercus-terminalis*, 66. *Synergus*

* A large caterpillar, probably of a *Noctua*, sometimes consumes the whole interior of the oak-apples.

socialis, 15. *Decatoma immaculata*, 3 males and 2 females. *Megastigmus dorsalis*, 633 males and 578 females. *Callimome*, 264 males and 595 females; species the same as in July. *Eupelmus urozonus*, 3 males and 1 female. *Tetrastichus Diaphantes*, 11 males. *Chætochilus sylvellus*, 1. *Aphis* ——? *Thrips* undescribed, 25 and upwards. *Pteromalus Naubolus*, 403 males and 599 females. *Pteromalus dilectus*, 15 males and 29 females. *Pteromalus fuscipennis*, 12 females. *Pteromalus platynotus*, 5 females. *Pteromalus planus*, 1 female. *Pteromalus dubius*, 1 female. *Pteromalus fasciiventris*, 1 male. *Pteromalus decidens*, 1 female. *Pteromalus ovatus*, 5 females.

“*September*.—*Cryptophagus cellaris*, 1. *Latridius transversus*, 3. *Corticaria transversalis*, 14 and upwards. *Megastigmus dorsalis*, 12 males and 9 females. *Callimome*, 4 males and 17 females; species the same as in July. *Pteromalus Naubolus*, 24 males and 23 females. *Pteromalus dilectus*, 1 male and 2 females. *Pteromalus* ——? 2 females; nearly allied to *P. Naubolus*. *Pteromalus* ——? 4 males; nearly allied to *P. Naubolus*. *Pteromalus decidens*, 1 female. *Pteromalus ovatus*, 3 males and 15 females. *Eupelmus urozonus*, 2 males. *Ceraphron* ——? 1. *Ceraphron* ——? 1.

“*October*.—*Megastigmus dorsalis*, 4 males. *Pteromalus dilectus*, 1 female. *Pteromalus ovatus*, 1 female. *Tetrastichus Diaphantes*, 1 female.

“*December*.—*Megastigmus dorsalis*, 3 males and 3 females. *Callimome nigricornis*, 1 male.

“*January*, 1846.—*Megastigmus dorsalis*, 8 males and 4 females. *Callimome nigricornis*, 2 males.

“*February*.—*Megastigmus dorsalis*, 33 males and 6 females. *Callimome nigricornis*, 35 males. *Pteromalus domesticus*, 6 females. *Eulophus gallarum*, 600 and upwards.

“*March*.—*Bracon* ——? 1. *Synergus socialis*, 4. *Callimome nigricornis*, 6079 males and 981 females. *Pteromalus domesticus*, 16 females. *Eulophus gallarum*, 4513.

“*April*.—*Synergus socialis*, 5. *Megastigmus dorsalis*, 100 or upwards. *Callimome nigricornis*, 10,600 and upwards. *Pteromalus Naubolus*, 2. *Eulophus gallarum*, 10.

“*May*.—*Bracon* ——? 6. *Megastigmus dorsalis*, 40. *Callimome nigricornis*, 30. *Callimome* ——? 2 or 3. *Pteromalus Naubolus*, 708. *Pteromalus ovatus*, 20.

"June.—*Megastigmus dorsalis*, 5 males and 1 female. *Pteromalus Naubolus* and *ovatus*, 179. *Eupelmus urozonus*, 3 males and 5 females. *Tetrastichus Diaphantes*, 128.

"*Summary of Species and Specimens.*—Coleoptera, 9 species; 191 specimens, and upwards. Orthoptera, 1 species; 5 specimens. Neuroptera, 2 species; some hundreds of specimens. Hymenoptera (Cynipites), 4 or 5 species; 30,246 specimens. Hymenoptera (Parasitic), 45 species; 24,417 specimens, and upwards. Diptera, 3 species; 23 specimens, and upwards. Lepidoptera, 5 species; 9 specimens, and upwards. Hemiptera, 5 species; 51 specimens, and upwards. Arachnida and Acari, 5 or 6 species; a few specimens. Total—species, 75; specimens, 55,000 and upwards.

"All the Coleoptera, Orthoptera, Neuroptera, Diptera, Lepidoptera, Hemiptera, and Aptera, with the exception of *Balaninus Glandium* and *Drosophila*, were probably accidental visitors.

"*Teras Quercus-terminalis* is the cause of the formation of the oak-apples, in each of which a great number of its larvæ reside; sometimes sixty flies or upwards emerge from an oak-apple. It varies exceedingly in size, but usually all the individuals produced from one oak-apple are of one sex, and of the same size. Sometimes the habits of the larva are solitary, and it then lives in two other kinds of galls that are formed on oak-leaves.

"*Synergus socialis* is one of the 'Inquilini,' or dwellers in hired houses, as some of the Cynipites have been termed.

"*Pteromalus Naubolus* is, perhaps, only a variety of *P. semifascia.*—*Francis Walker.*" (Zool. 1846, p. 1454.)

"*Notes on Oak-apples.*—The plan of creation requires a continual appearance and disappearance of material existence. Each form of life is from dust; and having performed its part, or completed its circle, returns to dust, which is again gathered up into new creatures; and these numberless and ever-varying circles constitute the great round of existence, and the whole work is preserved in order by the control which the parts exercise upon each other. The oak-leaf falls and returns to dust, which serves for the growth of the oak, and, in process of time, is developed again into leaves. In other cases the circle of existence is less simple, and two

circles of life are combined; and some part of the substance of the oak-leaf is transformed into oak-spangles by means of a gall-fly. In the oak-currant the circle is more complicated, for not only gall-flies, but also parasitic flies take part in the work. In the oak-apple the arrangement is far more intricate, for very numerous kinds, perhaps one hundred in number, representing all the chief orders of insects, are occupied in it; and it is not only inhabited by insects, but is also frequented by Acari or mites, whose chief dwelling-place is wood-moss, where the species of *Bryobia*, *Zetes*, *Tydeus*, *Iphis*, *Murcia*, *Nothrus*, *Oribates*, *Pelops*, *Penthaleus*, *Hoplophora*, *Eumæus*, *Erymæus*, *Caligonus*, *Carabodes*, *Celæno*, *Cepheus*, and the more elegant *Eupodes* and *Linopodes* abound; and British Entomology is in need of a book on these wood-moss mites; and oak-apples afford abundant materials for another volume. *Andricus terminalis*, by means of its punctures and egg-laying, is the means of forming the oak-apple, which supplies its offspring with board and lodging; but numerous enemies appropriate to themselves the bodies, or the food and habitation, of this offspring; and other kinds avenge the Aborigines by consuming their invaders. Some kinds inhabit the oak-apple for two months; one species lives a year in it; and the successive generations of this fly pass from oak-apple to oak-apple. But the life-history of the other kinds requires to be traced for ten months elsewhere. Each oak-apple is tenanted by many individuals of the Teras, and there is much to be observed as to how the grubs are distributed through the oak-apple during its growth, and in noticing the successive arrival of other species, which find their way into the oak-apple, or insert their eggs therein. In conclusion I will mention two or three oak-apple insects, in addition to those which I have previously noticed. *Lampronota Segmentator*:—this is probably a parasite of *Pœcilochroma corticana* (Fam. Tortricidæ), a moth that frequently emerges from oak-apples. *Psylla* —:— I have not yet ascertained the name of this species; it has a very close resemblance to *P. Buxi*. *Anthomyia pluvialis*:—another species of this genus, *A. canicularis*, has been reared from the cottony oak-gall, the habitation of *Andricus Ramuli*. *Eulophus Gallarum* is frequent in these two galls.—*Francis Walker.*" (Entom. v. 431.)

COLEOPTERA.

Lathridius lardarius.—July. In the synopsis to Walker's first paper nine species of Coleoptera are said to be included; if we reckon the two species of *Lathridius* mentioned, *viz.* *L. lardarius* and *L. transversus*, we have ten. From this, and from the habits of the two species, I think we may infer the insect referred to is the same as that bred in September—the *L. transversus*, *Oliv.*, and not *L. lardarius*, *De Geer*.

Balaninus glandium?—Walker marks this species with a query, and it is very probable that the beetles bred by him were *Balaninus villosus*, *Herbst*, and not the acorn-feeding *B. glandium*, *Marsh*, as *B. villosus* (which is a British species) has been bred from oak-apples by Dr. Reinhard, Dr. Suffrain, and Prof. Kaltenbach. Besides *B. villosus*, another species of this genus is common in Britain as a gall-inquiline; the larvæ of *B. Brassicæ*, *Fab.*, feeding on the substance of the willow- and sallow-galls of *Nematus saliceti* (= *Vallisnieri*) and *N. pedunculi*.

ORTHOPTERA.

In addition to the common earwig, another Orthopterous insect has been bred from the galls of this species, *viz.*, *Meconema varia*, *Fab.* (the tree-grasshopper).

HYMENOPTERA (Cynipites).

Andricus terminalis, *Fab.* = *Teras Quercus-terminalis*.—This insect, the true gall-maker, was for some time rather unhappy in the choice of its generic name, as *Teras*, the name given to the genus erected by Hartig, had priority with the Lepidoptera, Treitschke having taken it for a genus of Tortricidæ. Marshall then endeavoured to resuscitate Geoffrey's name, *Diplolepis*, while Dr. Förster, in his synopsis of genera, proposes *Dryoteras*; but on Dr. Mayr's authority it is now included in *Andricus*.

Synergus socialis.—In Dr. Mayr's monograph of the Synergus this is given as a synonym of *S. melanopus*, *Hart.*, and *S. facialis*, *Hart.*, only, recorded as inhabiting *A. terminalis* galls. However, as *S. facialis* occurs in the summer of the first year, probably all Walker's species so bred belonged to this species, as I breed it very commonly from oak-apples

in the summer myself, and they are certainly all *S. facialis*, *H.*; those bred in March and April of the second year may be *S. melanopus*, *H.* (= *S. socialis*, *H.*), as this species passes the winter in many oak-galls. The identification of *Synergi* is always difficult, so it is quite likely that these two species—*S. melanopus* and *S. facialis*—were included by Walker under the Hartigian name, *S. socialis*: a *Synergi* in the spring from this gall has not occurred to me at present. These are the true *Inquilini*, or, as Walker terms them, "dwellers in hired houses;" they are, I believe, invariably vegetable-feeders, living on the substance of the gall, and so in many cases depriving the legitimate inhabitants of their means of sustenance; in their manner of parasitism thus somewhat resembling the cuckoo-bees (*Cuculinæ*). I find no record of any other species of *Cynipidæ*, as having been detected to be in any way connected with the galls of this species.

HYMENOPTERA (Parasitic).

Ichneumonidæ.

Hemiteles areator, Panz., Grv.—This species has been bred from many *Lepidopterous* pupæ, in which it is probably hyper-parasitic on other *Ichneumonidæ*; it was very probably connected with *Tortrix viridana* in this case. Ratzeburg records two other species of *Hemiteles* bred from this gall, *viz.*, *H. coactus*, *Rtzb.*, and *H. punctatus*, *Rtzb.*

Lampronota segmentata = *Lissonota segmentator*, Fab. (*Entom.* v. 432).

Pimpla spp.?—Ratzeburg also records (*Ichn. d. Forst.*) two species of *Pimpla* from *A. terminalis* galls, both bred by Herr Reissig in the spring of the second year, *viz.*, *P. calobata*, *Grv.*, and *P. caudata*, *Rtzb.*; whether these were the two species bred by Walker it is difficult to determine. *P. alternans*, *Grv.* = *P. scanica*, *Vill.*, a species parasitic on *Orchestes Quercus*, has also occurred in these galls.

Braconidæ.

Bracon ?—March and May, second year. Ratzeburg received his *B. caudatus* from Herren Brischke, Tischbein, Reissig, and Nördlinger, all obtaining it from these galls in May of the second year, thus coinciding with the six specimens bred by Walker in time of appearance. *Bracon*

immutator, *Nees*, has been bred from these galls by Dr. Reinhard; it was probably parasitic on a *Curculio*.

Microgaster sp.?—Both sexes of *Microgaster* (*Apanteles*) *breviventris*, *Rtzb.*, have been bred from the gall of this species, in which they were probably parasitic on *Orchestes Quercus*.

Aphidius sp.?—This undetermined species of *Aphidius* was probably parasitic on an *Aphis*.

In addition to the above list of *Ichneumonidæ*, Ratzeburg received three other species from his numerous correspondents, as follows:—

Cryptus hortulanus, *Grv.* (*Ichneumonidæ*).—"Herr Reissig bred one female from *Cynips terminalis* galls at the end of May of the second year; with it the very common *Hemiteles punctatus*." (*Ichn. d. Forst. ii. 124.*)

Microtypus Wesmaelii, *Rtzb.* (*Braconidæ*). Ratzeburg himself bred a solitary individual from an *A. terminalis* gall, which he erected into a new genus, separated from *Microgaster*; it was bred, with hundreds of *Torymidæ*, at the end of June (1847).

Microdus rufipes, *Wesm.* = *Therophilus rufipes*, *Nees.* (*Braconidæ*).—Several specimens bred by Herr Bouché from these galls, in which it was parasitic on *Hedya ocellana*.

CHALCIDIDÆ.

Eurytomidæ.

Decatoma immaculata.—Ratzeburg records *Eurytoma signata*, *Nees*, as very commonly bred from this gall; he also gives it as parasitic in several other galls and on a *Lithocolletis*. It is undoubtedly a compound species, and from his description certainly a *Decatoma*; so the *A. terminalis*-bred specimens were probably the same species as Walker's *D. immaculata*.

Torymidæ.

Callimome nigricornis, *Fab.*—This is *Syntomaspis caudata*, *Nees*. Ratzeburg gives *Torymus admirabilis*, *Först.* (= *crinicaudis*, *Ratz.*) as bred commonly from *A. terminalis* galls; they are both synonyms of this species, which occurs very abundantly in the spring of the second year. It has also

been bred from the common oak-spangle gall of *N. lenticularis*; and Kaltenbach says it has been bred from *Orchestes Quercus*, by Herr Reissig. We meet with great confusion in trying to work out the records of parasitism in Chalcididæ; the species themselves are perplexing, and the synonymy more so; *e.g.* Ratzeburg, in 'Die Ichneumonien,' under *Torymus caudatus*, Nees, arranges specimens he had received from correspondents bred from galls of *A. terminalis*, Rh. Eglanderix (a rose species), and from galls of *Nematus viminalis* (a willow species); whilst under *T. admirabilis* and *T. crinicaudis*, besides the oak-gall specimens, he includes specimens bred from *Tortrix strobilana*, thus having three specific names for one species, and in one species including four certainly distinct. But to return to Kaltenbach's assertion that this species is parasitic in Coleopterous larvæ, which is interesting, we have the following quotation occurring in Mayr's excellent and most lucid monograph:—

"In Von Heyden's collection there is a female with the statement,—'From beetle-larva under oak-bark, *Bostrichus*?'—which was named *C. admirabilis* by Dr. Förster. It is three millimetres long; oviduct, five millimetres long; blue, with a slight green shade; abdomen for the most part violet; legs green, with yellow tarsi; mesothorax very finely punctate, almost smooth and shining. Although undoubtedly this specimen does not differ from the species bred from *A. terminalis* galls, it may be found to belong to another species, when the above-quoted economy shall be proved to be correct."

Apart from dwelling in galls various species of *Torymidæ* are known to be parasitic on Hymenoptera and Lepidoptera; but these are the only two instances, as far as I know, of its connection with the Coleoptera; and here, as in many other cases of parasitism, further observation would be satisfactory.

Callimome abdominalis, Boh.—*Cingulatus*, Nees (Walker's list) and *Cyniphidum*, Ratz., are synonyms. This species, which occurs in many other oak-galls, may be bred in June and July of the same year.

Callimome regius, Nees, = *C. inconstans*, Wlk. (Walker's list) = *leucopterus*, Wlk. (Walker's list) = *longicaudis*, Rtz.

Callimome auratus, Fonsc. = *viridissimus*, Boh. (Walker's list) = ? *parellinus*, Wlk. non Boh. (Walker's list) = *con-*

finis, Wlk. (Walker's list) = *minutus*, Wlk. (Walker's list) = ? *exilis* (Walker's list) = *mutabilis*, Wlk. (Walker's list) = *latus* (Walker's list) = *chlorinus*, Wlk. (Walker's list) = *leptocerus*, Wlk. (Walker's list) = *autumnalis*, Wlk. (Walker's list) = *muscarum*, Nees = *propinquus*, Först. = *propinquus*, Ratz. = *appropinquans*, Ratz. = *gallarum*, Ratz. = *nanus*, Först. = *basalis*, Wlk. = *curtus*, Wlk. = *inconspectus*, Wlk. = *bicolor*, Wlk. = ? *terminalis*, Wlk. = *microstigma*, Wlk.—This and the preceding species—C. regius, Nees—are of general occurrence in oak-galls, as probably might be inferred from the list of synonyms.

Megastigmus dorsalis, Fabr. = *Bohemanni*, Ratz. = *xanthopygus*, Först.—This species has been bred from most oak-galls. Dr. Mayr describes six varieties, and says: "A. terminalis, a single specimen in July of the same year, var. (f)." Mr. Walker seems to have had a succession of emergences: it occurred with him from July of the first year to June of the second. I have only bred it in June, July, and August of the first year, and then commonly. It is curious this species should not affect this gall so much in Germany, as in Britain it is especially common in it; e. g. Walker's 1560 specimens compared to Mayr's 1, with his numerous correspondents: it is also unnoticed by Ratzeburg in connection with this gall.

Eupelmidae.

Eupelmus urozonus, Dalm.—This species is figured in the 'Entomologist,' vi. 226, from one of A. H. Haliday's drawings. It may be bred commonly from these galls in the summer. Ratzeburg says of *E. azureus*, a synonym of this species, that it is hyper-parasitic in this and other galls on *Eurytoma* and *Microgaster*.

Pteromalidae.

In addition to the fourteen species mentioned by Walker, Ratzeburg gives the following, besides several doubtful instances; but owing to the immense number of species, and to the very close resemblance between many, the question of synonymy must be difficult; but as with the *Torymidæ*, so with the *Pteromalidæ*, several varieties and species are recorded under different names; but in this genus we have no Mayr to follow at present.

(1) *Pteromalus Cordairii*, Ratz. = ? *Neesii*, Ratz.—Bred by Herren Erichson and Tischbein from the gall of this species, and of *A. curator*.

(2) *Pteromalus Dufourii*, Ratz.—Bred by Herr Reissig from second-year galls of *A. terminalis* and *Cecidomyia* (*Hormomyia*), *Fagi*.

(3) ? *Pteromalus gallicus*, Ratz.—Bred by Herr Nördlinger from "Galläpfeln."

(4) *Pteromalus leucopezus*, Ratz.—Terminalis-bred specimens, received by Ratzeburg from Herren Nördlinger, Tischbein, and Reissig (commonly).

(5) *Pteromalus stenotus*, Ratz.—Ratzeburg bred both sexes of this species from this gall himself, and received a female from Ziegler, bred from *Tinea cognatella*—*Hyponomeuta cognatella*, *Hüb.*

(6) *Pteromalus meconotus*, Ratz.—A single female bred by Ratzeburg; and fifteen males and five females bred by Herr Tischbein from these galls. Herr Nördlinger also bred it from them at the end of May (first or second year not stated).

(7) ? *Platymesopus Westwoodii*, Ratz.—Bred by Herr Saxesen in July, 1837, from an oak *Cynips*; the species was not specified, but it was probably *A. terminalis*.

(8) *Platymesopus Erichsonii*, Ratz.—Bred by Herr Erichson, from the gall of this species (*A. terminalis*).

Elachistidæ.

Eulophus gallarum, Lin.—This is one of the most frequent and abundant inhabitants of oak-apples, and it is also common in many other galls, occurring in both the first and second years. Ratzeburg gives five species of *Eulophus* and eight species of *Entedon* as parasitic on *Orchestes Quercus* alone. Ratzeburg's *Entedon scianeurus* is probably this species, which is not a true *Eulophus*, but an *Olynx*.

Tetrastichidæ.

Tetrastichus Diaphantes = *Cirrospilus Diaphantus*, Wlk.—This insect belongs to a very extensive family, Walker alone having described about one hundred and eighty species of *Tetrastichus*.

I believe the above includes all the Chalcididæ mentioned

by Walker. Ratzeburg mentions two or three others, in addition to those noticed above. Next to the Chalcididæ, but lower in the scale of creation than that family, come the Proctotrupidæ, the most slightly-developed of all the Hymenoptera; of this family two or three species are connected with oak-apples. Walker names two,—a *Ceraphron* and an *Inostenma* (Platygasteridæ); Ratzeburg ('Die Ichneumonien,' iii. 181) figures a *Ceraphron* bred from these galls, and which he erected into a new genus—*Dendrocerus Lichtensteinii*; this may be synonymous with the first species of Walker—*Ceraphronidæ*.

DIPTERA.

Cecidomyia sp.?—Of the two species of *Cecidomyidæ*, bred by Walker, it is very probable that one was the *C. inflexa*, *Bremi*. Specimens of *Tipulidæ* have occurred to me as also to Mr. Rothera, in the summer of the first year, from these galls; but they belong rather to *Sciara* than *Cecidomyia*, I think.

Anthomyia pluvialis.—This is the typical species of the restricted genus *Anthomyia*. *A. (Homalomyia) canicularis*, *L.*, is said to be associated with cabbages, but there are many very closely-allied species.

LEPIDOPTERA.

Tortrix viridana, *L.*—Ratzeburg, in his 'Die Ichneumonien,' gives sixteen Hymenopterous parasites of this species, *viz*, three *Braconidæ*, ten *Ichneumonidæ*, and three *Chalcididæ*; of these Hemitheles areator only is included amongst Walker's insects. It is probable that two or three pupæ of this pretty, but far too common, little moth were collected by Walker with the galls, and so came to be bred accidentally with one of its parasites.

Zeiraphera communana.—This is the *Pædisca (Pæcilochroma) corticana*, *Hüb.*, which species is a frequent feeder on these galls: but there is another Hübnerian *P. corticana* amongst the *Tortrices*, with which it must not be confounded—the *Antithesia (Penthina) corticana (= picana, Frol.)*, which feeds on the leaf-buds of willow.

Chætochilus sylvellus.—This species is *Cerostoma sylvella*, *L.*

A large Lepidopterous larva has occasionally been found feeding in the interior of these galls, since Walker's notes; but, as far as I know, the species to which it belongs has not been determined at present. (See Entom. viii. 167, and other notes.) In addition to the five species mentioned by Walker, three others have been recorded from this gall.

Thecla Quercus.—A larva of this butterfly was found feeding on oak-apples by Mr. Barrett (Ent. Mo. Mag. iv. 153.)

Hedya (Spilonota) ocellana, Fab.—A common species, flying in June and July; the larva feeds on various trees and shrubs. Ratzeburg received seven species of Ichneumonidæ as parasitic on it; one of these—*Microdus rufipes*—is mentioned in these notes.

Semasia (Ephippiphora) gallicolana, Zell., = *obscurana*, Wilk. non Steph.—On the 23rd June, 1869, Mr. C. W. Dale bred a specimen of this rare species from an oak-apple, collected in the spring, near Sherborne, Dorsetshire, which he first recorded under the name *Stigmonota internana*, Gn.,—quite a different species. However, his mistake was rectified by the Editors of Ent. Mo. Mag., who gave us the following piece of information at the end of their note:—

“Dr. Rössler states that the larvæ of *S. gallicolana* live through the winter in the old and dried galls of *Cynips quercûs-terminalis*, which are firmly fixed on the twigs of young oaks, and that severe winters seem to be fatal to them; after a mild winter nearly every gall collected produced one or several of the moth.” (Ent. Mo. Mag. vi. 186.)

As pointed out by Mr. Barrett, in his “Notes on Tortrices,” in the same magazine, this species has been confounded with *Halonota (Phthoroblastis) costipunctana*, Haw. Kaltenbach (‘Die Pflanzen-feinde, p. 659) says:—“*P. costipunctana*, Haw. = *gallicolana*, Z. The larva lives, according to Von Heyden, on oak, in the galls of *Cynips terminalis*, L., and is not uncommon at Frankfort: in these it lives in an out-stretched cavity, leaves the gall in October, and the imago appears in May of the following year (Stett. Entom. Zeit. xxi. p. 118). I received this species from Dr. Ott Hofman, who likewise had bred them in numbers from these oak-galls.”

From these observations it appears that this moth is undoubtedly an oak-apple inquiline; and from Mr. Barrett's

information, the synonymy of *P. costipunctana* with *gallicolana*, as in Doubleday's list and many German authors, is incorrect, Haworth's insect being a distinct species.

HEMIPTERA.

Thrips sp.—These little pests have now been ascertained to belong to the order Thysanoptera, separate from Hemiptera, Homoptera, and Orthoptera, each of which it resembles in some characteristics.

Aphis sp.—The species bred by Walker was no doubt *Thelaxes (Vacuna) dryophila*, *Schk.*, an oak-frequenting species, which feeds on the twigs, leaves, and fruit; it has also been found feeding on the substance of these and folii galls. No doubt other species of Aphides, now included in the genus Homoptera, may be found in and on oak-apples occasionally; but *T. dryophila* is the only species recorded as being dependent on them for sustenance, as far as I know.

Psylla ——.—I am unable to find any true *Psylla* (Homoptera) connected with oak.

The object I have had in view throughout these notes has not been so much the embodying of new information as the collating of old, to serve as a starting-point for more extended and confirmatory observation. The interest of parasitism, which affects all orders of insects, is very apparent in the "life in an oak-apple."

E. A. FITCH.

Injury to Linen in Bleach Fields by the Larvæ of Arctia rubiginosa. By EDWARD NEWMAN.

[AN application for advice on this subject having been made to the Editor of the 'Field' newspaper, and having been handed me for my opinion, I wrote to Mr. Eccles, from whom the application originally came, soliciting further information, and asking permission to publish the same. In reply I received the following interesting and explicit letter, to which I have appended a few observations of my own, regretting, however, their insufficiency and incompleteness. Still, however, I think it will not be considered an unimportant step to have ascertained the name and nature of an insect that can cause so great an injury, more especially as it

was previously deemed innocuous. I do not attempt to suggest a remedy at present.]

“To Edward Newman, F.L.S., &c.

“Larne, November 26, 1875.

“Dear Sir,—The firm of which I am a member has suffered serious loss by holes in linens exposed on bleach-fields during this summer and autumn in particular, and at same seasons in former years, without being able to ascertain the cause.

“I presume you are aware that the system of bleaching linens in this country is a peculiarly tedious one, extending over six weeks. The linens, after having been boiled in soda-ley and thoroughly washed, are spread over bleach-fields, where they remain for days; and this process is repeated again and again, according to quality, for some linens require double the amount of work that others do; and I have invariably found that those which require the most frequent grassing have been most subject to holes. I have been obliged to give the matter very special attention; and in September last I detected a particular lot of linens very seriously damaged at grass by holes, and this lot covered with thousands of these caterpillars.

“I should mention that before being sent to grass I had this parcel of linens most carefully examined, by drawing each web over a pole, erected in front of a window, and found it free from holes. When brought in from grass four days afterwards, I had it examined in the same manner, in same place, and by the same person, when the holes were discovered with thousands of these caterpillars on the webs, and in many cases in the holes; generally at each hole there was a greenish matter, evidently ejected by these caterpillars. Some of the holes were not larger than the head of a pin, but many of them were sufficiently large to admit of the caterpillars creeping through, and I found them in the act of doing so. At every part of the web where I found holes I found caterpillars in their vicinity, and where there were no holes I did not find them.

“I am sorry I did not keep any samples of these holes as they were when discovered, but I had them all very carefully marked, and I now enclose you a few cuttings to show you

their appearance after having undergone the necessary slavery of bleaching. I also enclose samples of same after finishing, and you will remark that these holes are very clean cut.

"I fortunately collected a number of these caterpillars in a piece of newspaper which I had in my pocket; they cut their way out of it, leaving on it the same greenish marks, and the holes in it are identically similar to those as made on the linens when examined. I enclose you also this scrap of newspaper.

"Since the early part of October, when the colder weather set in, these caterpillars have disappeared, and simultaneously the holes are not to be found. I am therefore convinced that the holes in the linens have been caused by these caterpillars, and to an extent which, without seeing, must be incredible. I do not for a moment contend that the caterpillars eat the linens for food; but is it impossible that they eat their way out of the cloth, just as a rat does, to make its exit, for of course the linens when exposed at grass become tossed by wind, &c., and are generally blown into rolls; and when caterpillars are upon the webs they are enclosed in the folds, and may they not eat their way out? I am convinced that they do; and, as the caterpillars will doubtless appear again next season, I am now mainly anxious to prevent next season the destruction I have had to submit to this year. Can you inform me how this is to be done?

"The bleach-fields are forty acres in extent, and, having been in grass for perhaps half a century, they are, of course, very much covered with moss. The moths'-eggs laid this year will doubtless become caterpillars about June next; by destroying their eggs I get rid of the plague. I have thought of giving the fields a heavy coat of lime, which is to be had of very best quality in great abundance in this neighbourhood. I have been recommended salt by one, and nitrate of soda by another; but, as the case is a very peculiar one, I am anxious to act under such professional advice as you are so competent to give. I therefore beg that, even if I have failed to convince you of the possibility of the holes having been caused by these caterpillars in the way I have described (not as food, but as a means of exit), you will nevertheless be good enough to inform me what, in your opinion, is the best means to adopt with a view to rid the field of any eggs laid

by this or any other moths during the past or in any previous year, and so prevent such eggs becoming caterpillars, for it is as such they have done the injury.

“Of course, whatever is used as a remedy must not permanently do injury to the grass, nor damage any linens which may hereafter be exposed thereon; and, as the extent of ground to be operated upon is so considerable, it is important that the stuff should be as inexpensive as possible to insure the complete destruction of moths’-eggs, &c.

“Hoping you will give the matter your careful consideration,—I am yours faithfully,
 “WM. ECCLES.”

[In the first place, I may state that the caterpillars, of which I have still a number under my notice, are those of a familiar but not very common moth, well known to entomologists as the ruby tiger (*Arctia rubiginosa*). At present (December) they seem to be hibernating on the inner side of the flower-pot in which they are confined, covered only by a piece of gauze, and are perfectly stationary, neither requiring food nor exercise. At p. 140 of the ‘Entomologist’ I gave a complete life-history of the insect,—of course not mentioning the delinquency in respect of linen-cloth, of which I was totally ignorant, and believe to be entirely exceptional. I will, however, repeat some of the salient points, as they may possibly assist my correspondents in the North of Ireland in pointing out the insect to their neighbours, and warning them of the injury it has already done in the bleach-fields. The life-history will be found *in extenso* in No. 33 of the ‘Entomologist.’

The parent moth lays its eggs (from thirty to forty in number) on the leaves of the broad-leaved plantain (*Plantago major*), and also on several species of dock and sorrel: these hatch, and become caterpillars in about fourteen days. They are covered with small, stiff, reddish hairs; and as they crawl up the plantain or dock leaves, or climb the bents or blades of grass, they remind one of miniature bears; in fact, they ascend a blade of grass just as a bear mounts the pole in the Zoological Gardens. But when they are still younger, and not yet possessed by a rambling or climbing spirit,—indeed, while they are quite babies,—they keep on the under side of a dock-leaf or plantain-leaf, or, in captivity, of a

lettuce-leaf, if provided by their care-taker, and then make little circular holes in those leaves, at first not much bigger than shot-holes. Viewed from the upper side of the leaf these holes have a very strange appearance: the body of the caterpillar is completely concealed by the leaf, while the head, just visible through the shot-hole, seems to be making mouths at you from the other side, after the manner of a clown grinning through a horse-collar; the incessant movement of the caterpillar's jaws, as seen through a pocket-lens, tends to make the resemblance more complete.

In August these caterpillars generally leave off eating, and prepare for their winter's rest, retiring towards the roots of the herbage, and there remaining until April, when they feel the calls of hunger, again come abroad, and feed greedily. About the middle of May I have found them full fed, and building their cocoons, in which to undergo the transformation to a chrysalis. The cocoon is rather a curious structure: it is composed of loosely-felted silk, abundantly interspersed with the red hairs which covered the body of the caterpillar, and which seem to have been shed for this especial service; the shape of the cocoon is something like a boat turned upside down; the chrysalis is very dumpy, and quite black. Before assuming this state the caterpillar emits a quantity of greenish fluid, as stated by Mr. Eccles. This leaves a green stain on the cloth, very similar to that on the piece of newspaper in which Mr. Eccles had imprisoned them. I am unable to decide whether this green fluid is ejected from the mouth or the anus; I think probably the latter, as such a discharge seems usually to follow the last excrementitious matter prior to the change to a pupa. The samples of injured cloth are very curious: they exhibit little holes of no particular form, but apparently cut by the mandibles of a caterpillar; there is, however, no single aperture large enough for the larva to have passed through: but I do not think this a difficulty of any moment, for the injury remains, and is unquestionably to be attributed to the larvæ, whether they were detected occupying the holes, or utilising them as a means of escape. One thing seems perfectly clear, they could not have been made by the moths on their emergence from the pupæ; the solvent then used, of whatever nature, would not produce the appearance of having been gnawed,

since we all know that the moth is entirely destitute of mandibles, and of performing a task requiring such energy. Still I have observed that many moths prefer a substance like linen-cloth to which to affix their cocoons; and it seems probable that in this process of cocoon-building they may nibble little holes in the cloth. I know that this is the case with other caterpillars; they use their jaws very freely, often gnawing their way through wood or even harder substances. I entirely acquit the caterpillar of any penchant for the linen-cloth as an article of diet, but the injury remains, notwithstanding the acquittal, and every precaution must be taken against its recurrence. I confess my inability to suggest any remedy that is likely to prove effectual.

There is no doubt that to attack the insects in the egg-state, as Mr. Eccles suggests, is the right plan; but we must not entirely neglect the first instruction given by Mrs. Glass in her cookery-book, touching the jugging of a hare: "First catch your hare." In both instances—hare, and ruby tiger's eggs—this seems essential. The idea of looking for these eggs would evoke a smile on the gravest countenance: they are no larger than the head of the smallest pin. Then as to attacking them on the broad scale, either by treating the bleach-fields with lime, salt, or nitrate of soda, I fear it is impracticable. Moreover, every experiment of this kind is assuredly a leap in the dark. I trust the mischief may not occur again; as in the case of the yellow-tail moth, the Hessian fly, and various other insects which have seemed to threaten a continuous loss, and from time to time have elicited prophecies of famine, which happily still await fulfilment, this visit of the ruby tiger may possibly never recur. Sincerely hoping this may be the case, I must content myself with doing as Mr. Eccles suggests,—continuing to give this subject my best and most unremitting attention.

EDWARD NEWMAN.]

Entomological Notes, Captures, &c.

Description of the Larva of Lithosia aureola.—On the 22nd of September last I received from Mr. J. G. Ross, of Bathampton, near Bath, a dozen larvæ of this species. They varied considerably in size, the largest, a full-grown one,

being about three-quarters of an inch in length, and tolerably stout in proportion. Head globular and shining, about the same width as the 2nd segment; body rounded above, but nearly flat ventrally; it is of tolerably uniform width, but a little attenuated posteriorly; segmental divisions tolerably well defined; the trapezoidal warts very large and well-developed, giving the surface of the body a rather rough appearance; from each wart springs a tuft of hair. The ground colour is rather a peculiar dark olive-green, thickly freckled with both darker and paler spots, making the creature altogether bear a striking resemblance to the lichens on which it feeds. The shortest, and indeed almost the best, description of it would be simply "lichen-coloured," the grayish green, or commonest type of lichen-colouring being understood. The dorsal stripe is formed by an interrupted series of narrow black marks; there is also a series of similar, but more conspicuous marks on the subdorsal region, these marks, on the middle segments, being bordered above with whitish; the tubercles are reddish brown; the hairs brown. The head is intensely black, with a very conspicuous, white, A-shaped mark. Ventral surface dull, pale olive-green, with interrupted, smoky central stripe.—*Geo. T. Porritt; Huddersfield, January 4, 1876.*

Sphinx Convolvuli at Bury.—Yesterday I had a worn specimen of *Sphinx Convolvuli* brought to me to identify. It was captured about the second week in August, whilst on the wing, in a dwelling-house, probably attracted by the light, in the centre of the town.—*R. Kay; 2, Spring Street, Bury, December 15, 1875.*

Hemerobius in Winter.—On Sunday morning (January 9th) I found a species of *Hemerobius* in my room. It was of a brown colour. There had been no fire in the room; and the thermometer in the garden registered 18° of frost on the previous night. Do these insects usually hibernate?—*H. N. Ridley; Cobham, Gravesend, January 12, 1876.*

[I was not previously aware of this habit in *Hemerobius*, having never observed it.—*Edward Newman.*]

Mamestra subjecta.—In my list of the insects sent to you I omitted to send you the capture of a worn *Mamestra subjecta*, taken in my garden in July or August last.—*A. Thurnall; Whittlesford, December 29, 1875.*

THE ENTOMOLOGIST.

No. 153.]

MARCH, MDCCCLXXVI.

[PRICE 6d.



ENNOMOS ANGULARIA (male and female).

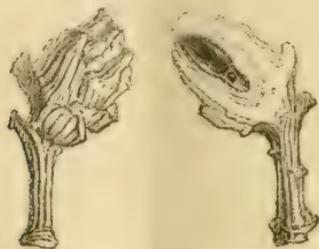
Variety of Ennomos angularia.—The figures, male and female, of *Ennomos angularia*, are not only singular as a variety, but also singular as being so much alike as almost to induce the conclusion that they might be referred to some new and undescribed species. They were bred by Mr. Neave from the same batch of eggs, and were the only specimens of this particular coloration. The fore wings have the upper surface uniform dark brown, with a transverse oblique median band of a pale fulvous; the hind wings are paler, shaded to darker towards the margin. Mr. Neave has kindly lent them, purposely for figuring in the 'Entomologist,' and has accompanied them with the following information:—"In the early part of 1874 I had eleven eggs of *Ennomos angularia* given to me; they were all laid singly on the glass lid of a pill-box: of these only four hatched. The larvæ were fed the whole time upon whitethorn, and produced imagos on the

following days. The pair figured—male, 3rd July; female, 5th; the other two, a male and female, on the 2nd and 8th respectively. These latter were dark, but not so strongly marked as the former. I may add the parent female was darker than the ordinary type.—*B. W. Neave*; 5, *Highbury Grange, Highbury Park, N., February 3, 1876.*—*Edward Newman.*

Descriptions of Oak-galls. Translated from Dr. G. L. MAYR'S 'Die Mitteleuropäischen Eichengallen' by E. A. FITCH, Esq.

(Continued from p. 42.)

Fig. 38.



GALL OF *ANDRICUS INFLATOR* (and section of the same).

38. *Andricus inflator*, Hart.—This gall appears like a terminal swelling of the young shoots of *Quercus pedunculata*, and is clothed with leaves like any other twig. Its development is undoubtedly caused by the gall-fly laying its egg in the axis of the terminal bud. When the bud is developed in the spring, the top of the axil part remains white, its periphery being but little prevented from development with the leaves; an elongate cavity is exhibited, in a longitudinal section, at the lower part of which lies the small egg-shaped inner gall, like an egg in a cup of corresponding dimensions; the cavity is covered with a thin skin at the top. In June the fly breaks through the upper end of the inner gall and the top membrane. The empty gall continues growing until the autumn, and from its axillary buds several twigs are developed in the course of this and the next year. Professor Schenck calls the *C. axillaris* described by Hartig a variety of this species. Schenck has bred the fly, and found it identical

with *A. inflator*. Dr. Giraud tells me in a letter that he takes it for a modified form of the gall of *Andricus curvator*. A specimen which Professor Schenck gave me consists of a swelling, almost egg-shaped, of about 8 millimetres, by 5.5, full of blisters, thin-walled, the surface of which is uneven, covered with leaf-like scales, on one side leaving folds, the margin of which exhibits indistinct traces of leaves; at the bottom of the large cavity lies an oviform inner gall. This swelling is situated in the upper angle between the twig and the lateral bud; the latter, however, does not grow on the twig itself, but on a very short stumpy lateral.

Note 1.—On May 19th of this year (1870?) I found two swollen galls on *Q. sessiliflora* which seemed to belong to the galls of *C. axillaris*, although when fresh they differed in appearance. At the beginning of June, I opened the larger of the two, the cavity in which resembled the gall of *A. curvator*, which species I extracted from it.—*G. L. Mayr.*

38*a.* *Andricus curvator* var. *axillaris*.—From Mayr's note, and a subsequent one under *curvator*, it will be seen that figure 38*a* is referable to *Andricus curvator* var. *axillaris*, and not to *A. inflator*.

This gall is, I believe, tolerably well distributed in Britain: it has occurred, but never commonly, almost everywhere I have collected, and has been recorded from Scotland (Ballater) by Mr. Traill. *Sapholytus connatus*, *H.*, is its inquiline, and *Megastigmus dorsalis* a parasite, both occurring like the gall-maker, in the early summer. Ratzeburg says, in his 'Die Ichneumonien' (ii. 151), "I obtained one female from Herr Hartig, which he had determined as *Siphonura variolosa*, *Nees*. He had bred his specimens from *Cynips disticha* and *Andricus noduli* and *inflator*." *S. variolosa*, *Nees*, is probably a synonym of *Ormyrus punctiger*, *Westw.*, a species which occurs in several galls. In addition to *M. dorsalis* I have bred *Syntomaspis caudata*, *Nees*., *Pteromalus* sp.? and *Psocus bipunctatus* from these galls.—*E. A. Fitch.*

39. *Andricus circulans*, *Mayr.*—In February and March of last year (1869) I found, in the neighbourhood of Vienna,

Fig. 38 a.



A. CURVATOR
var.
AXILLARIS.

small galls growing out of the axillary buds on stubs of the Turkey oak; the producers of these belong to a new species.

Fig. 39.



GALL OF
A. CIRCULANS.

These galls are of an elongate-oviform shape, similar to small ant-pupæ, about 2 to 5 millimetres long; from one to eight occur in a bud, and are so surrounded by the interior broad and short bud-scales, that only their upper part is visible. When the air is humid, the long linear outside scales stand out in such a manner that the gall is easily seen, but when the weather is dry they close over the galls in such a manner that it is difficult to see them. The galls are naked, of either a brownish yellow, a dirty reddish brown, or a beautiful light red colour, and show, when examined through a strong magnifying-glass, oval or elliptical cells. The walls of the gall are very thin, and enclose the cavity in which the gall-maker lives. If a large number of galls occur in one bud, it sometimes happens that one gall is in the centre, while the others are arranged round it in a circle; when there are only four they resemble the seeds of one of the Labiata: the galls are frequently so compressed that they are flattened at the points of contact. Galls collected in February and kept in a hot room, produced some males at the beginning of March, while the females did not appear till eight or ten days later; from those collected on March 21st the flies emerged in April, and of those collected on April 15th many were already pierced; but from those that were entire the flies emerged in the course of a few days. No *Andricus* appeared in May—only a few *Ceroptres* and *Pteromalidæ*. I have only met with a few specimens this year.—*G. L. Mayr.*

In a note Dr. Mayr gives a description of the imago. The *Ceroptres* referred to is *C. Cerri*, *Mayr.*—*E. A. Fitch.*

The Devonshire Gall, Cynips Kollari. By the late
FRANCIS WALKER.

[At p. 251 of vol. vii. of the 'Entomologist,' we read:—"I was expecting Mr. Walker's notes on the parasites of *Cynips*

Lignicola (read Kollari), when the mournful intelligence reached me that his labours were ended, and his observations had ceased for ever." These notes were written, although not forwarded, and are here produced, by kind permission of the family, as an appendix to the other information there given concerning this gall and its inhabitants.—*E. Newman.*]

"Four inquilines are said by Dr. Mayr to inhabit this gall: *Ceroptres arator* and *C. pallicornis* appearing from April to June, *S. melanopus* and *S. Reinhardi* appearing in May and June of the second year. He mentions two parasites—*Callimome regius* and *Megastigmus stigmaticans*; and observes that *Diomorus calcaratus* is a parasite of *Stigmus pendulus*, which also inhabits this gall.

"From some of these galls, gathered in the autumn of 1872, *Cynips Kollari*, *Callimome regius*, and *Megastigmus stigmaticans*, emerged in July, 1873; also one male and one female of *Therophilus rufipes*. I am indebted to the Rev. T. A. Marshall for the name of this Braconid. In 1874 the above galls produced 1 *Callimome regius*, female, July 23rd; 1 *Megastigmus stigmaticans*, male, July 17th; 1 ditto ditto, August 3rd.

"The following list enumerates the products of some galls gathered in the autumn of 1873:—

"September, 1873: 410 *Cynips Kollari*; 6 *Callimome regius*, 4 males and 2 females.

"October: 110 *Cynips Kollari*; 2 *Callimome regius*, 1 male and 1 female; 25 *Megastigmus stigmaticans*, 24 males and 1 female.

"November: 110 *Megastigmus stigmaticans*, 96 males and 14 females.

"December: 64 *Megastigmus stigmaticans*, 47 males and 17 females.

"January, 1874: 41 *M. stigmaticans*, 18 males and 23 females.

"February: 19 *M. stigmaticans*, 6 males and 13 females.

"March: 12 *M. stigmaticans*, 2 males and 10 females.

"April: 5 *Syntomaspis caudatus*, 3 males and 2 females; 26 *Callimome regius*, 18 males and 8 females; 7 *C. abdominalis*; 7 *Eurytoma squamea*; 24 *Decatoma biguttata*; 2 *Pteromalus fasciventris*; 1 *P. tibialis*; many of *Synergus Reinhardi*; 2 *Hemitelus areator*; 1 *Hemerobius fuscus*; 2 *Psocus* sp—?

“May: 58 *Callimome regius*, 5 males and 53 females; 3 *Megastigmus stigmaticans*, 2 males and 1 female; 4 *Eurytoma squamea*; 4 *Decatoma biguttata*; 1 *D. flavicollis*; 1 *Dasycera sulphurella*; 1 *Grapholita Juliana*; 1 *Passalæcus gracilis*.

“June: 663 *Megastigmus stigmaticans*, 466 males and 197 females; about 40 *Synergus melanopus*; 1 *Psocus bipunctatus*; 2 *P. 4-punctatus*.

“July: 35 *Cynips Kollari*; 166 *M. stigmaticans*, 21 males and 145 females.

“FRANCIS WALKER.

“September, 1874.”

On an Immense Flight of Small Butterflies (Terias Lisa) in the Bermudas. By J. MATTHEW JONES, Esq.

[Reprinted from ‘Psyche’ for December, 1875, No. 20, p. 121; and communicated by the Author.]

MARVELLOUS indeed, as naturalists well know, are those periodic movements of the feathered race known as spring and autumn migrations. Moved by an instinctive impulse implanted in them by the Creator, thousands upon thousands of birds of all sizes, from the bulky swan to the tiny humming bird, travel by sea or land to distances so remote that, unless it was ascertained beyond doubt that the space was traversed, the fact would be considered almost incredible.

But if we are greatly astonished at the power of endurance exemplified in this long-sustained flight of some of the smallest birds, what will be said when we relate a circumstance connected with a similar power possessed by a species of butterfly, so small and apparently incapable of withstanding the violence of the elements, that we know not which is the more remarkable, the distance traversed, or the number of these frail little creatures which lived to reach those remote isles of the ocean, after an aerial journey of some six hundred miles or more?

Thus it was. Early in the morning of the first day of October, in the year 1874, several persons living on the north side of the main island perceived, as they thought, a cloud coming over from the north-west, which drew nearer and nearer to the shore, on reaching which it divided into two

parts, one of which went eastward and the other westward, gradually falling upon the land. They were not long in ascertaining that what they had taken for a cloud was an immense concourse of small yellow butterflies (*Terias Lisa*, *Boisd.*), which flitted about all the open grassy patches and cultivated grounds in a lazy manner, as if fatigued after their long voyage over the deep. Fishermen out near the reefs, some few miles to the north of the islands, very early that morning, stated that numbers of these insects fell upon their boats, literally covering them. They did not stay long upon the islands, however, only a few days, but during that time thousands must have fallen victims to the vigorous appetites of the blue bird (*Sialia sialis*, *Baird*) and black bird (*Minus carolinensis*, *Gray*), which were continually preying upon them. Only one other instance of a flight of these butterflies visiting the islands is recorded (in my 'Naturalist in Bermuda,' p. 120).

Mr. Darwin, in his 'Naturalist's Voyage of H.M.S. Beagle,' writes as follows:—Several times when the ship has been some miles off the mouth of the Rio Plata, and at other times when off from the shores of northern Patagonia, we have been surrounded by insects. One evening, when we were about ten miles from the Bay of San Blas, vast numbers of butterflies, in bands or flocks of countless myriads, extended as far as the eye could range. Even by the aid of a telescope it was not possible to see a space free from butterflies. The seaman cried out "it was snowing butterflies," and such in fact was the appearance. More species than one were present, but the main part belonged to a kind very similar to, but not identical with, the common English *Colias Edusa*. Some moths and Hymenoptera accompanied the butterflies, and a fine beetle (*Calosoma*) flew on board. The day had been fine and calm, and the one previous to it equally so, with light and variable airs. Hence we cannot suppose that the insects were blown off the land, but we must conclude that they voluntarily took flight. The great bands of the *Colias* seem at first to afford an instance like those on record of the migrations of another butterfly, *Pyrameis Cardui* (Lyell's 'Principles of Geology,' vol. iii. p. 63), but the presence of other insects makes the case distinct, and even less intelligible. Before sunset a strong breeze

sprung up from the north, and this must have caused tens of thousands of the butterflies and other insects to have perished.

In the 'Entomologist' (vol. iii., p. 226) it is stated that during a cyclone, and a distance of 600 miles from the African coast and 200 miles from the Cape Verde Islands, a vessel was visited by numerous birds and butterflies, the latter being *Diadema Bolina* and *Pyrameis Cardui*.

Now the instance related by Darwin only proves the fact of flocks of butterflies being observed *ten* miles from the land, and that recorded in the 'Entomologist' leaves it an open question as to whether the insects were direct from the coast of Africa or Cape Verde Islands,* or indeed whether they occurred in remarkable numbers. We have, therefore, reason to believe that the vast host of *Terias Lisa* which arrived at the Bermudas on the 1st of October last, and that visitation recorded in the 'Naturalist in Bermuda' as occurring on the 10th of October, 1847, are the only instances known of such extraordinary flights of Lepidoptera, or indeed of any insects being met with at such an amazing distance from land.

The question, therefore, naturally arises—How did this immense concourse of butterflies get to the Bermudas? The nearest point of land is Cape Hatteras, in North Carolina, which is somewhere about 600 miles distant, and if they had started from this point and taken a straight line to the islands, without meeting with any contrary winds, it would, at the rate of twelve miles per hour (a fair average rate of travel for any of the *Pieridæ*), have taken them two days and two hours (of course including nights) to complete the distance; a space of time almost too great, we should imagine, for an insect in no degree remarkable for robust frame or strength of wing to keep up a continuous flight. We are, however, inclined to think that the presence of this vast concourse of insects at the Bermudas was not owing to ordinary causes, and that we must look to some extraordinary means to solve the mystery. From a very extended series of observations made at intervals during the last twenty years, with the view of throwing light upon the migration of North American birds to those

* I do not find any record of the occurrence of *P. Cardui* in the Cape de Verde Islands, although it is found on the islands to the north.-- *S. H. Scudder*.

islands, we have become impressed with the fact that the largest flights of birds occur there during the period of great atmospheric disturbance. From the latter end of September to that of October, violent revolving gales are prevalent throughout the region which comprises the east coast of the Southern and Middle* States and the North Atlantic in those latitudes, for some 600 or 800 miles from land. At this particular period vast flights of birds of all kinds are proceeding southward along the coast for their winter resorts in Florida, West Indies and South America, and must often meet with the violent gales we have alluded to. Now the observations of scientific aeronauts, like Glaisher and others, teach us that the upper atmosphere is composed of currents of air differing in their courses as elevation proceeds, and some cases are on record in which balloons at a great height have suddenly come in contact with violent direct gales, which carried them onward with such velocity as to render their course one of extreme peril, only escaping destruction by the superior manœuvring of those in charge. Let us suppose a violent revolving gale passing along the coast of the Southern States, about the latitude of the Bermudas, during the period of the autumnal migration of birds and butterflies, engulfing some of those great flights which are then proceeding along in a southerly direction. Drawing them up high in its vortex, a direct westerly gale is met with, blowing with great force out to sea. Hurlled with amazing rapidity along this cool aërial current, in the course of about three or four hours the heated vapour arising from the Gulf Stream would be met with; and would it be considered as too imaginative to grant that the ascending warmth of that stream has power sufficient to ameliorate the condition of the cool current, to stay its rapid course and allow the animal freight to descend, which, then within a comparatively short distance of the Bermudas, would seek the nearest land by that instinctive impulse so characteristic of these tribes, and aided perhaps by perfect calm or favouring breeze, arrive at those distant isles, without encountering the dangers which—in the form of contrary winds—would most certainly accompany an

* *Terias Lisa* occurs along the Atlantic Coast from New Hampshire to Cuba. It is excessively rare north of Cape Cod, common from New Jersey to Cape Hatteras, and extremely abundant farther south.—*S. H. S.*

intentional migration to the islands? If our theory, however, be an incorrect one, as it may be, we should indeed be glad if some one would lend a helping hand to solve this question of a migration of tiny butterflies from the American main to those small and remote isles, 600 miles away over the rolling waters of the trackless deep.

J. MATTHEW JONES.

Halifax, N.S., November 15, 1875.

Description of some Varieties of Vanessa Io, &c., probably caused by starving the Larvæ. By H. RAMSAY COX, Esq., F.L.S.

So much has been said on "varieties" being produced by starvation that some readers who have not had personal experience in the subject may be a little interested in a short description of the "varieties" (so-called) that I lately bred of some of the *Vanessæ*, caused, I believe, by starvation. I should say that the shortness of fare the poor larvæ were subjected to was quite unintentional.

We captured in the New Forest a number of half-grown larvæ of *Vanessa Io*, which were carefully fed for a few days; but owing to my boy's neglect, and to my being busy with the net, they were left several days without food; all dead leaves and stalks had been devoured. They were a very long time changing, and many fastened themselves to the *bottom* of the cage, as if too weak to spin up on the top or sides, in the ordinary manner. *Very few died either in the larval or pupal state.*

Nearly all the imagos were of course rather small; they varied much in the intensity of their colouring, and two specimens are very singularly marked. In one, the yellow costal spot is only represented by a very small white mark: there is scarcely any yellow in the ocellus, a large part of which is filled up with black, the usual chocolate patch in it is also black. The chocolate ground colour is also darker than usual. In the hind wing the ocellus contains only two small round violet spots. The other specimen is similarly marked, except in the hind wings, in which there is no ocellus at all of the ordinary character, but merely *an irregularly shaped*

dull whitish blotch, containing a very indistinct small brown mark.

Vanessa Urticæ and *Polychloros* were similarly treated: the latter produced no peculiar-looking specimens, excepting that the ground colour was darker than in ordinary bred specimens. The *Urticæ* in spite of their starving came out nearly the natural size. Many have a thick black nervure in the centre of the wing; also a brownish patch between the middle costal spot and that in the inner margin, and the dark margin round the wings *is wider than usual*.

The effects of starving these three species would therefore appear to be similar, as far as the causing of dark spots, patches, &c., goes. Being very interested in the subject, I should be glad to hear from other collectors if they have often noticed the same features when breeding the *Vanessæ*.

H. RAMSAY COX.

Thornleigh, Forest Hill,
January 24, 1876.

Collected Observations on British Sawflies.

By EDWARD NEWMAN.

BEFORE attempting to catalogue the reputed British species of sawfly, I crave permission to give my own view of what a sawfly is, and also to indicate what I suppose its position in the system of Nature. In doing this I propose to incorporate, recapitulate, and amalgamate, certain opinions I expressed in the year 1832, and during the ten or twelve years immediately following.

I am led to this course by reading, after a lapse of thirty years, the following passage in a letter addressed to me by the late Dr. Harris, of Harvard University:—

“In a private course of lectures on Entomology, given to some of the students of the University four years ago, I endeavoured to explain your system, and made diagrams for the purpose, some of which still remained hanging in the room when our excellent friend Mr. Doubleday saw my collection of insects. I have often wished you would combine in one work all that you have published on the classification of insects, and the characteristics of the groups. . . . You have often very happily illustrated what

before was obscure, and have pointed out some striking resemblances, or affinities, as it is the fashion to call them. You have proved to my satisfaction the centrality of certain groups or types of form containing some of the characteristics of the surrounding groups, together with a character peculiarly their own. This, it appears to me, must be the key to affinities, if such exist. That there are really seven great and perfectly natural groups of insects, and that they approach each other as you have represented, appears undeniable. Divide any one of them, and the parts lose their relative value when compared with the other groups."

—*Extract from a letter from Dr. Harris to E. Newman, dated January 7th, 1844; and published in the Memoir of Dr. Harris, by Col. T. W. Higginson, prefixed to the Entomological Correspondence of T. W. Harris, edited by Samuel H. Scudder, 1869.*

At the risk of being considered prosy in the repetition of a thrice-told tale, I will repeat Cuvier's "distribution of animals according to their organisation," and define four groups, which, though virtually identical with those I am about to employ, have different names. The divisions are these:—

1. *Endosteate animals*, having an endo-skeleton, or internal framework of bone, to which the muscles are attached; the muscles clothe and cover the endo-skeleton, and both are enclosed in a sack, called the skin. We are told by anatomists that this endo-skeleton is continually undergoing disintegration, absorption, and renewal; but of this I am incapable of forming an opinion, still less can I describe any portion of the process. Nevertheless, seeing that the exo-skeleton of the next group is repeatedly discarded and reproduced, I am perfectly ready to admit an analogous phenomenon may exist in the endo-skeleton, although the process by which it is performed is so widely different that one fails to follow it in all its details. [These are the *Vertebrata* of Cuvier.]

2. *Exosteate animals*, which have no internal framework of bone, but, in its stead, an indurated skin, enveloping and enclosing the softer parts; and this I call the exo-skeleton, or external skeleton. This answers the same purpose of protection and support to the muscles as the endo-skeleton, but its position is exactly the reverse. The exo-skeleton, as

I have called it, varies infinitely in its character: in the larvæ of Lepidoptera it is thin, soft, and flexible in the extreme; while in crustaceans, particularly in the claw of an aged crab, it is so thick, solid, and calcareous, that it can only be broken by a smart blow with the hammer. Between these two opposites of extreme thinness and extreme thickness, every conceivable intermediate occurs; but whatever difference exists in this respect all exo-skeletons agree in being repeatedly shed and renewed during life-time. The process of moulting is common to most animals: the bird loses and reproduces its feathers; the suckler its hair; but in exosteates this exuviation extends to the whole covering: this is shed entire, and not only to the covering, for the exuviation extends to the interior, but those organs which are most intimately connected with life share the same fate as the exo-skeleton, of which they actually seem to form part, and are cast off like our old clothes and replaced by a new suit. I have been particularly interested in observing how complete is this internal, as well as external, exuviation in crabs, crayfish, and lobsters, the discarded garments of which form most beautiful objects to examine, showing that even the breathing apparatus to its most minute parts is cast off, and replaced by a new one secreted within the body of the animal. [These are the *Articulata* of Cuvier.]

3. *Anosteate animals*, which have no bones at all, but which have the power of building a house or shell for protection out of material secreted by their own body. I say have the power of doing so; but they do not always exercise the power, very many species having neither bone, shell, nor any substitute for these at any period of life. [These are the *Mollusca* of Cuvier.]

4. *Actiniate animals*, which have their several organs arranged in a radiating fashion round a centre, like the starfish. The other divisions have not this radiating arrangement of parts, but are what is called bilateral, that is, they have both sides alike. [These are the *Radiata* of Cuvier.]

The second of these divisions is that to which the sawflies belong; but these require further division.

In my Familiar Introduction, published in 1841, I adopted Latreille's name of *Condylopa* for this province, but I now prefer to propose an entirely new one—*Exosteata*; its contents

are also modified. The province, as altered, contains four sub-provinces, as under:—

1. *Hexapods*, which at no period of their existence have more than six legs, and which are variously known as butterflies and moths; gnats and flies; bees, wasps and sawflies; beetles; locusts and cockroaches; bugs, plant-bugs, plant-lice, animal-lice, springtails; dragonflies and stoneflies, &c.: these are associated by the single and simple, though constant, character of possessing six legs, and no more. These frequently possess also two or four wings; but in a primary definition this appears scarcely deserving of notice, since wings are so frequently wanting. [These are the *Insecta* of Latreille.]

Moreover, these insect-wings are in reality windpipes, or, perhaps, speaking with greater precision, portions or branches of windpipe everted and altered expressly to fit them for the function of flight, instead of confining their duties to the more ordinary and—as we believe—normal office of respiration. In order to achieve this additional duty, we find that certain main branches of windpipe, having forsaken their usual site in the interior of the trunk, issue, one or two from each side of the mesothorax, and one or two from each side of the metathorax, each branch encased in a bony cylinder, which is frequently sufficiently transparent to admit of the structure of the windpipe being seen through its walls; while the constant pulsatory movements of blood-disks everywhere, between each cylinder and its enclosed windpipe, proves, beyond the possibility of doubt, the existence of a circulation throughout the insect world. These external ramifications of the windpipe, and as a consequence its bony casings, are infinitely less numerous than those confined to the trunk, Lyonet having stated that he counted 1804 branches in a specimen of *Xyleutes Cossus*, and that he only discontinued counting because they eluded the powers of his glass from excessive tenuity. Still they are numerous and conspicuous, and subserve the useful purpose of supplying characters to the descriptive entomologist; but of this more hereafter. We find them always connected with each other throughout their length by a membrane, which, in fact, is double, or composed of two membranes, although it appears as only one: its double character is

proved by the presence of fluid, which, on the creature's emergence from the pupa state, is observed to occupy a space between them, sometimes even imparting to the part the appearance of an inflated bladder. Nevertheless, as the insect rapidly advances towards maturity, the blood retires into the trunk, and the bladder is seen to shrink and finally to collapse, while the two membranes approach, unite, and henceforward become one and indivisible. A word remains to be said about the encased windpipes. These are generally divided and branched, the branches taking many directions, frequently anastomosing, and thus forming a complete network or frame, which supports the membrane, distended over them like the canvas over the ribs in the sails of a windmill, and the two united constitute the so-called "wing." In aquatic larvæ a very similar arrangement of parts is observable; but while in the imago state the number of these "wings" never exceeds four, in aquatic larvæ of hexapods it often rises to twelve or fourteen; then they are employed as swimming organs, in addition to their use as respiratory organs; but the name of "windpipe," or of some equivalent in the language of science, is retained, while in the perfect insect the name of "wings" is universally applied.

2. *Octopods*, which at every period of their existence possess eight legs,—as mites and spiders, and all spider-like animals; in these there is never any indication of wing. [These are the *Arachnides* of Latreille.]

3. *Anisopods*, whose legs are mostly ten, but often more, and which are for the most part marine animals,—as crabs, lobsters, crayfishes, prawns, and shrimps. [These are the *Crustacea* of Latreille.]

4. *Myriapods*, which possess a multitude of legs, and which are familiarly known as centipedes, or hundred legs. [These are the *Myriapoda* of Latreille.]

The essential characteristic of Exosteatate structure, necessitated, as I conceive, by the external situation of the principal organs of support, is the fusion, amalgamation, or inseparability, of several systems of organs. The organs of support, circulation, and respiration, instead of being detached, as in endosteates, are so inextricably involved as to defeat the attempts of the most skillful anatomist to separate them; indeed, it seems a necessity that the organs of respiration

should be attended by those of circulation, and that both should be enclosed by those of support throughout their circuitous and manifold ramifications. In Endosteates the bones form a connected system adapted to the especial function of support, and the organs of respiration consist of a single and simple windpipe opening at its upper extremity into the throat, and terminating at its lower extremity in the lungs, where the air which it has received at the throat comes in contact with the blood, and receives the necessary oxygenation to ensure its life-supporting properties. In hexapods we may suppose the same process of oxygenation necessary, but it does not take place at any fixed point, as the lungs: the process goes on in every part of the trunk, in the legs, wings, and antennæ, because the windpipe is infinitely divided, and accompanies the blood-vessel in all its windings, however intricate, however ramified; so that the blood is always lubricating and moistening the windpipe, and thus maintaining it in that condition so essential to the due performance of its functions.

In both Endosteates and Exosteates the windpipe is composed of a series of rings closely appressed together; they are sufficiently strong to maintain their form and position against any pressure that may come from without, but still sufficiently flexible to offer no impediment to the free motion of the equally flexible bones, which they invariably traverse from end to end. We have lately heard a good deal of flexible glass: these tubular bones, through which the blood and air constantly circulate, may be compared to flexible glass. They also resemble glass in being frequently transparent, so that the functions, in course of progress within, may be observed and watched from without. This transparency, however, is confined to a few families, and, in these families, exclusively to the wing-bones; the existence of transparent bone in the trunk has not been noticed, and probably does not exist. Moreover, the wing-bones of Coleoptera are almost invariably opaque, and of a dark brown colour, which effectually precludes all examination of the interior.

This differentiation of the two great provinces of animals—I say *two*, because I make no attempt to cope with the other two, Anosteate and Actiniate—is so totally, so diame-

trically opposed to the teaching of Kirby and Spence—teaching which for half a century we have been taught to believe infallible—that it would be uncandid, and certainly uncourteous, to omit all mention of these fathers in Entomology, supported as they are by other leaders in the domain of science. In pursuance of this object, in the justice of which every reader will concur, I cannot do better than cite their own words. After enumerating the observations of Swammerdam, Réaumur, Bonnet, De Geer, Baker, and Chabrier, all of whom speak more or less decidedly of blood-vessels, currents, moving fluids, pulsations, and circulation, they proceed in this emphatic manner, crushing, as it were, the observations of these worthies under the weight of authority,—the authority of Lyonet, Cuvier, and Marcel de Serres,—enforced as it is by their own views on this important and highly interesting question.

“But though these arguments, which I have stated in their full force, appear strong, and at first sight conclusive, those which may be urged for the more modern opinion—that no circulation exists in insects, properly so-called—appear to have still greater weight. Lyonet, whose piercing eyes and skilful hand traced the course of so many hundred nerves and *bronchiæ*, long after they became invisible to the unassisted eye, and which were a thousand times smaller than the principal blood-vessels opening into so large an organ as the supposed heart of insects might be expected to be, could never discover anything like them. His most painful researches, and repeated attempts to inject them with coloured liquids, were unable to detect the most minute opening in the dorsal vessel, or the slightest trace of any artery or vein proceeding from or communicating with it. And Cuvier, whose unrivalled skill in Comparative Anatomy peculiarly qualified him for the investigation, repeated these enquiries, and tried all the known modes of injection, with equal want of success; and is thus led to the conclusion that insects have no circulation; that their dorsal vessel is no heart, and therefore ought not to be called by that name; and that it is rather a secretory vessel, like many others of that kind in those animals.”—‘*Introduction to Entomology*,’ vol. iv. p. 91.

Notwithstanding this very explicit statement of facts and

opinions, the learned authors cite the wondrous discoveries of Carus, which seem opposed to them, and finally arrive at this solution:—

“The endeavours of M. Carus to discover any proofs of a circulation in their last state, except in the wings at their first development, were without success. He observes that the fact of the currents of fluids in larvæ, not being defined by vascular parietes, enable us to comprehend the rapidity and facility with which the traces of the circulation are lost in the perfect insect. On the other hand, the existence of a circulation at one period, and its cessation at another, elucidates many circumstances connected with the physiology of these animals; for instance, the contrast between the rapid growth and transformation of the larvæ, and the stationary existence of the imago, &c. Lastly, he remarks that the phenomena of this circulation do not throw any light on the obscure subject of the mode of nutrition in perfect insects; which, therefore, must still be supposed to be effected according to the idea of Cuvier,—without the intervention of vessels.”—‘*Introduction to Entomology*,’ vol. iv. p. 96.

To Dr. Bowerbank we are indebted for clearing up the doubts about circulation. He attributes the errors, for such they assuredly are, into which Lyonet and other great authorities have fallen, neither to haste, nor inattention, nor inability, but solely to the imperfection of the microscopes they employed. After the publication of his paper in the fourth volume of the ‘*Entomological Magazine*,’ troops of scientific men came to test, and of course ended in verifying, his observation: Professor Owen, Marshall Hall, Newport, Gulliver, Mantel, Geoffroi St. Hilaire. Of the last-named the following reminiscence will be read with pleasure:—

“One of the most remarkable of my visitors was the great French naturalist Geoffroi St. Hilaire, who paid a short visit to England in 1833. He had read my paper ‘*On the Circulation of the Blood in the Larva of Ephemera marginata*,’ and doubted the possibility of seeing the valvular action of the great dorsal vessel described therein. I had fortunately in my possession some very favourable subjects for exhibiting these beautiful phenomena; and when all was in order, and the great man applied his eye to the instrument, he at once saw the very facts he had doubted, and, without moving his

eye, he shouted 'Ah!' He sat as if glued to it, and did not seem capable of moving from it. His son-in-law, Dr. Martin St. Ange, fed him with the sweet cake that had been offered to him with some wine as refreshment, as he sat gazing at the beautiful sight; but nothing could induce him to remove his eye from the insect, until at last a plunge it made in the cell carried it out of sight; and Geoffroi St. Hilaire started to his feet, threw up both his arms as he strode down the room, and shouted '*Magnifique!*'"

(To be continued.)

Entomological Notes, Captures, &c.

Ants and Imbauba Trees.—Some time ago I sent to Germany for publication a note on the relation between our imbauba trees (*Cecropia*) and the ants which inhabit their hollow stem. As there may be some delay in publishing, I will give you a short abstract. Mr. Belt has already stated that the ants farm scale-insects in the cells of the imbauba stem, and he believes that their presence must be beneficial. This is no doubt the case; for they protect the young leaves against the leaf-cutting ants (*Ecodoma*). Now there is a wonderful contrivance by which, as in the case of the "bull's-horn acacia," the attendance of the ants at the right time and place is secured. At the base of each petiole there is a large flat cushion, consisting of most densely-crowded hairs, and within this cushion a large number of small, white, pear-like or club-shaped bodies (specimens enclosed) are successively developed, which, when ripe, emerge at the surface of the cushion, like asparagus on a bed, and are then greedily gathered by the ants and carried away to the nest. The object of the dense hair-cushion appears to be (1) to secure to the young club-shaped bodies the moisture necessary for their development; and (2) to prevent the ants from gathering the unripe bodies. In most cases it is by honey-secreting glands that the protecting ants are attracted. Now Mr. Belt observed ('Nicaragua,' p. 225) that the honey-glands on the calyx and young leaves of a passion-flower were less attractive to the ants than were the scale-insects living on the *stems*. This would most likely be the case with the imbauba; and

it is probable that the use of the little pear-shaped bodies is to form an attraction stronger than that of the scale-insects, and thus to secure the attendance of the protective ants on the young leaves. As far as I could make out, the club-shaped bodies consist mainly of an albuminous substance. The ant colonies are founded by fertilised females, which may be found frequently in the cells of young imbauba plants. Each internode has on the outside, near its upper end, a small pit, where the wall of the cell is much thinner than anywhere else, and where the female makes a hole by which she enters. Soon after this the hole is completely shut again by a luxuriant excrescence from its margin, and so it remains until about a dozen workers have developed from the eggs of the female, when the hole is opened anew from within by these workers. It would appear that the female ants, living in cells closed all around, must be protected against any enemy; but, notwithstanding, a rather large number of them are devoured by the grub of a parasitic wasp belonging to the Chalcididæ. Mr. Westwood has observed that the "pupæ of the Chalcididæ exhibit a much nearer approach to the obdected pupæ of the Lepidoptera than is made by any other Hymenoptera" ('Introduction to the Modern Classification of Insects,' part xi. p. 162). Now the pupa of the parasite of the imbauba ant is suspended on the wall of the cell by its poster or extremity, just like the chrysalis of a butterfly.—*Mr. Darwin; in 'Nature' of February 17, 1876.*

Remarks on the Oviposition of Limacodes Asellus.—In the early part of last year Mr. W. H. Harwood sent me thirteen pupæ of this species, from which I reared five female moths and seven males, and as I wanted to obtain the eggs I was determined to run the risk of allowing them to copulate which one pair obligingly did. A female having emerged first, a male followed the day afterwards; and in about an hour or so after it had emerged they copulated: this took place at mid-day. After separation I placed the female in a gallipot with a few beech leaves, and covered it over with a piece of white silk sarsenet and then with glass, and in two or three days I removed the sarsenet and found it bespattered with a whitish and glutinous-looking substance, resembling gum or varnish; and not believing it to be the egg, but some

kind of viscous matter which had got dry, I drew my finger over the largest patch and found that moisture came from it, so concluded that it was composed of eggs. Although I applied a strong lens I could not detect an egg of any shape; however, I put the gallipot aside, and looked every day until some eight or nine days had elapsed, when I found the sarsenet thickly sprinkled with whitish and very minute larvæ; but being much engaged at the time, I regret that I was unable to procure food until the second day after the larvæ had hatched: the weather was hot, and I was sorry to find them in a semi-alive state, and I could not get any to feed. By the species copulating at mid-day, and the eggs being decidedly those of a Tortrix, it would appear that it should not be classed in the genus *Limacodes* with *Testudo*, where the late Mr. Henry Doubleday puts it, as it certainly is more approximate to the genera *Halias* and *Sarrothripa*.—*F. O. Standish; High Street, Cheltenham, February 14, 1876.*

Argynnis Dia.—I have to announce an undoubtedly British specimen of this fritillary. It is a female, and was taken in 1872, at Worcester Park, Surrey, by a connexion of my own, Master Wallace A. Smith. He could not identify his capture, and placed it apart by itself. Very recently, on my looking over his insects, he drew my attention to the specimen as something peculiar. He perfectly recollects making the capture, and the exact spot where it was made. I found the specimen pinned and set in beginner's fashion. Mr. Wallace Smith has never had to do in his life with any dealer or collector; and, except things given to him by me, his cabinet contains nothing which he did not catch himself.—*W. Arnold Lewis; Temple, February 14, 1876.*

Pieris Rapæ in Winter.—This morning a gentleman brought to me a fresh living specimen of *Pieris Rapæ* he had captured in his garden yesterday. This is surprising, as we are now in the midst of the severest frost we have had this winter.—*G. T. Porritt; Huddersfield, February 14, 1876.*

Dasycampa rubiginea near Street, in December.—I had the good fortune to obtain a specimen of this moth while geologising and fern-collecting, in a gully about three miles from Street, during the last week of December. The specimen is unfortunately somewhat injured.—*J. Edmund Clark; 20, Bootham, York, February 8, 1876.*

Food-Plants of Gonepteryx Rhamni.—In reply to Mr. Edward A. Fitch (Entom. viii. 302), I may say that there is no more difficulty in obtaining the leaves of the apple and pear tree in Wales than there is in finding the Welsh language there; but the question is, are these the natural food-plants of *Gonepteryx Rhamni* in Great Britain? Mr. Fitch says the larvæ will eat apple, pear, and medlar: he may have bred the species upon these plants, or he may have obtained his information from Kaltenbach's 'Pflanzenfeinde,' where medlar and the "Pyrus-arten" are given, besides the buckthorns, on the authority of De Geer. Still I shall be glad to hear if any entomologist has ever found the eggs or taken the larvæ from either of these trees in this country. If so, it will satisfactorily account for the appearance of the butterfly in Carmarthenshire. In support of Mr. Fitch's theory, it is also interesting to know that Kaltenbach in the same work gives almost the same additions to the food-plants of *Lycæna Argiolus*. I have generally understood the food-plants of this butterfly to be confined to holly, ivy, and the two buckthorns. Kaltenbach does not mention either holly or ivy as food-plants of the "holly blue," but, quoting from De Geer, gives *R. Rhamni* and *R. Fraugula* (De Geer, i. thl. 8 Abh. pp. 62—65), and continues to say, that "later observers have found the larvæ on medlar and apple." Can any of your readers substantiate this statement? If so I shall be very glad to hear from them, either through the medium of your columns or otherwise.—*Owen Wilson; Carmarthen.*

*The Larvæ of Arctia fuliginosa** (Entom. ix. 42).—I have perused with much interest Mr. Eccles' letter with regard to the injury done to his firm's linen, and would offer a few suggestions for the removal of the damaging agent. I notice Mr. Eccles desires to be informed how to get rid of the eggs. This, I think, is a mistake, as the real enemy is the caterpillar; and, besides, that is the most tangible object to proceed against. Now, the next thing to be considered is what measures should be adopted for their destruction. I would suggest that Mr. Eccles should employ some boys for a few days about the middle of April to collect these caterpillars, paying them so much per hundred for all they collect. This would not, I think, be a very difficult task, as

* Erroneously printed "rubiginosa" in the February number.—*E. Newman.*

it is a habit with these caterpillars to bask in the sun after hybernation (the state they are in at the present time), when they may be picked up quite easily where they occur. As they are collected it is needless to say that care must be taken to destroy them; and, should there be any difficulty with regard to this, I would suggest, as one means by which some of them might be disposed of, that Mr. Eccles should send me a few dozen, as I am not fortunate (or, as Mr. Eccles would probably say, unfortunate) enough to find them so plentifully near me.—*C. W. Simmons*; 39, *Market Street, Caledonian Road, London, N., February 3, 1876.*

Preservation against Mites, &c.—Van. Physostigmatis (Calabar bean) is an excellent preservative in cabinets against the attacks of mites and grease, to be used the same way as benzine or corrosive sublimate; and I tried benzine or benzole, as is directed in Newman's 'British Moths,' but I could not get the insects right after.—[*Rev.*] *G. C. Madden*; *Armitage Bridge Vicarage, Huddersfield, January 18, 1876.*

Larva of an Œstrus(?) Infesting Man.—I extracted twenty Funyês, an insect like a maggot, whose eggs had been inserted on my having been put into an old house infested by them. As they enlarge they stir about, and impart a stinging sensation; if disturbed the head is drawn in a little. When a poultice is put on they seem obliged to come out, possibly from want of air. They can be pressed out, but the pimple in which they live is painful. They were chiefly in my limbs.—'Livingstone's Last Journals,' vol. ii. p. 4.

Insects of Kent and Surrey.—The Council of the South London Entomological Society have decided to attempt the publication of a list of insects found in Kent and Surrey; and in order to make the Lepidopterous portion as complete as possible, I venture to ask for help from collectors who have worked in either county, and more especially in districts above twenty miles distant from London. Local lists will be gratefully acknowledged.—*J. Platt Barrett*; 34, *Radnor Street, Peckham, S.E.*

Answers to Correspondents.

Pyrameis Atalanta in Perthshire.—Several specimens of the above species were seen and captured in our garden at

Blairgourie; and my friend Mr. Guild, of Broughty Ferry, took several in his garden there in September. Can you tell me if it is usual to find this butterfly so far north?—*James Grimond*.

[The name of this butterfly occurred in every list I received from Scotland when writing my account of British butterflies, and in no instance is anything said of its rarity. Dr. Buchanan White informs me it occurs in Scotland from the sea level up to the base of Ben Lawers.—*E. Newman*].

To breed Bombyx Rubi.—I have the last three seasons had a number of larvæ of *Bombyx Rubi* which have always died during the winter. I now have some hibernating, and should be glad if you could tell me when I ought to begin to feed them again, and how they ought to be kept during the winter.—*C. Lemesle Adams; Walford Manor, Shrewsbury, December 23, 1875*.

[Procure a large wooden box of any kind,—a tea-chest will do; put a large tuft of heathy turf in it; instead of a lid, cover with a piece of wire gauze; leave it out in all weathers; take care that the bottom be perforated to allow the wet to drain off; treated thus, they will be sure to come out.—*Edward Newman*].

Preserving Larvæ of Lepidoptera.—I shall be extremely obliged if any one will tell me the mode of preserving larvæ. I have seen some preserved which look very natural, and I wish to know the method employed.—*E. G. Browne; Eton College, Windsor*.

[I have long been promised a paper fully explaining the process, and accompanied by figures of implements employed. I know not why it is deferred; and trust the author on reading this will kindly comply with the wishes of his friends.—*Edward Newman*].

The Doubleday Collection.—The valuable collection of Butterflies and Moths, belonging to and collected by the late Mr. Henry Doubleday, of Epping, has been now, by the wish of many collectors and with consent of the Trustees, placed in the Bethnal Green Museum; to be called "The Doubleday Collection."—*Septimus Warner; Hoddesdon, February 24, 1876*.

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No. 154.]

APRIL, MDCCCLXXVI.

[PRICE 6d.

Description of Polysphænis sericina from Guenée.
By EDWARD NEWMAN.



POLYSPHÆNIS SERICINA (female).

THIS beautiful moth being now added to the list of the Lepidoptera of the British Islands, on account of its occurrence in Guernsey, I think it will be well to copy the description from Guenée.

“Fore wings bright grass-green, clouded with olive-green, with the median area, or at least the upper part of it, of a still brighter green, powdered with whitish; the two median lines are very distinct, white, bordered with black; extra-basilar line deeply notched towards the lower extremity; the elbowed line, with the teeth, very distinct, and prolonged into black points. The ordinary markings are more or less hidden in the greenish white; the subterminal line is almost reduced to white dots on the black wing-rays. Hind wings reddish fulvous, with the wing-rays and a cellular mark darker, and a broad, marginal, black band surmounted with a very indistinct transverse line; these markings are perceptible on the under side. That of the fore wings with a

large, cellular, black spot. Antennæ of the male furnished with slender laminae, which are pubescent on the sides and verticillate towards the tip. Abdomen with the five anterior segments crested, the crests more conspicuous on the third and fourth. Larvæ of a grayish flesh-colour, with brownish markings, and the dorsal area lighter and in form of a band; the medio-dorsal stripe very distinct, of a velvety black-brown, with an oblong white mark; in approaching the hinder incision the subdorsal stripe scarcely perceptible, surmounting a yellow spot about two-thirds of the length of each segment, and which becomes black on the 10th and 11th segments; the stigmoidal stripe is scarcely perceptible, and nearly concolorous with the ground colour. A black base-ment occurs on the 12th segment, and this extends into the anal claspers. The head is brown, with two black spots on the forehead. It feeds in April on the honeysuckle, and only in the night, and remains continually on the twigs, attacking the lower leaves."—'Noctuelites,' vol. ii. p. 72.

This fine insect occurs in Central and Western France, Italy, Dalmatia, and the Channel Islands, but is nowhere abundant. Owing to the peculiar habit of the caterpillar, feeding as it does on the lower leaves of the honeysuckle, and only in the night, it is very likely to escape observation; indeed, in the larva state it would be almost impossible to find. Our southern maritime counties offer it a congenial habitat, and the honeysuckle in all our hedgerows would afford it abundant food, while their excessive trimness and stiffness, so rarely found on the Continent, would offer it ample security against the umbrella and beating-stick of the larva-hunter. I am indebted to Mr. W. A. Luff, who is now studying the Entomology of the Channel Islands, for this beautiful species.

EDWARD NEWMAN.

Descriptions of Oak-galls. Translated from Dr. G. L. MAYR'S 'Die Mitteleuropäischen Eichengallen' by E. A. FITCH, Esq.

(Continued from p. 52.)

40. *Andricus burgundus*, Gir.—The resemblance between the gall of this species and the one last described is so strong that I am unable to give a constant mark of distinction. If,

in spite of this, I have described *A. circulans* as a new species, it is because the flies differ considerably from one another, and *A. burgundus* appears a month later. Dr. Giraud informed me that he also had met with the species last described, and thought it new. He thinks that each gall of *A. burgundus* is formed on an anther, and the union of several galls in an undeveloped flower-bud would produce such an impression. It is certain that the galls of *A. circulans* are generally developed on leaf-buds, and further investigations will show whether the galls of *A. circulans* are *only* to be found on leaf-buds, and those of *A. burgundus* *only* on flower-buds. The figure of the gall of *A. burgundus* is from typical specimens.—*G. L. Mayr.*

In the 'Entomologische Zeitung' (Stettin), xxxi. 396, Von Schlechtendal, in his paper on gall-flies, describes the gall of another and new species as the *Andricus burgundus*, *Gir.* This is another Turkey oak species, and has not occurred in Britain.—*E. A. Fitch.*

41. *Spathegaster Giraudi*, Tschek.—This small oviform gall, varying in length from 2·7 to 4·5 millimetres, is developed in the early spring from the small axillar buds (which are scarcely larger than a pin's head) of the weakest, one-year old, shoots of *Quercus pubescens*. When recent it is green, more or less reddish, and generally thickly covered with soft, red, porrected hairs. It only consists of a thin, moderately soft shell, which forms the larva-cell; the small bud-scales are situated at the base of the gall. The gall-fly appears in the first fortnight in May. This year, the spring being late, I did not obtain the fly till the middle of May, from fresh galls kindly sent me by Director Tschek.—*G. L. Mayr.*

This species—named after Dr. Giraud, from galls found rather commonly near Piesting (Austria), by Tschek (1869,

Fig. 40.



GALL OF ANDRICUS BURGUNDUS (of the natural size and magnified).

Fig. 41.



GALL OF S. GIRAUDI.

Verh. der zool.-botan. Gesellschaft, Wien, xix. 559)—is but a synonym of one of Giraud's own species, *S. flosculi* (1868, Ann. Soc. Ent. Fr. p. 54), as pointed out by Dr. Mayr. *Ceroptres arator*, *H.*, occurs in the gall as an inquiline, in the summer of the same year.—*E. A. Fitch.*

42. *Spathogaster aprilinus*, Gir.—This vesiculate gall, normally about as large as a pea, is generally developed on the terminal, rarely on the axillar, buds of *Q. pubescens*, but it sometimes occurs on those of *Q. sessiliflora*. It is remarkable on account of its rapid growth, as it becomes mature, and exhibits the circular hole made by the exit of the fly, within a few days after the bursting of the buds. It is spherical, oviform, or knobby, and either of a yellowish white or yellowish green colour, partly rosy, and covered with short scattered hairs; at its base it rests on the large exterior bud-scales; the interior scales, which easily fall off, are dispersed about its upper part.



GALL OF
SPATHEGASTER APRILINUS.

It consists of a juicy, thin-walled marenchyma, and contains from one to five cells, which are conspicuous on the outside, appearing like bumps, and are often distinctly divided by furrows; in the interior a somewhat perpendicularly-placed marenchyma forms the division of the cells. The cells are large in comparison to the size of the insect, generally oviform, and for the most part placed upright on their longitudinal axis. The galls are often so small that the buds which contain them can only be recognised through the bud-scales which are less regularly placed and are more open. Each gall-fly, when escaping, makes a circular hole in the substance of the gall, but it is done in such a manner that the piece cut out is left adhering at one point. Soon after the escape of the fly the gall shrivels up to such a degree that we only meet with a dry crippled bud in its place. Dr. Giraud states, in his 'Signalements,' &c., that he found many galls on April 20th already pierced, and yet he obtained a number of flies up to April 23rd. On the 17th of April, last year, I found these galls on the

Laaerberg, near Vienna; some of them were pierced, but in spite of that I obtained many of the gall-flies within the next few days. This year, spring being so late, I did not find them till May 15th; then, however, in great profusion on the Leopoldsberg, near Vienna. They occur as much on shrubby oaks as on old trees. The large well-developed galls were more or less pierced; they only produced two males, but in the course of the same month a number of *Platymesopus tibialis*, *Westw.*—*G. L. Mayr.*

I have seen British specimens of this gall, found by Mr. Rothera, near Nottingham. It probably occurs elsewhere; but, as Giraud observes, it occurs early, and the period of its existence is very short. It is, consequently, very likely to escape observation. In addition to *P. tibialis*, Mayr obtained four species of *Ceroptres arator*, *H.*, in June of the first year.—*E. A. Fitch.*

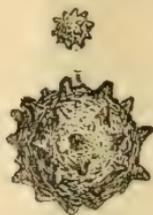
Fig. 43.

? GALL OF *CYNIPS ARIES*.

43. ? *Cynips aries*, Gir.—This beautiful gall has been sufficiently described by Dr. Giraud in his ‘Signalements,’ &c. (*Verh. d. zool.-bot. Ges.* 1859, p. 371), with this exception:—“Si je ne me trompe, elle siège dans le pétiole d’une feuille dont la nervure principale seule a continué à croître et a produit ce grand prolongement qui la surmonte;” for the gall is a genuine bud-gall, being developed from the axillar buds, and still retaining the small bud-scales at its base. The specimen figured I received from Dr. Giraud.—*G. L. Mayr.*

44. ? *Cynips gemmea*, Gir.—With regard to this questionable species I refer to the description given in Dr. Giraud's

Fig. 44.

? GALL OF *CYNIPS GEMMEA* (natural size, and magnified).

'Signalements,' &c., and only give a figure from a typical specimen in the imperial zoological cabinet.—*G. L. Mayr.*

45. ? *Cynips exclusa*, Ratz.—It is very doubtful whether this gall is produced by a distinct species of gall-fly, or only

Fig. 45.

? GALL OF *CYNIPS EXCLUSA* (in the bud).

belongs to one of those just described. I add the figure of a specimen, from Von Heyden's collection, which probably is referable to this species; but it is badly preserved, which makes it impossible to refer it to one of the previously described galls (Forstinsekten, iii. 56, pl. v., fig. 8).—*G. L. Mayr.*

Notes on Preserving Larvæ. By HENRY A. AULD, Esq.

ALTHOUGH the mode of preserving larvæ for the cabinet is familiar to many practical entomologists, there may be a few who read this journal to whom the method, simple as it is, may be unknown. Specimens are often seen pickled in bottles of spirits; but treated thus they seldom form very beautiful objects, and, enclosed in tubes and vials, cannot be arranged side by side with the imago forms. Therefore, to know how to preserve larvæ in such a way that they may be

placed with the perfect insects, and so enhance the interest of their collections, would doubtless be a boon to many a tyro-lepidopterist; and in the hope that, now the season has fairly set in, some may be induced to experiment upon the commoner species, these few notes are offered.

Fig. 1.

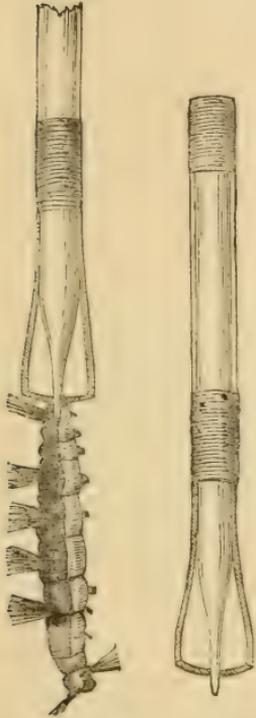


Fig. 2.



Fig. 1. Blowpipe; the left-hand figure having the larvæ attached. Fig. 2. Shows the mode of preserving. For the loan of these two cuts—which illustrated my notes on the same subject, in 'Science Gossip,' a few years back—I am indebted to the kindness of Messrs. Hardwicke and Bogue, the publishers of that journal.—*H. A. A.*

A blowpipe is required; but as the instrument, constructed as it generally is, would be unfit for the work, it is necessary to procure some specially made from glass-tubing, the end of which is to be melted and drawn out to a fine point. It is, perhaps, preferable to make them oneself from tubes of

various diameters, so that the largest or most minute larvæ may be operated upon. Two pieces of watch-spring, about three inches long, each having a portion at the tip heated, and then bent at right angles, a quarter of an inch from the end, should be bound round the blowpipe, as shown in fig. 1. A spirit-lamp, tripod stand, and an oven, are also requisite, the latter—represented in the sketch by the glass-bottle, as shown in fig. 2—being easily made from a tin-canister, such as chocolate is generally sold in, by punching out of the lid a hole the size of a florin.

It is almost superfluous to mention that the larvæ should be in good condition, and selected, if possible, shortly after their skins are cast, but not before they have regained their toughness. They should be killed in the cyanide bottle, or with anything not destructive to their colour, and then steeped for an hour or so in a solution of alum to harden the skin. The internal organs are then to be removed by forcing them through the anal aperture with the fore finger and thumb between blotting-paper. The inside being completely removed in this way, the larva should be fastened to the blowpipe in such a manner that the two pieces of watch-spring pressing against the point of the tube may grasp the smallest portion of its last segment. Thus fastened, it can be gently inflated and kept distended whilst drying in the oven, which, in the case of small specimens, will occupy from one and a half to two minutes, according to the heat, which should not be raised very high for those of a delicate colour. It sometimes happens that when inflated the larva does not assume the position required: it bends into a semicircular form, or the head-part curves downwards. To remedy this a simple arrangement of thin wire tied to the blowpipe, as shown in fig. 3, may be made to hold it whilst drying; in fact, by bending the wire it may be held in any position.



Fig. 3.—Fine wire attached to blowpipe to hold larvæ whilst drying.

When removed from the oven dry, the specimens are ready to be mounted on twigs, very fine ones being cut to fit in

between their claspers. If mounted in this way on the food-plant they will possess a very life-like appearance, and form beautiful objects for the collection.

Cossus ligniperda preserves admirably; and the Bombyces will be the favourites of all who take to preserving them. The larvæ of the Sphingidæ, if of a green colour, are almost sure to fade during the drying process, which for them should be conducted very slowly. Some persons restore the natural colour by the use of pigments; but this is to be deprecated. If there are many which do not retain their natural appearance, there are, on the other hand, many that do; and by practising on these a proficiency may be acquired which will enable the operator to manipulate the others with better chance of success.

HENRY A. AULD.

The Retreat, Blackheath.

Preserving Larvæ of Lepidoptera.—Perhaps the following, taken from the 'Taxidermist's Manual,' may help Mr. E. G. Browne:—"The easiest way of destroying the caterpillars is by immersion in spirits of wine. They may be retained for a long time in this spirit, without destroying their colours. After having killed the caterpillar, as above directed, make a small puncture at the tail, gently press out the contents of the abdomen, and fill the skin with fine dry sand, bringing the animal to its natural circumference. It is then exposed to the air to dry, and will have become quite hard in the course of a few hours; after which the sand may be shaken out at the aperture, and the caterpillar then gummed to a piece of card. Another method is, after the entrails are squeezed out, to insert into the aperture a glass tube, drawn to a very fine point. The operator must blow through this pipe while he keeps turning the skin slowly round over a charcoal fire; the skin soon becomes hardened, and, after being anointed with oil of spike and resin, it may be placed in the cabinet when dry. A small straw or pipe of grass may be substituted for the glass pipe. Some persons inject them with coloured wax after they are dried."—*R. Laddiman; Norwich, March 18, 1876.*

[I have often tried the plan of killing larvæ in spirits of

wine, recommended by Mr. Laddiman on the faith of the 'Taxidermist's Manual,' and actually procured a gross of small phials of very clear glass, intending to keep one larva in each; but long before the one hundred and forty-fourth phial was loaded, those at the beginning of the series had become as black as ink, which seemed so objectionable that I abandoned the attempt, and threw away the specimens. I have since received skins filled with fine dry sand, which continued to escape; I suppose through the aperture by which it was introduced. The drawers in which such preserved larvæ were deposited presented the appearance of being infested with mites, and constantly evoked the exclamation:—"I see you have mites here; you must look after them in time!" The coloured wax I have never tried.—*Edward Newman.*]

Notes on the Yucca Borer (Megathymus Yuccæ, Walk.).

By CHAS. V. RILEY, M.A., Ph.D.*

[THE Castnians have always been a favourite group with me, and I have felt a disposition to place them with those familiar Lepidoptera, of which *Xyleutes Cossus* is an expressive example, and which we all seem to recognise by the name of "internal feeders." It is a group marvellously heterogeneous in its adult state, and marvellously homogeneous in the larval state. I recollect well the cachinnation I provoked, when in 1832 I proposed they should be associated: it was thought a climax of absurdity to place *Xyleutes Cossus* and *Ægenia Tipuliformis* in the same category. Mr. Riley's most interesting paper gives me some confidence that the idea is not so far-fetched; and I hope hereafter, if I should live, to include other and unlooked-for Xylophagans, even among the Micro-Lepidoptera. But I will quote Mr. Riley.—*Edward Newman.*]

The study of aberrant forms in Nature is always interesting. They are continually confronting the naturalist. They baffle the systematist, and constantly remind him of the necessarily arbitrary nature of his classificatory divisions. Few divisions seem more natural, at first glance, than that of

* From a Paper read before the Academy of Science of St. Louis, U.S.: communicated by the Author.

the Lepidoptera into Rhopalocera (butterflies, or day-flyers) and Heterocera (moths, or night-flyers). It was no sooner proposed by Boisduval than it was recognised as a most convenient arrangement, and adopted very generally. The antennæ in this order are always conspicuous, and their clubbed or non-clubbed tips are easy of observation, and associated with other important characteristics which separate the two groups. The Sphingidæ, however, by their crepuscular habit, and their antennæ thickening towards the end, though terminating abruptly in a point, bring the two groups in close relationship, and diminish their value; while the Castniidæ, on the one hand, and the Hesperidæ, on the other, so intimately connect them, that it becomes almost a matter of opinion as to whether the former should be considered butterflies, or the latter moths. *Urania* and other abnormal genera make the relationship of the two groups still more perplexing. On antennal structure alone—whether we consider the clubbed or non-clubbed tips according to Boisduval, or the rigidity, direction, and length, which Mr. Grote deems of greater importance—two primary divisions cannot be based. If we take the spring or spine on the hind wings, which is so characteristic of the Heterocera, we meet with the same difficulty, for a large number of moths do not possess it, while an accepted Hesperian (*Euschemon Rafflesiæ*, *Macl.*), from New South Wales, is furnished with it. Nor is there any one set of characters which will serve as an infallible guide to distinguish moths from butterflies; and the number of moths described as butterflies, and the fact that Kirby considers the position of *Barbicornis*, *Threnodes*, *Pseudopontia*, *Rhipheus*, *Ægiale*, and *Euschemon*, included in his ‘Synonymic Catalogue of Diurnal Lepidoptera’ as doubtful butterflies, gives sufficient proof of the truth of the statement. Between all classificatory divisions, from variety to kingdom, the separating lines we draw get more and more broken in proportion as our knowledge of forms, past and present, increases. Every step in advance towards a true conception of the relations of animals brings the different groups closer together, until at last we perceive an almost continuous chain. Even the older naturalists had an appreciation of this fact. Linnæus’s noted dictum, “*Natura saltus non facit*,” implies it; and Kirby and Spence justly observe that “It appears to be the opinion of most modern physiologists

that the series of affinities in nature is a concatenation or continuous series; and that though an hiatus is here and there observable, this has been caused either by the annihilation of some original group or species or that the objects required to fill it up are still in existence, but have not yet been discovered." Modern naturalists find in this more or less gradual blending their strongest argument in favour of community of descent; and speculation as to the origin, or outcome rather, in the near present or remote past, of existing forms, is naturally and very generally indulged, even by those who a few years back were more inclined to ridicule than accept Darwinian doctrine. Shall we then say that the old divisions must be discarded because not absolute? As well might we argue for the abolition of the four seasons because they differ with the latitude, or because they gradually blend into each other. Entomologists will always speak of moths and butterflies, howsoever arbitrary the groups may come to be looked upon, or however numerous the intermediate gradations. These thoughts naturally present themselves in considering so osculant a species as the *Yucca* borer.

The entomological reader is aware that the queenly *Yuccas* cradle and nourish a very curious and anomalous Lepidopteron—the *Pronuba yuccasella*. The genus is further interesting, from the entomological side, as giving us the insect under consideration. In the home of the *Yuccas*, and more particularly in the home of the caulescent species, like *Y. aloifolia* and *Y. gloriosa*, persons who have occasion to dig up the roots, or subterranean trunks, often notice that these are bored and hollowed out along the axis, the burrow cylindrical, and lined at its upper end with silk, which is generally intermixed with a white, glistening, soapy powder. These tunnellings are made by our *Yucca* borer, which dwells therein; and their presence may generally be detected by masses of excrement observable amongst the leaves, and by certain chimney-like projections made by the twisting and webbing together of the more tender heart-leaves, or even of the flower-stalk, after they have been partly devoured, into a sort of funnel, from which the excrement is expelled. The tunnellings weaken the trunk and induce rot, so that the plant is not unfrequently prostrated thereby; and as the

insect is sufficiently common in the Gulf States to sometimes be found in every third plant over extended regions, its work renders the *Yucca* worthless as a hedge-plant, for which it has been tried.

In the months of April and May, in South Carolina, but earlier in more southern latitudes, the parent *Megathymus* may be observed, where the *Yuccas* abound, passing, with very rapid, darting flight, from plant to plant, remaining but a few seconds at one place, during which she fastens an egg to some portion of a leaf. She is generally seen at this work in the morning hours. The eggs, which are well developed when she issues from the pupa, are laid singly, though several are often attached to the same leaf, generally near its tip, and on the upper or under side indifferently. In the course of about ten days the young reddish brown larva gnaws its way out through the crown of the egg, and conceals itself in a web between some of the more tender terminal leaves. Generally it will be found at first near the tip of a leaf, where the sides naturally roll up and afford a safe retreat. It then gradually works to the base, feeding the while, and rolling and shrivelling the blade as it descends. Other blades are often joined; and, in fact, the insect lives among the blades till it is about one-fourth grown, and seldom enters the trunk before that time. How soon, in the larval development, the white, powdery secretion, already spoken of, appears, or how many larval moults occur, has not been ascertained; but the more mature larva is always more or less covered with this powdery matter, which doubtless serves as a protection from the mucilaginous liquid which the tissues of the *Yuccas* contain and freely exude upon interference or maceration. Pupation does not take place till the subsequent late winter or spring; there being, from all that I can ascertain, but one brood each year. The burrow often extends two or more feet below ground, and during the coldest weather the larva probably remains in a partially dormant state at the bottom. Occasionally two larvæ inhabit the same trunk; in which case their tunnellings are kept separate, side by side. The pupa state is generally assumed just below the chimney-like funnel at the top of the burrow, and no other preparation is made for it than partial closing, near head and tail, to insure suspension. This

funnel is, in reality, built and extended by the larva; and what little matter besides silk goes to make its exterior has been added and worked in from the outside. In the several larvæ that I have had feeding in breeding-cages, this habit of building up and making tubes, for which remnants of leaves and other extraneous substances are pressed into use, struck me as quite characteristic; and in one instance I have had such a tube extended over nine inches from the tunnelled trunk, the moss on which the section of *Yucca* rested being used in its construction.

In the issuing of the imago the pupa skin is rent on the middle of the notum and across the eyes, and the casings of the legs are never, and those of the antennæ seldom, severed from their solderings in the exuvium. The imago rests with its antennæ slightly diverging and generally directed forwards, with the wings elevated, closely appressed, and with the costa of primaries at an angle of about 45° from the body. Regarding the flight, which is diurnal, Dr. J. H. Mellichamp, of Bluffton, S.C., was impressed with the extremely rapid and darting motions of the insect as it passes from plant to plant; and Mr. E. A. Schwarz, of Detroit, who has had very excellent opportunity of observing the species in Volusia Co., Florida, informs me that, when startled, *Megathymus* flies directly upward twenty or thirty feet, then horizontally for a long stretch,—sometimes out of sight,—and descends as directly as it rose. It frequents open places, is very shy, and generally settles near the ground.

(To be continued.)

Entomological Notes, Captures, &c.

On the Immense Flight of Terias Lisa in the Bermudas (Entom. ix. p. 54).—The majority of the readers of the 'Entomologist' will, I am sure, have felt great interest in the valuable paper, by Mr. J. M. Jones, on the extraordinary flight of *Terias Lisa* to the Bermudas. As I take especial interest in the migration of butterflies, as well as birds, and being ignorant of the geographical range of that species, beyond that given by Mr. S. H. Scudder in a footnote at p. 57, I should feel greatly obliged to my friend Mr. Jones if he could kindly answer the following questions:—(1) In

what proportion of sexes did the butterflies arrive? (2) Was the species previously indigenous to the Bermudas; and, if not, does the food-plant of the larvæ occur on the islands? (3) Were the females observed to deposit any eggs? (4) Would the insect in the latitude of the Bermudas hibernate; and, if so, at what stage of its existence? Now, as a natural consequence, if *Terias Lisa* is not indigenous to the Bermudas, and its food-plant does not occur there, this vast flight of butterflies must have perished without providing for the continuance of the species. Darwinian as I am,—thoroughly believing in the evolution of species,—I cannot credit any of these interesting phenomena to “chance.” There must be a design in this occasional and often periodical migration of species, which, in regard of insects, must necessarily be, as a rule, only partial, after the manner described by Mr. Bates, as occurring in the Amazon region, and by Mr. Holdsworth, in Ceylon. There can be no doubt, I think, that many of our so-called species originate first by separations, as above alluded to, and then by the breeding *inter se* of these forced insular forms.—*Henry Reeks; Thruaxton, March 8, 1876.*

Varieties caused by the Starving of Larvæ.—Mr. H. Ramsay Cox gives the following passage (*Entom.* ix. p. 58), as to the effect produced upon *Vanessa Urticæ* in the imago state by starving the larvæ:—“The *Urticæ*, in spite of their starving, came out nearly the natural size.” I beg to say that I once experienced a somewhat similar effect produced in the imagos of *Vanessa Urticæ*; and a query, as to which, appeared in the ‘*Entomologist*’ (vol. v. p. 371). My experience, however, was somewhat different from that of Mr. Cox, inasmuch as my specimens were very much smaller than the usual size, the largest measuring one inch and three-quarters, the smallest only one inch and five-sixteenths, respectively, from tip to tip of fore wings. At the time I had no idea of the probable cause; but from a paragraph in Newman’s ‘*British Butterflies*’ (p. 54), being an extract from the ‘*Entomologist*’ (vol. ii. p. 132), by Mr. J. R. S. Clifford, and remembering that my larvæ, like those of Mr. Cox, had been left with a short supply of food, I believe the cause of the small size of the imagos was attributable to the deficiency of food whilst in the larva state. My experience, as to the

wings of the perfect insects being in no way shrivelled, corresponds with that of Mr. Clifford.—*George W. Oldfield*; 25, *Margaret Street, Cavendish Square, March 1, 1876.*

Description of the Larva of Ebulea crocealis.—On the 14th of June last I received a few larvæ of this species from Mr. J. H. Threlfall, of Preston, who had collected them at Grange; and on the following day a further supply from Mr. W. H. Grigg, of Bristol. The full-grown larva is about half an inch in length, and stout in proportion; head globular, the same width as the 2nd segment; body cylindrical, slightly attenuated at the extremities; segmental divisions deeply cut; tubercles raised, each emitting a fine hair; a distinct polished plate behind the head. The ground colour is a very pale semi-translucent glaucous-green; the head, and plate on 2nd segment, intensely black and shining; a dark green pulsating vessel forms the medio-dorsal line, this line dividing even the plate on 2nd segment; the sub-dorsal lines are waved, of the same colour, but finer and less distinct; there are no perceptible spiracular lines; tubercles and spiracles black; hairs brownish. The ventral surface uniformly very pale, transparent glaucous-green. Feeds on *Inula dysenterica*, and when full-grown draws the edges of the leaves together, and in the cavity thus formed changes to pupa. The pupa is rather elongated, smooth, and shining; colour a deep rich brown; the abdominal divisions yellowish brown. The imagos began to appear on June 30th.—*Geo. T. Porritt*; *Huddersfield, March 3, 1876.*

Early Hatching of Crocallis elinguaris.—In the early part of last August I took a female of *Crocallis elinguaris* at Bishop's Wood, Highgate, which laid me a batch of eggs on the side of a chip-box. At the time I took the moth it was settled on a tuft of grass in the hedge, and had the appearance of being just out, so that I concluded the eggs would be useless; but upon looking at them this afternoon I found two small larvæ out, and the other eggs show signs of approaching fertility. On referring to Newman's 'British Moths,' I find that the larva lives throughout the winter. Is not this an uncommon occurrence?—*E. Holton*; 56, *Acton Street, Gray's Inn Road, March 4, 1876.*

[There are many instances of recorded deviation from the rule of hibernation in caterpillars.—*Edward Newman.*]

The Mole's Flea: a Discovery for Leap Year.—A rare prescience, analogous to that which led Adams and Leverrier to announce the existence of a ninth planet long before our best instruments had brought it within the range of human vision, induced some of our leading entomologists to name an insect as the Mole's Flea, just half a century before that saltant hexapod vouchsafed to present himself to the expectant eye of science. Mr. Fitch, whose researches on galls and gall-insects have rendered him the *facilis princeps* of the Cecidology of this country, has discovered that the mole is thickly infested with a minute flea peculiar to itself. He writes to me thus, in reply to my request that he will give me some details of the capture:—"I do not think any 'details of capture' can be needed for the mole's flea, as I believe the difficulty would be to find a mole on which these fleas were not abundant. Last spring I caught from thirty to forty moles, and I do not think there was one of them on which I did not notice these fleas. Several of these moles were dead, though perhaps not stiff, when taken out of the ground, yet their fur contained the fleas; so I do not think they leave the animal so soon as is the case with some others, which I have observed to take their departure immediately after the death of the animal on which they were living. In killing hedgehogs, not always an easy task, I have seen the ground completely covered with fleas immediately afterwards: in one case, which I recollect more especially, the operation took place on a white door-step. I remember, last year, on catching a field-mouse, directly I had put an end to its existence by squeezing its throat, the fleas made their exit over my hand. If you recollect, I told you these fleas were blind; and I believe this fact is well known to microscopists." I see by a list of microscopic objects, obligingly lent me by Mr. Fitch, that a "mole's flea without eyes" is advertised for sale; the price is one shilling and upwards for these and other parasites in the same catalogue. Mr. Fitch has supplied me most liberally with specimens of this flea, and I have forwarded a series of them to my friend Dr. Bowerbank, who has immortalised himself by revealing the secrets of the insect-world and of sponges. Dr. Bowerbank writes as follows:—"I have carefully examined the mole's fleas with a power of 200 linear, viewing them in every possible position,

but I cannot detect an eye in any of them. They have beautiful, short, clubbed antennæ, and are altogether very interesting little fellows." I see no alternative, therefore, but to conclude that the mole's flea is perfectly without eyes; and one sees at once that there is small need of the power of vision in an insect that is never destined to see the light of day except through the intervention of the mole-catcher. To a *non-entomologist* it must appear strange that the name of "mole's flea" and "*Pulex Talpæ*" should have been applied to a flea never found on the mole; but entomologists will know that this is in strict accordance with the time-honoured custom in the science, for an entomologist will frequently name an insect after any plant, rather than that on which it feeds. Therefore the name of "mole's flea," having been given by Samouelle, and endorsed by Curtis, Dugés, Westwood, and Walker, must be retained, however inappropriate for the usurper, and a new name must be invented for this real inhabitant of mole-skin. Having virtually declined the practice of insect-naming and description-writing for thirty-six years, I shall not now resume it; so leave the christening of this little stranger to those who covet, and claim, and not unfrequently do battle for, such barren honours.—*Edward Newman.*

Bugs Introduced into Africa by the Arabs.—Inside, the dwellings of the natives are clean and comfortable; and before the Arabs came bugs were unknown. As I have before observed, one may know where these people have come from, by the presence or absence of these nasty vermin.—'*Livingstone's Last Journals*,' vol. ii. p. 33.

Insect Fauna of St. Helena.—The following brief extract is part of a letter from Mr. Waller to Dr. Hooker, and is reprinted from 'Nature' for February 3rd:—"The insect flora[?], although so extremely limited that I have not in nearly even three months collected more in Coleoptera than one hundred and fifty species, still continues to keep up its character for eccentricity—ringing the changes on some half a dozen types (chiefly Rhyncophorous) to a marvellous extent. We seem, indeed, never to exhaust them, turning up new species almost every time that we can secure a hard day's work on the *Compositæ* ridge. Having ultimately to work them out, I take scores of specimens, and must have mounted carefully some six or seven thousand already."

*Answers to Correspondents.**Windpipes of Insects: Organs of the Senses in Insects.*—

I have read your article about the windpipes of insects (Entom. ix. 62) with much pleasure, and I think you are doing good service in thus enlightening our entomological friends, so few of them trouble themselves about such matters, although they are most interesting subjects for study. Species hunting is all very well; but to my mind the wonderful variations and adaptations of their organs to their especial purposes is by far the more interesting subject of study. Who knows anything about their organs of smell? I have long had some crude ideas on that subject, and I shall hope to discuss that subject with you some of these days.—*J. S. Bowerbank; 2, East Ascent, St. Leonard's-on-Sea.*

[Certainly not sent for publication; but I hope Dr. Bowerbank will pardon the breach of confidence I commit in publishing it. It is lamentable to reflect that we have absolutely no knowledge of the seat of hearing, taste, or smell, in any of the hexapods; indeed, if we have not stood *absolutely still* since the publication of the 'Bybel den Natuura' in 1783, we may be said to have retrograded. I make no apology to entomologists for my exultation in having found an approver of my views. This exultation is surely allowable, when we hear the pæans with which the naming of a new beetle is hailed.—*Edward Newman.*]

Circulation of Blood in Insects.—In the last number of the 'Entomologist' (Entom. ix. 00) it is stated that Dr. Bowerbank discovered circulation in insects. In a magazine, named 'Ward's Miscellany,' of 1838, it says that a German naturalist, Behn, discovered it. I should be obliged if you will kindly tell me on which side is the error.—*Alfred Jones; Torquay, March 14, 1876.*

[I may refer to this subject again hereafter. It will be sufficient for the present to state that I have ascertained the titles and dates of these papers on "Circulation of Blood in Insects." 1. Dr. Bowerbank's papers are as under:—"Observations on the Circulation of the Blood in Insects."—'*Entomological Magazine,*' vol. i. pp. 239—244, April, 1833. "Observations on the Circulation of Blood and the Distribution of the Tracheæ in the Wings of Chrysops Perla."—'*Entomological Magazine,*' vol. iv. pp. 179—185, October, 1836.

2. M. Behn's papers are as follows:—"Discovery of a Circulation in the Legs of Hemiptera, dependent on the motions of the Dorsal Vessel."—*Müller's Archiv.*, 1835, pp. 554—62. "On the Structure of the Blood Vessels."—*Deutsch. Nat. Bericht.*, 1844, p. 113. I think this will be considered as giving Dr. Bowerbank a decided priority.—*Edward Newman.*]

Lampides bætica.—How many times has *Lampides bætica* been captured in England?—*E. F. Johns; Winton House, Winchester, March 16, 1876.*

[Three: two specimens are said to have been taken by Mr. M'Arthur; the first on the 4th of August, 1859, and the second the day following; the third specimen was taken by Mr. Latimer, near Christchurch, in Hampshire, also on the 4th of August, 1859. (See 'British Butterflies,' p. 119.) No subsequent record has been published. There is something suggestive of my "blown-over" theory in this accordance of date.—*Edward Newman.*]

Inquiry respecting Asthenia pygmæana.—I have lately taken a specimen of a Tortrix unknown to me, and which agrees in every respect with *Asthenia pygmæana* in Stainton's 'Manual.' Have there been any late occurrences of this insect? as I find it nowhere mentioned in the 'Entomologist' or elsewhere. I was surprised to see it turn up, and I think I must have mistaken it for some other insect. Could you oblige me with any information on the subject? I have never observed a specimen like the above-mentioned before. As there are so few Tortrices occurring this month I think I could hardly have mistaken it.—*W. Thomas; Surbiton Villa, Surbiton, March 7, 1876.*

[I am unable to assist Mr. Thomas in this inquiry. I am unacquainted with the species *Pygmæana*, and I have not seen Mr. Thomas's specimen. This insect is the *Subsequana* of Haworth, of whose description Mr. Stainton's appears to be a translation. A description in German will be found at p. 281 of Herrich-Schæffer's splendid work, but no figure, it having been previously figured by Hübner, No. 69. In such a case I would recommend Mr. Thomas to take the insect to Mr. Weir, Mr. Machin, or Mr. Eedle, either of whom would probably be able to give the required information at a glance.—*Edward Newman.*]

Larvæ in Reeds.—Could you kindly tell me what the

enclosed larvæ are? They are abundant in the reeds here.—[*Rev.*] *A. C. Hervey; Beaulieu, March 17, 1876.*

[The specimens of reeds sent contain each the larva of a parasite, which still requires further examination.—*Edward Newman.*]

Black Spots on Insect Cabinets.—Can you tell me the cause of black spots arising in the drawers of a mahogany insect cabinet, lined as usual with cork? Some of my drawers are covered with the most unsightly black spots and blotches of all sizes. I find the cork beneath the paper where these marks occur of a blackish colour; but why it should be so I am at a loss to know. At first I thought that washing the paper in places with bichloride of mercury, or the accidental dropping of the oil of aniseed, thyme, and spirits of wine, with which I occasionally soak my insects, might have caused this discoloration; but places in some of the drawers where I know neither of these liquids have fallen, accidentally or otherwise, are just as bad. I find neither painting them over with white paint, nor chalking them carefully, are of any use permanently, as the black substance, whatever it is, asserts its supremacy in the course of a short time, in most instances. Can you suggest a remedy? I have had the cabinet many years (probably ten); and it is only within the last year or two these disgusting disfigurements have appeared. They seem, too, to be increasing. The cabinet is mahogany throughout; there is no deal in it anywhere.—*J. H. White; Hemingford Grey, St. Ives, Hunts, March 8, 1876.*

[I have never observed anything of the kind, and can hardly give an opinion. Perhaps some of my correspondents have had similar experience, and will say what remedy was found effective.—*Edward Newman.*]

Mosquitoes in Ireland.—On the 26th of January I was bitten by an insect, exactly resembling a mosquito, in the evening by lamp-light, in the residence of a friend in the centre of the county Wexford. I was first attracted by the buzz, with which I have had unpleasant associations both in Australia and America. After allowing it to bite me on both hands, I killed it. The marks of the bites still remain. Have mosquitoes often been observed in Ireland?—*Alfred Webb; 74, Middle Abbey Street, Dublin, February 8, 1876.*

[*Culex pipiens*, the common gnat, is the only so-called

mosquito of England and Ireland. It is abundant in both countries.—*Edward Newman.*]

W. Thomas; Surbiton.—I am obliged for the notice, but prefer not recording escapes; moreover, the insect in question would scarcely be recognisable on a gas-lamp.—*E. Newman.*

Geo. R. Dawson; Driffield.—The hind wings of the female are darkest. This is almost invariably the case in the Noctuidæ, when the sexes differ.—*Id.*

E. F. C.—The food of larva of *Bombyx Pernyi* is unknown to me. In confinement it will eat oak; but the species ought not to be in the larva state at this time of year.—*Edward Newman.*

Augustus Priest.—Many thanks; but I have repeatedly declined mere lists of names. If accompanied by any particulars that could possibly interest other subscribers, or any information respecting the habits, food, &c., of the insects named, such lists would be acceptable.—*Edward Newman.*

Extract from the Proceedings of the Linnean Society of London.

FEBRUARY 17, 1876.

J. Gwyn Jeffreys, F.R.S., Vice-President, in the chair.

Ants.—“Additional Observations on Ants,” by Sir John Lubbock, Bart. In this paper Sir John communicated some further experiments in continuation of those contained in his last memoir. As regards the cases in which when an ant has found a store of food, other ants make their way to it, he commenced by referring to some of his recent observations. To the edge of a board communicating with the nest he fastened three parallel strips of paper about a foot long (G, H, and I). One of these (G) led to a shallow glass tray containing a number of larvæ. The object of this was to ascertain how many ants would find the larvæ for themselves under such circumstances, and, as a matter of fact, none did so. On the middle strip (H), near the centre, and at right angles with it, he placed two strips of paper two inches long, one (K) leading to another shallow tray (F) containing larvæ, while the other (L) rested on the third strip of paper (I). He then took an ant (*F. nigra*), marked her, and put her on the tray (F). She immediately took a larva, and went away to the nest along the strip of paper (H). Now, it is obvious that

by always causing the marked ant to cross from the strip of paper (H) to the larvæ over a particular bridge of paper (K), and if, whenever a stranger came, the paper bridges (K and L) were reversed, it would be shown whether the other ants who came to the larvæ had had the direction and position explained to them. In such a case they would go right, notwithstanding the interchange of the paper bridges; but if they found their way by tracking the footsteps of the first ant, they would pass over the paper bridge (K), and thus be led away from the larvæ to the strip of paper (I). The result was that out of seventy-nine strange ants, which came up to the point at which the paper bridges diverged, twenty-four went straight along the strip of paper, eleven took the right bridge to the larvæ, while forty-four were misled, and went over the paper bridge (K) away from the larvæ to the strip of paper (I). He then slightly altered the arrangement, transfixing one end of the two paper bridges by a pin, and so fastening them by one end to the strip of paper (H), the other ends free, that each of them could be turned either to the larvæ or to an empty glass tray. When the marked ant came he turned one paper bridge (K) to the larvæ, the other (L) to the empty tray; while whenever any other ant came he turned the bridges, so that K led to the empty tray, and L to the larvæ. Under these circumstances, seventeen ants which came along the strip of paper (H), without a single exception, went over the bridge (K) to the empty tray. He then varied the experiment by leaving the paper bridge (K) loose, as at first; but instead of having a separate bridge (L) he cut the strip of paper (H) into two pieces (H' and H''); then, when a strange ant was coming, he rubbed his finger two or three times over the bridge (K), so as to remove—or, at least, confuse—the scent. As soon as the ant had passed over the first part (H') of the strip of paper (H), and had arrived on the part (H''), he took up the piece (H') and placed it where the paper bridge (L) had been in the previous experiments, *i. e.*, so as to connect the end of H with the empty glass tray. By this arrangement the bridge K was left in its place, and, on the other hand, there was a bridge which the marked ant had crossed and re-crossed as often as K, but which led away from the larvæ. Under these circumstances, out of forty-one ants which found their way to the end of the strip (H), and within two inches of the larvæ, fourteen only passed over the bridge (K) to the larvæ,

while twenty-seven went over (H') to the empty tray. Taking these observations altogether, out of one hundred and fifty ants which came to the end of the strip of paper (H), and thus within two inches of the larvæ, only twenty-one took then the right turn, and arrived at their destination. These experiments, therefore, certainly seem to show that when ants flock to a treasure of food, which one of them has discovered, they either accompany one another or else track it out by scent. The fact, therefore, is by no means an evidence of any high intelligence, or any complex system of communication, but is merely an instance of instinct, little higher than that which is found in other social animals. On the other hand, that some higher power of communication does exist, seems, however, to be obvious from some of the facts recorded in Sir John's previous paper. In the latter part of his present paper the author narrated a variety of experiments on the senses of ants, and on their power of recognising friends. A lively discussion followed the reading of the paper.—'Nature,' *March 2, 1876.*

The Doubleday Collection of British Lepidoptera.—The terms proposed by the Trustees of the Doubleday Collection, and agreed to by the Directors of the South Kensington Museum, are—(1) That the Collection shall be lent for a period of five years, after which the Trustees shall have the right of resuming possession of it. (2) That it shall be kept separate and undivided, and called the "Doubleday Collection." (3) That it shall be open to the public at all reasonable times, under the care of the attendant; and that due care shall be taken for the protection and preservation of the specimens. (4) That as soon as possible after it has been deposited in the Museum, a Catalogue, specifying the number of each species, &c., shall be made, a copy of which Catalogue shall be furnished to the Trustees. The Bethnal Green Museum is a branch of the South Kensington. The Collection has been safely deposited at the Bethnal Green Museum for about a month. It is at present in one of the lower rooms, near Lane Fox's collection; but, so soon as arrangements have been made for the proper exhibition of the insects, it will be brought up. It has been inspected by several entomologists during the month.—*Edward Newman; 7, York Grove, Peckham, March 18, 1876.*

THE ENTOMOLOGIST.

No. 155.]

MAY, MDCCCLXXVI.

[PRICE 6d.

On the British Species of Sphekodes. By EDWARD NEWMAN.



1. *SPEKODES GIBBA*, male. 2. Ditto, female. 3. *S. SPEKOIDES*, male.
4. Ditto, female (Mr. Smith now places these as synonymous with *S. gibba*). 5. *S. SUBQUADRATA*, female (the head of the male is of the same subquadrate form).

SPEKODES is a genus of small bees, whose life-history is at present extremely obscure. Authors are by no means unanimous as to the leading question, whether the species are constructors or parasites, who labour not themselves, but avail themselves exclusively of the labours of others. St. Fargeau believed them parasitic on the genus *Ialictus*, but Kirby says they burrow in the ground for purposes of nidification. To Mr. Smith we are indebted for an excellent monograph of the species, published in the 'Zoologist'

(Zool., vol. iii., p. 1012), so long ago as the year 1845. In this the following observations occur on the question of parasitism; they will bear repeating after the lapse of thirty years:—"Most authors who have described or alluded to this genus since the publication of Kirby's 'Monographia' have described these bees as parasitic insects; but I am not aware that anyone has proved them to be so. This supposition I believe to be founded on their wanting the polliniferous organs, combined with a habit they have of entering holes or burrows in banks, as if in search of the nest of some bee, wherein to deposit their eggs. This, however, is but slight evidence. There is, perhaps, no insect which has the habit of entering the burrows of other species more constantly than *Trypoxylon Figulus*,—an insect which I have ascertained to be no parasite, since it furnishes its nest with spiders; still I have observed it burrowing. Again, *Ceratina* is destitute of polliniferous organs; but this insect has been proved by Mr. Thwaites to construct its own nidus. Réaumur has described *Sphekodes* as excavating its burrows in the bare sections of banks to the depth of nine or ten inches, in which to deposit its eggs, together with a supply of pollen and honey. Mr. Kirby appears to have entertained the same view; and my own observation leads me to a similar conclusion. On several occasions I have seen these bees busily engaged in burrowing; and last summer I watched one thus employed for a considerable length of time. All that I have seen engaged in this way selected a spot either in the midst of a colony of *Halicti* or *Andrenæ*. I think it, however, very probable that they frequently make use of a ready-formed burrow, and that they furnish a supply of liquid honey in the manner of *Colletes* or *Ceratina*. I am thus led to dissent from the generally-received opinion of their being parasitic, and shall endeavour, by future observation, to place their true habits beyond a doubt. Walckenaer, Serville, and St. Fargeau, agree in considering *Sphekodes* to be parasitic on *Halicti*. My own observation has shown me that they are as frequently to be found in company with colonies of *Andrenæ*; and, if parasitic, it will eventually be found that they are by no means confined to the genus *Halictus*."—*Zoologist*, p. 1011 (1845).

Ten years later Mr. Smith, in his 'Catalogue of British Bees,' seems to remain of this opinion, for he says—

“The bees which are included in this genus have hitherto been regarded as parasitic on those comprised in the genus *Halictus*; and, indeed, many circumstances tend to support such a supposition. They are usually found burrowing, not only in similar situations, but forming mixed colonies. The females of both genera appear some time before the males, and in fact their economy is alike. St. Fargeau places them amongst his division of parasites, immediately following his exotic genus *Rathymus*, with which they have not the slightest affinity, their only resemblance being in the distribution of colours—black and red. The result of my observation leads to the conclusion that no species of the *Andrenidæ* is parasitic. The only apparent support of the theory of their parasitism is the absence of the usual polliniferous organs. Such, however, is also the case in *Prosopis*, *Ceratina*, &c. In the year 1849 I discovered a mixed colony of *Halictus abdominalis*, *Andrena nigro-ænea*, *Halictus Morio*, *Sphekodes subquadratus*, and *S. Geoffroyellus*: this being at a short distance from my house I had an opportunity of frequently observing their economy. My visits to the colony were frequent, and I made close observation on the proceedings of the bees; yet, notwithstanding, I could not in a single instance detect the *Sphekodes* entering the burrows of *Halictus*. Those into which the former bee entered were of a smaller diameter than those of *Halictus*; in fact, intermediate in size between the burrows of *H. abdominalis* and *H. Morio*—too small to have admitted the female of *H. abdominalis*. These proceedings were observed on several occasions. No males of any of the bees were to be seen at this time, those of *Andrena* having disappeared some time, and those of the *Halicti* not being developed. On visiting the colony one cloudy morning I was much delighted to observe the head of one of the species of bees at the mouth of most of the burrows,—the female *Halicti* at their own burrows, and *Sphekodes* also at *their own*. The result of my observations of this colony led me to believe, still more firmly, that *Sphekodes* is not a parasite. Since the time when the above observations were made, I have on several occasions detected *Sphekodes* busily engaged in forming her burrow; a fact which I consider conclusive of the correctness of the opinions above stated.”—*Catalogue of Bees*, p. 15.

In 1866 the late Mr. Shuckard, author of 'Essay on the Indigenous Fossorial Hymenoptera,'—a volume of great research,—issued a philosophical, but somewhat incomplete, work, intituled 'British Bees: an Introduction to the Study of the Natural History and Economy of the Bees Indigenous to the British Isles.' I say "incomplete," inasmuch as the species are not systematically described, and the "natural history" of the bees we find under the "general observations" which are appended to the "general character" at the head of each genus. This plan has the advantage of admitting a discursiveness of style, which might be out of place in a more scientific and systematic work; but at the same time it allows a vagueness altogether at variance with the precision of true science. As an instance of this vagueness, the author says that "All the facts recorded, without reference to authorities, are the result either of personal observation or of diligent study, which, from the length of time that has intervened, have become so blended in my mind that I can no longer separate their sources." So that the author both assumes the liberty of *appropriating* the researches of others without acknowledgment, and of *repudiating* passages which may hereafter be pointed out as erroneous, on the plea that they are, in all probability, copied from others. This seems hardly fair to those who have laboured long and assiduously in the same field. Thus the principle of *suum cuique* is altogether ignored. Hence we scarcely know for what portion of the following remarks we are to give Mr. Shuckard the credit of originality:—

"They are not uncommon insects; and I have found them abundant in sandy spots sporting in the sunshine on the bare ground, where they run about with great activity; the females chiefly, the males the while disporting themselves on any flowers that may be adjacent; and they are especially fond of ragwort. Their prevalent colours are black and red, the latter occurring only on the abdomen in different degrees of intensity and extension, and sometimes limited to a band across it. Much difficulty attaches to the determination of the species, from the characters which separate them being exceedingly obscure, for it is not safe to depend on the differences in the arrangement of colour upon them, as it varies infinitely; nor can their relative sizes be depended

upon as a clew, for in individuals which must be admitted to be of the same species, size takes a wider extent of difference than in almost any of the genera of bees. St. Fargeau, who maintains the parasitism of the genus, accounts for it by saying that in depositing their eggs in the nests of the *Andrenæ*, *Halicti*, and *Dasypoda*, the *Sphekodes* resorts to the burrows of the species of these genera, indifferent to their adaptation to its own size; and thus, from the abundance or paucity of food so furnished to its larvæ, does it become a large or a small individual. Westwood says they are parasitic upon *Halictus*. Latreille says they are parasites. They are certainly just as destitute of the polliniferous apparatus as the preceding genus. Mr. Thwaites once thought he had detected a good specific character in the differing lengths of the joints of the antennæ, but I believe he never thoroughly satisfied himself of its being practically available. At all events, great difficulty still attaches to their rigid and satisfactory determination. There is an array of entomologists who deny their being parasites. Mr. Kirby says they form their burrows in bare sections of sand-banks, exposed to the sun, and nine or ten inches deep, and which they smooth with their tongues. But then, in impeachment of the accuracy of his observation, he further supposes there are three sexes, founding his statement upon what Réaumur remarks of having observed pupæ of three different sizes in the burrows. In the first place, it is not conclusive that these pupæ were those of *Sphekodes*; and secondly, we know that this condition of three sexes is found only in the social tribes, wherein the peculiarity of the economy exacts a division of offices. Therefore his adoption of this inaccuracy militates against the reception of his other statement. But Smith also states that they are not parasites, and apparently founds his assertion upon direct observation. It still, however, remains a debatable point, from the fact of the destitution of the polliniferous brushes, and thence the character of the food necessary to be stored for the larvæ. It would be very satisfactory if these apparent inconsistencies could be lucidly explained. If, however, it be ultimately proved that *Sphekodes* is a constructive bee, as well as *Prosopis*, we have still this fact exhibited by our native genera, that none of the sub-family of short-tonged bees or *Andrenidæ* are parasitical. This is a

remarkable peculiarity, as it is amongst them that we should almost exclusively expect to find that distinguishing economy, from the seemingly imperfect apparatus furnished in the short structure of their tongues. It is possible, however, that Nature has so moulded them as to fit them chiefly for fulfilling its objects within merely a certain range of the floral reign, and which restricts them to visiting flowers which do not require the protrusion of a long organ to rifle their sweet stores."—'British Bees,' p. 197.

It will be seen, therefore, that the economy of these bees was unknown, or rather very imperfectly known, to those who have been the most assiduous in their researches into bee life-history. The insects themselves—that is, their personal appearance—are familiar to all who have spent pleasant hours in the capture of wild bees. English species are very uniform in colour and general appearance; but those of the same species vary greatly in size. The species agree in having the head and thorax black, without any gloss, and clothed with a very short pilosity of a gray colour; the abdomen is generally of a brick-red colour, and very glabrous; it is always more or less varied with black, particularly at the tip. None of the British species appear to have those yellow or whitish markings on the face which are so conspicuous and ornamental in the genus *Prosopis*. There are five species described as British by Mr. Smith, as under:—

1. *S. gibba* is fond of hiding in flowers, burying itself among the florets of composite flowers, especially of thistles; and these flowers, being in great measure autumnal, it follows that autumn is the proper season for collecting this species, which is also frequently found on sand-banks, in company with the burrowing bees that commonly frequent such situations. Fig. 1 represents a male; fig. 2, a female (the unshaded parts of the figure are red in the bee; the line below represents the size); fig. 3 represents a male; and fig. 4, a female of *Sphekodes sphekoides*: this was the *Melitta sphecoides* of Kirby, 'Monographia Apum,' vol. ii., p. 41; it is not now maintained as a distinct species, but is incorporated with *S. gibba*, and included under the same name.

2. *S. rufescens*.—There is a great confusion about the specific name of this species. It is certainly the *Apis gibba*

of Fabricius, but not of Linneus, which name is correctly applied to the preceding species, which it closely resembles. It seems to have been first described by Fourray; and Mr. Smith now combines it with his own *S. pellucida*, described at p. 1014 of the 'Zoologist.' It is equally abundant with *Sphex gibba*, frequenting composite flowers in the autumn, particularly those of thistles and ragwort. The thorax of *S. gibba* is wavy; that of *S. rufescens* finely punctured.

3. *S. subquadrata*.—This species seems of somewhat doubtful distinction. I have a single specimen so-named by Mr. Smith. I took it from the blossoms of the ragwort (*Senecio Jacobæa*), in a gravel-pit on Blackheath, very near Vanburgh House. Mr. Smith says he had the good fortune to discover a colony of it; and, by watching it until the time when the males usually appear, at length succeeded, in the month of August, in capturing both sexes in the nest. The females were readily distinguished by their subquadrate heads from all the other species. The males are not so easily distinguished; they most closely resemble those of *S. gibba*, but their heads are not wider than the thorax, the antennæ are proportionately shorter, and the wings are not fuscous as in that species. Fig. 5 represents a female.

4. *S. Ephippiata*.*—This little bee is extremely common on composite flowers, particularly of ragwort, thistles, and scabious. I have occasionally found it abundantly on the field scabious (*Scabiosa arvensis*), or, in modern parlance, *Knautia arvensis*, and less commonly on *Scabiosa succisa*. It occurs also on *Jasione montana* on Blackheath, and on *Ageratum Mexicanum* in gardens. Mr. Smith has said nothing of its favourite flowers, localities, or economy; but, like several previous authors, he raised the varieties into species, and again united them, as in duty bound. Sex has also some bearing on the aspect of the insect, and probably also on its coloration. It is less and more slender than its congeners, and has a good deal the appearance of a small *Halictus*. Mr. Smith has a very excellent paragraph on this subject, which is admirably appropriate, and will be found particularly useful here, as I have no figure:—

* Misprinted "Ephippia": the word probably meaning "ephippiatus," or saddled, in allusion to the red on the abdomen having a fancied resemblance to a saddle.

“The size alone would serve to distinguish this little bee from its congeners; but it is subject to very considerable variety. The females have sometimes the extreme base, as well as the apex of the abdomen, black, and the head occasionally subquadrate; the legs are sometimes nearly black. The males vary much in the degree of colouring in the legs: specimens occur with their feet testaceous-red; the abdomen also varies much in its markings. I formerly considered it to constitute two species; but I have satisfied myself that it is only a variable insect. In the Linnean Cabinet is the authentic specimen of the *Sphex ephippia* of Linneus,—one of the varieties of this insect. The *M. divisa* of Kirby is a dark example of the male, having the antennæ black; but they are usually more or less fulvous beneath; but in truth it is almost impossible to decide whether the latter variety be not in reality a very minute male of *S. gibbus*.”—‘*Catalogue of Bees*,’ p. 20.

The fifth species is described by Mr. Smith, under the name of *S. fuscipennis*, which is said to have been found by Dr. Leach at Kingsbridge, in Devonshire.

EDWARD NEWMAN.

Larvæ Preserving. By W. E. SHARP, Esq.

To the systematic entomologist who makes a collection of any special group of insects, not so much from a mere love of acquisition of specimens, or ambition to surpass rival collectors, but who looks upon it as an illustration of the various groups, families and genera into which the insect world is divided, it must ever cause regret that this should only be attainable with complete satisfaction in the imago state. In all orders of insects those typical characteristics which unite or divide species into genera and families are displayed in many cases as much in those stages which we must consider as incomplete, as in the imago form. Bearing this in mind the methodical collector of insects should exhibit not only the imagos of a species, but also side by side with these the unattractive larva from which they sprang, the pupa form and home in which they underwent their metamorphosis, and even the egg from which they were first hatched; and these

not placed unmeaningly side by side on pins, but so arranged as will best illustrate the habits, food, and general economy of that species. We could then see at a glance the whole life-history of the insect, and the better appreciate those typical distinctions which are often more forcibly developed in the long larval life than in the indefinite characteristics of the imago. Yet how seldom do we see among collectors such a course adopted. One of the chief reasons for this deficiency is doubtless want of space in cabinets or store-boxes. To introduce into a collection, already sufficiently large, the whole antecedents and surroundings of every species from egg to perfect insect, would require immensely more room than most collectors have to spare. This difficulty, however, is not insurmountable. The real secret lies in the difficulty there is found in satisfactorily preserving these immature forms; and we owe our thanks to Mr. Auld for having given some valuable hints on so difficult a subject. As regards my own experience, I have several times tried this plan of inflation, but have not as yet been able to get very satisfactory results from it. Of course, the fault may lie as much with the want of skill in the operator as with the method itself. My difficulties are these, and perhaps Mr. Auld would say whether he has been able to overcome them, and, if so, how.

First, one of the results is a distension and rigidity of the skin perfectly unnatural to the living larvæ. It is obvious, that as the skin of the caterpillar is blown out to its fullest extent, and kept so till dry, there can be none of the folding in of the skin at the segment joints, neck, &c., and all these indentations are completely lost in the smooth rotundity of the inflated skin; for instance, in such a subject as *L. Quercus* the narrow purple bands which lie between the segments are extended till the larva is almost unrecognizable; indeed, it is quite curious to observe the loose flaccid skin, when inflated, suddenly start out to its very fullest extent, like a small balloon.

Again, the larva is generally blown out perfectly straight by this method (indeed Mr. Auld gives directions for the attainment of this end), and by the extension of the skin the body is elongated perhaps one-third more than its natural length when in a posture of repose. The head is also stretched out to its furthest extent, claspers and legs the same, and

altogether the inflated skin looks but a wretched caricature of its original self. By this operation, too, the skin becomes very brittle, and unless great care is taken the hair is very likely to be singed, or the skin scorched to a beautiful brown tint. These, however, are but minor objections, the chief one seeming to me to lie in the undue extension and rigidity of the body. Perhaps where I have failed in getting satisfactory results, more skilful operators might succeed; but even those museum specimens which I have seen preserved in this way seem open to the same faults.

The method I have found to produce the best results I was induced to adopt from a paragraph in 'Science Gossip,' page 234, 1872. The plan consists of injection with white wax. Paraffin wax is what I use injected into the skin after the contents have been removed, as Mr. Auld describes. The wax is melted by being placed in a vessel immersed in hot water, and then injected into the empty skin by a syringe, having a very fine orifice, which is inserted into the anal opening. A piece of cotton, slipped round the last pair of claspers, should be held by the fingers against the syringe to prevent the larva slipping off, which it is very liable to do, and thereby spoil the operation. The melted wax must be urged very gradually into the skin, until the exterior is plump and full, but not so full as to distend any part in an unnatural manner. The skin should be held to the syringe till the wax becomes hard enough not to run out, and at the same time pliable enough to yield to the fingers, so that any impressions, indentations, or other markings requisite can be made, and the juncture of the segments run round with a blunt knife, lightly or deeply, as the subject may require. The larva can be curled or bent round, the head drawn back as in *Vinula*, or the front segments pushed together as in some of the *Sphinges*. The *Geometer* larvæ can be bent into their natural form; warts, humps, &c., brought into full relief; claspers and legs arranged to satisfaction; and, in short, all the fantastic forms which adorn the exterior of this magazine, imitated to an almost exact copy of Nature,—all which results are quite unattainable with the inflation system.

In preserving larvæ in this way, the principal points to guard against are as follows:—Too rapidly or vigorously filling up the skin, in which case the wax may burst through

or overflow, and with pilose larvæ irretrievably spoil the specimen, as when the wax once gets on the outside of the skin it is impossible ever to get it off without pulling all the hair off with it. In the case of smooth larvæ the wax, if it overflows, can easily be pulled off when hard. If, on the contrary, the injection be carried on too slowly, the orifice of the syringe will be closed by the hardened wax, and must be taken out of the skin and warmed again; and to keep the larva steady at the same time, without the wax already injected into it running out, is no easy matter. With care, however, both these extremes may be avoided. The real difficulty is with very small or slender larvæ; indeed, I should suppose for these the inflated mode would answer better than the injection. I have not myself tried much below the size of *P. Rapæ*. With hairy subjects the chief difficulty is to prevent the hairs coming out during the process of disembowelling; and I should like to know whether any contributor has ever had the courage to attack *Chrysorrhœa* or *Auriflua*, and, if so, with what results, as, from bitter experience, I have learned it is better to have nothing to do with them. To ensure the colour of some of the green or transparent skinned larvæ, a little colouring matter of the correct tint, mixed with the melted wax before injection, will be found to give good results. As regards mounting, it is certainly very unnatural to see larvæ stuck on the ends of wire, or fastened flat down to cardboard, it being much more in harmony with Nature to mount them on the proper food-plant, which should be carefully dried,—leaves, stem, and flowers, if possible,—and then the larvæ of different ages skilfully fastened on by the hidden help of wire, gum, &c.

I should be glad to hear the experience of other entomologists on this mode of larvæ preserving, as I consider many are debarred from this branch of collecting by the numerous and acknowledged difficulties which are attendant.

W. E. SHARP.

Birkenhead.

[The reader will of course understand that I am not responsible for any of the plans recommended by my correspondents. I have not tried either of them.—*Edward Newman*.]

Notes on the Yucca Borer (Megathymus Yuccæ, Walk.).

By CHAS. V. RILEY, M.A., Ph.D.*

(Continued from p. 86.)

THE first notice of this insect that we have any record of is that by Boisduval and Le Conte, who figure it under the name of *Eudamus? Yuccæ* on plate 70 of their 'Iconographie.' Though there is no text accompanying the plate, it is evident from the generic reference that the insect is considered Hesperian, and no one could hesitate to so consider it if guided by the figures. In those of the imago the head is unnaturally broad, the body too slender, and the antennæ with the club too slender and too much hooked. The wings in repose are thrown forward as in *Thecla*; the antennæ erect, and the legs too slender. The larva has the large and nutant head, narrow thoracic joints, and green, yellow and white longitudinal stripes so characteristic of Hesperid larvæ. The pupa has much the form and colour of *Epargyreus Tityrus*, *Fabr.* In short, these figures, in many respects, and those of the larva and pupa more particularly, are so unlike the insect considered in the present paper, that the question might be justly raised as to whether I am dealing with the *Yuccæ* of Boisduval and Le Conte, if the figures in the work in question were known to be generally trustworthy. But I have already shown how inaccurate and unreliable some of the said figures are; while the food-plant, as indicated by the specific name, and the size, markings, and colour of the perfect insects in the plate, leave no doubt as to the identity of *Yuccæ*, *B. and L.*, and the species here considered. Too much imagination entered into the composition of that plate, and the probability is that after Le Conte's figures were received in Europe by Boisduval, the latter by mistake coupled with *Yuccæ* the larva and pupa of some other large Southern Hesperian.

The next reference to this insect is by Walker, in 1856, who is the first to briefly describe it as *Castnii Yuccæ*. In 1871, Kirby referred it doubtingly to *Ægiale*, *Feld.*, in Hesperidæ. In 1872, Scudder made it the type of a new genus (*Megathymus*) in Hesperidæ, without further diagnosis than the incorrect figures in the 'Iconographic' alluded to.

* From a Paper read before the Academy of Science of St. Louis, U.S.: communicated by the Author.

This reference is followed by Wm. H. Edwards in the Synopsis accompanying the first volume of his work on N. A. Butterflies (1872). Scudder subsequently states that "it is not a butterfly," and Mr. A. R. Grote, after an examination of specimens collected in Florida, regards it "as belonging to the Castnians, where it is placed by Walker."

It will thus be seen that this insect has sorely perplexed systematists, having been bandied from the butterflies to the moths; and that the balance of opinion withdraws it from the butterflies and places it with the Castnians—a family which, in some respects, combines the characters of the two great Lepidopterous divisions, but is regarded, and justly, as having most affinities with the moths.

I shall endeavour to show that this opinion is not well-founded; that *Megathymus* is a genuine butterfly, and that its greatest affinities are with the Hesperians. Together with one or two other species it forms a small, aberrant tribe; but, in order to more fully discuss its affinities, it is necessary to give an exposition of its characters, as no detailed descriptions have yet been published.

Affinities.—Scudder, who has certainly given more attention than perhaps any other author to the Hesperians, divides them into two groups, which he considers of tribal value. The first to which he applies Latreille's name *Hesperides* is characterized chiefly by the primaries in the male having a costal fold (often inconspicuous, however); by the posterior extremity of the alimentary canal being protected beneath by a corneous sheath, which extends beyond the centrum or body of the upper pair of abdominal appendages, sometimes nearly to the extremity of the appendages; by the club of antennæ being elongate, roundly bent, or with a sinuous lateral curve; by the prevailing colour being dark brown, with white or translucent angular spots; by the stout body and swift flight; by the eggs being distinctly ribbed vertically; and by the larvæ generally feeding on leguminous plants and living in horizontal nests made with the leaves. The second tribe, to which he gives Hübner's name *Astyci*, the front wings of the male have no costal fold; the extremity of the alimentary canal is not protected by any extruded sheath; "the prevailing tints of the wings are tawny and black, marked also but often feebly with pale, sometimes vitreous, spots;"

the antennæ have a stout club, which either tapers rapidly or is devoid of a crook; the hind wings are usually horizontal in rest; the eggs are smooth, usually broader than high; and the larvæ "feed on Gramineæ, and generally construct vertical nests among the blades."

The eggs of the Castnians are, so far as I am aware, unknown and undescribed. In both butterflies and moths they present an infinite variety in form, in sculpture, and in the manner in which they are laid. As a rule, however, those of the larger moths are either ovoid, spherical, or flattened, and rarely subconical or sculptured; while those of butterflies are more often conical, and present greater variety in form and sculpture. The eggs of Hesperians are subconical, and those of the Astyci, as we have just seen, in being smooth and broader than high, agree exactly with those of *Yuccæ*.

The larvæ of the Castnians are, according to Boisduval, endophytous, boring the stems and roots of Orchids and other plants, like the Sesians and Hepialians, and like *Yuccæ*. But they are ornamented with the ordinary horny piliferous spots or warts which characterize Heterocerous larvæ, and have a horny anal plate. Butterfly larvæ, on the contrary, rarely possess these warts, but frequently have the body uniformly beset superiorly with close-shorn bristles as in *Yuccæ*, such bristles generally springing from minute papillæ. The newly-hatched larvæ of the two divisions approach each other more nearly in general appearance, as all animals do, the farther we go back to the commencement of individual life; but though the newly-hatched larva of *Yuccæ* bears a general resemblance to the same stage in many endophytous Heterocerous larvæ (*e.g.* *Xyleutes Cossus*), yet in the stiff hairs springing from the general surface, or from very minute points, instead of from distinct tubercles, it agrees with the Rhopalocera. The legs, both false and true, together with their armature and the trophi, are so extremely variable in both divisions that comparisons can hardly be instituted. The endophytous habit, though very exceptional, is found in butterflies (*e.g.* *Thecla Isocrates*, *Fabr.*: see Westwood's *Intr.*, ii., p. 369). None of the Heterocerous borers, so far as my experience goes, line their burrows continuously with a matting of silk; but use the silk very sparingly, or not at all, till about ready to pupate. The larva of *Yuccæ*, for the most

part, lives in a tube of silk, which it builds and extends often several inches beyond the trunk or stem in which it burrows, and from which it often, especially when young, issues to feed. In this, again, it approaches the Hesperians, which are partial concealers, and live, when not feeding, within silken cases or tubes constructed among the leaves of their food-plants.

The pupæ of the Castnians, like those of all Heterocerous borers known to me, are, according to authors, armed with rings of minute spines on the hind borders of the abdominal joints—the spines serving a very useful purpose in assisting the pupa out of its cocoon. Heterocerous borers also pupate in a more or less perfect cocoon, made either within or without the burrow; and, in the issuing of the imago, the mesothoracic covering generally collapses, the leg-cases become unsoldered, and those of the antennæ are always separated and often curled back over the head in the exuvium. The Hesperians pupate within the silken cavity occupied as larva, or else in a separate slight cocoon: the pupa is generally attached to a silken tuft by the hooks of the cremaster, and sometimes by a silken girth around the middle of the body besides: it is not unfrequently covered with a slight powdery bloom, and is characterized by the prominence of the prothoracic spiracle: the exuvium more nearly retains its form, the leg-cases remaining soldered, and even those of the antennæ being rarely separated. In not having a well-formed cocoon, in being covered with bloom, in the characters of the exuvium, in the conspicuity of the prothoracic spiracle, but more particularly in the want of minute spines on the borders of the abdominal joints, *Yuccæ* is again Hesperian and not Castnian. Indeed, except in the broader anal flap, densely surrounded with stiff bristles, in place of an apical bunch of hooks, in the smaller head and larger body, it resembles *Nisoniades* in general form, colour, and texture.

The typical Castnians, in the perfect state, have the wings large with loose and *very large* scales, and the hind-wings *invariably* armed, at costal base, with the *long stout spine*, or spring, which serves to lock the wings in flight by hooking in a sort of socket beneath the primaries, and which is so characteristic of the Heterocera. The venation resembles more nearly that of the Hepialians, and is totally unlike that

of the Hesperians. The veins are slender: in the primaries 1a and 5 are as stout as the rest: the discal cell is short, connected transversely with 3 and with an areolet above: in the secondaries the cell is nearly obsolete, and the independent or vein 5 of secondaries is as stout as the others. (Comp. Fig. 30 a, b, with Fig. 31.) The antennæ, though thickened at tip, are generally long and more or less supple, and there are two distinct ocelli between the eyes, behind the antennæ. The Castnians vary much in general appearance, but, whether we deal with the Brazilian *Castnia* Linus (*Cram.*) with its narrow, elongate, rounded, clear-spotted wings, and its remarkably elongate and swollen basal joint of the middle tarsi; or with *C. Licus* (*Cram.*) which has broad, angular wings; or with the genera *Ceretes*, *Orthia*, *Gazera*, and *Synemon*—we find the characters above-mentioned constant: they are typical of the family and are *Heterocerous* characters. *Yuccæ*, on the contrary, has none of these characters; but in the smaller wings, in their venation, in the closeness of the small and narrow scales and hairyness at base, in having no ocelli, and in the unarmed secondaries, entirely agrees with the Hesperians. I attach much less importance to the antennæ, size of head and body, or even the spurs of tibiæ; because they are all more variable. Thus, while most of the Castnians have the antennal club tipped with a spine or a bunch of bristles, others (*e.g.* *Castnia Orestes*, *Walker*, from Surinam) have it of the same shape as in *Yuccæ*, and unarmed, or even more short and blunt (*Synemon Theresa*, *Doubl.*). Again, in most Hesperians the club tapers, or is curved at tip; but there are all degrees of variation, from the extremely curved club of *Epargyreus Tityrus* (*Fabr.*) to the straight and blunt club of *Oarisma Poweshiek* (*Parker*). The small head and subobsolete spurs in *Yuccæ* are abnormal compared with either family; for most of the Castnians have the spurs much as in *Hesperia*, and the head almost as broad as the thorax. In the stiffer, relatively shorter antennæ, with large club; in the spines which stud the tibiæ, as well as in the stoutness of the thorax and abdomen, *Yuccæ* is again Hesperian rather than Castnian. The Castnians, like the Uranians and many other exceptional moths, resemble the butterflies in being day-flyers; but the position of the wings in repose, which is a more important

character, is said by all observers to be similar to that of *Catocala*, *Drasteria*, and other *Heterocera*, viz., deflexed or incumbent. *Yuccæ*, both in manner of repose, in colour, and in pattern, is a staunch *Hesperian*.

In short, a careful consideration of the characters of our *yucca* borer shows that in all the more important characters it is essentially *Hesperian*; and that in most of those characters by which it differs from the more typical species of that family—as in the small spurs, in having only the apical ones on the hind tibiæ, in the tibial spines, and difference in size of legs—it is more *Rhopaloceros* than *Heteroceros*. The same holds true when we consider the adolescent states. In the small head of both larva and imago, and in the very large abdomen, it is abnormal; but these characters are traceable to the abnormal larval habit, and are very unimportant compared to the pterogostic and other characters cited. I have long since concluded that general larval form and appearance is so dependent on habit and so variable according to habit, that it is less valuable than more minute structural characters, and that for purposes of classification it has even less value than egg-structure, and infinitely less than imaginal characters. All endophytous *Lepidopterous* larvæ, of whatever family, have certain general resemblances that are a consequence of similarity of habit; and I give it as my emphatic opinion that *Yuccæ* is a large-bodied *Hesperian*, which, though approaching the *Castnians* through *Synemon*, has no real relation with them. In certain marked characters it departs from the *Hesperians* as at present understood, and the only question which a careful study of the species gives rise to in my mind is—not whether it should be considered a *Castnian*, but whether it offers characters that necessarily separate it from the *Hesperians*. Families should, I think, be made as comprehensive as possible and not unduly multiplied; and in considering aberrant forms, the objects of classification are best subserved by retaining them in whatever division can claim the balance of characters. It is better to widen than to restrict in the higher groups. *LeConte* does better service in bringing *Platypsylla* among the *Coleoptera* than does *Westwood* in creating a new Order—*Achreioptera*—for it. *Phylloxera*, in *Homoptera*, is much more wisely retained in the *Aphididæ* than made the type of a new Family.

Let *Yuccæ*, therefore, be retained in *Hesperidæ*. By its aberrant characters it may constitute the type of a third tribe, for which I would propose the name *Castnioides*. This Tribe consists at present, in addition to *Megathymus Yuccæ*, of two other good species, the one from Mexico, the other from Costa Rica. It is very probable that this number will be greatly increased as we come more familiar with the Lepidopterous fauna of Mexico and Central America, where the yuccas and agaves abound; for I have little doubt that the last-named plants will also be found to nourish other species of the Tribe.

Enemies.—I have reared from the yucca borer eleven *Tachnia* flies, all belonging to the species which I have designated *anonyma*, and which infests the larvæ of a number of other Lepidoptera. The fact that *Yuccæ* is attacked by such a parasite is further proof that it is more or less an external feeder, since it is hardly probable that the parent *Tachina* would enter the burrow, and I know of no genuine endophytes that are similarly attacked.

Conclusion.—Whether we have in our yucca borer a remnant of more ancient and synthetic types from which the *Castnians* on the one hand and the *Hesperians* on the other are derived, or whether we have in it a more recent variation from the more typical *Hesperians*, are questions which, with present knowledge, permit only of a speculative answer. The former hypothesis is, however, the more plausible. The *Castnians*, while occurring in Mexico, find their greatest development in Central America and Brazil. The few *Castnioides* known, inhabit the southern part of N. America. During the tertiary period, when the ocean reached over the whole Mexican plateau northward, the fauna of North and South America was much more similar than at the present time. It is not difficult to conceive how a Lepidopterous family that was then common to both divisions of the continent, may since that time have deviated in the two directions indicated, and yet have left some less modified forms in the intermediate country. We are assisted in this conception if we view, with some botanists, the *Yuccas* as remnants of an ancient flora.

We may learn from the history of this butterfly, as from that of the Hackberry butterflies, how unsafe it is to describe,

and particularly to create genera, from mere drawings. *Megathymus*, as founded on Boisduval's figures, is very much of a myth. It is so with all genera erected by the mere coining of a name without recognizable definition; and while a Hübner, in making a number of divisions on superficial grounds, may accidentally hit upon relationships which subsequent research proves correct, he certainly does not greatly benefit science by his work. Again, we may learn the necessity for the adoption by entomologists of some rules for guidance in matters that do not come within the scope of present accepted rules. Can names connected solely with published figures be accepted? Shall we write *Yuccæ Boisduval* or *Yuccæ Walker*? Such questions become the more important when two different names are employed. A figure, however good, cannot be considered a definition; and, whilst most entomologists would consider that the species in question had not virtually been named until described by Walker, others take a different view, and perhaps with reason, since a good figure, so far as recognition of the thing intended is concerned, is infinitely more definite than the majority of the earlier descriptions of species in entomology.

In conclusion, I take pleasure in expressing my obligations to Mr. W. F. Kirby of Dublin, Mr. John A. Ryder of Philadelphia, and Mr. Herman Strecker of Reading, Pa., for kind assistance in my studies of this insect; and more particularly to my esteemed correspondent Dr. J. H. Mellichamp of Bluffton, S. C., for his efforts in furnishing material, and to my friend Mr. S. H. Scudder of Cambridge, Mass., for valuable aid, always freely given.

CHAS. V. RILEY.

Descriptions of Oak-galls. Translated from Dr. G. L. MAYR'S 'Die Mitteleuropäischen Eichengallen' by E. A. FITCH, Esq.

(Continued from p. 78.)

46. *Biorhiza renum*, Hart.—This gall is, in the fresh state, very beautiful, though small. It appears towards the end of September on the under sides of the leaves of *Quercus sessiliflora*, *Q. pedunculata*, and *Q. pubescens*, generally in large numbers, and often densely crowded: it is attached to

the leaf by means of a very delicate, extremely short stalk, and is not visible from the upper side. In shape it is either

Fig. 46.



BIORHIZA RENUM.

spherical, oval, reniform, or tuberculate, and has a central diameter of two millimetres. In colour it is at first green; but later on it generally changes to a brilliant red. The gall exhibits in section a succulent parenchyma; and in the interior is a larva-cell, without an inner gall. In the month of October the galls begin to fall off the leaves: they pass the winter on the ground. Dr. Giraud states that he did not obtain the flies till the following summer.—*G. L. Mayr.*

Having described the root, bark, and bud-galls, we now come to the large class of leaf-galls, thirty-three of which are described by Dr. Mayr. In his description of this gall he says, as above, that there is no inner gall; this he subsequently corrects by saying, "I find a thin, but indistinct inner gall." This species has been recorded from several localities in England and Scotland, and I have found it widely distributed in Essex, but it only occurs on the leaves for about the first fortnight in October, and, like the oak-spangles, it swells up in the winter; so, in order to be successful in breeding the gall-flies, it is necessary to keep it moderately moist. Dr. Giraud, who was the first to breed the *Cynips*, says:—"It is remarkable that the galls inhabited by the *Biorhiza* assume a blackish colour and a regularly oval form, whilst those which are occupied by other insects remain yellow or red, and preserve their irregular form." *Synergus varius*, *H.*, and *S. Thaumacera*, *Dalm.* (= *Klugii*, *H.*, and *luteus*, *H.*), are inquilines of this species, both occurring in April of the second year. Dr. Giraud mentions *S. vulgaris*, *H.*; but, as this is not confirmed by Mayr, it is probable the specimens were referable to *S. varius*. *Schlechtendal* bred a male *Callimome* from these galls, but the species was not specified. The only other parasite I can find recorded is *Mesopolobus fasciiventris*, *Westw.*, in addition to the *Anthomyia* (Diptera), which was bred by *Hartig*,

who was somewhat doubtful as to its being the producer of the gall. He named the species *A. Gallarum*.—*E. A. Fitch*.

47. *Biorhiza synaspis*, Hart.—This gall may be found in May on the under side of the leaves of young oaks. It is a green, sappy, smooth ball, of from five to seven millimetres in diameter, and attached to the leaf in one spot only. In section it exhibits a central larva-cell, surrounded by a thin inner gall bordering the sappy reticulation. In June the gall falls, and assumes a red

Fig. 47.



BIORHIZA SYNASPIS
(and in section).

colour; and towards the end of the month, or in July, it is pierced by the wingless gall-fly. The specimen figured I obtained many years ago from Dr. Giraud (never having found the gall myself). It is of a brownish yellow colour, covered with numerous red spots.—*G. L. Mayr*.

This insect belongs to the Hartigian genus *Apophyllus*, which is separated from *Biorhiza*, *Westw.*, through having one less joint in the antenna than that genus. Hartig himself included this species and *Biorhiza aptera* both in *Apophyllus*. Since the publication of his 'Mittleeurop. Eichengallen,' &c., Dr. Mayr has met with the galls of this species in some numbers on *Quercus sessiliflora*, and more rarely on *Q. pubescens* in September, thus differing from Hartig's time of appearance, who says "the gall falls in June." He also bred from them at the beginning of October several specimens of *Synergus albipes*, *H.*, and *S. physoceras*, *H.*; the latter occurs in no other gall but this, Hartig's specimens, received from Kollar, being bred from "small round galls on the leaves of *Quercus pubescens*." This gall has not been recorded as British, but it is doubtful whether it does not occur here.—*E. A. Fitch*.

Extracts from the Proceedings of the Entomological Society of London.

DECEMBER 1, 1875.

Sir Sidney Smith Saunders, C.M.G., President, in the chair.

Zygæna Filipendulæ with Yellow Spots.—Mr. W. A. Forbes exhibited a variety of the burnet moth (*Zygæna Filipendulæ*) with yellow (instead of red) spots, of which he

had bred several from larvæ taken near Winchester. They were bred with others of the ordinary colour; but he believed that the variety was natural, and not caused by extraneous circumstances.

New Coleoptera.—Mr. G. C. Champion exhibited specimens of *Anisotoma oblonga*, *Er.*, taken by him near Farnham, and *A. curta*, *Fairm.*, from Esher, Surrey. The latter was new to the British list. Also *A. Algerica*, a new species, taken by Mr. Rippon in Algiers.

Larvæ and Pupæ of Ephydra.—Mr. William Cole exhibited carefully-executed drawings of the pupæ of a species, apparently belonging to the Dipterous genus *Ephydra*, which he had taken clinging to the stems of grass below high-water mark, near Southend. The water whence it was taken was brackish. He also exhibited the larvæ and perfect insects in spirits.

Parasites of Osmia.—The President stated, with reference to the numerous parasites found on *Osmia tridentata*, that M. Jules Lichtenstein, of Montpellier, had recently obtained the *Zonitis præusta* from the cells of this bee; and likewise the *Euchælius vetusta*, *Duf.*, from its desiccated adult larvæ, in the same way that *Halticella Osmicida* effects its metamorphosis; thus making the thirteenth parasite recorded as affecting this *Osmia*.

The Doubleday Collection.

[The following correspondence will interest readers of the 'Entomologist.']

11, Duncan Place, London Fields, Hackney, E.
March 18, 1876.

To the Directors, South Kensington Museum, London, S.W.

GENTLEMEN,—The Doubleday Collection of Lepidoptera, recently placed in the Bethnal Green Museum, is a collection of very great value to all entomologists, containing as it does types of nearly all the British and European species; and it is very essential that it should be open for all students to be able to compare and name specimens therefrom. This Collection, being arranged according to the universally accepted catalogue of our species, it is, therefore, of the greatest value. During the lifetime of the late Mr. Doubleday, the Collection was always open to any entomologist who wished to inspect it; and we beg permission to have the

same privilege allowed to us at Bethnal Green Museum. It is almost impossible for a student to compare specimens if the Collection is kept in a public place; therefore we venture to hope that the Collection will be kept in a private room. The late Mr. Doubleday was one of our very best authorities on the Lepidoptera, he having diligently studied the species during the whole of a long lifetime, and his knowledge of them was probably greater than any other living British entomologist. Therefore, we beg on behalf of the four entomological societies (the Haggerston, the East London, the South London, and the West London) we represent, to suggest this memorial. If our ideas on the subject are not fully explained herein, we beg to suggest a deputation, consisting of two members of each of the above societies, wait upon you at any time or place you may suggest.

Signed on behalf of the Haggerston Entomological Society, consisting of one hundred members—

J. A. CLARK, M.P.S., &c. W. HARPER.

On behalf of the East London Entomological Society, consisting of forty members—D. PRATT. T. EEDLE.

On behalf of the South London Entomological Society, consisting of ninety members—G. C. CHAMPION. J. G. MARSH.

On behalf of the West London Entomological Society, consisting of ninety members—T. BODEN. W. GATES.

South Kensington Museum, London, S.W.

April 7, 1876.

Bethnal Green Branch Museum.

SIR,—I beg to acknowledge receipt of a memorial, bearing date 18th March, 1876, signed by you and seven other gentlemen representing the Haggerston Entomological Society, the East London Entomological Society, the South London Entomological Society, and the West London Entomological Society, in reference to the Doubleday Collection of Lepidoptera, which has been lent by the Trustees for exhibition in the Branch Museum at Bethnal Green. I have the pleasure to acquaint you that, upon careful consideration of the arrangements necessary for the proper care of the Collection, it has been decided to give full effect to the wishes which have been expressed on the part of the four entomological societies named. A room will be specially provided, and an attendant will be in readiness to show the

Collection to such persons as may apply to the officer in charge for permission to inspect it.—I am, Sir, your obedient servant,

RUNCLIFFE OWEN,

J. A. CLARK, Esq.

Director, S. Ken.

11, Duncan Place, London Fields, Hackney, E.

Death of Thomas Wilkinson.—We regret to have to chronicle the death of Thomas Wilkinson, the distinguished entomologist. Mr. Wilkinson died on Thursday morning, April 13th, at his residence in Cliff Bridge Place. The cause of death is supposed to have been internal rupture. By profession Mr. Wilkinson was a butler; but during the latter part of his life he was in a state of independence. At the time of his death he would be fifty-eight years of age. Mr. Wilkinson was known as an entomologist, not only in Britain, but on the continent of Europe. The greater part of his life he devoted to patient and persevering efforts in rearing our Micro-Lepidoptera, and watching them through the stages of their minute existence. By his indefatigable exertions he succeeded in unloosing many a Gordian knot that would have continued to puzzle the mere theorist for years to come. His knowledge was not confined to entomological science. He was also a great botanist, and was more or less acquainted with many other natural sciences. It was not a little owing to the fine combination of knowledge which he possessed that he succeeded so eminently and so practically in his own favourite branch. He leaves behind him a collection of entomological specimens, which is declared by competent judges to be the best in the country. Mr. Wilkinson united to his great abilities as a naturalist many personal virtues. He was a steady, upright man, mild and unobtrusive in his manner. There was no element of selfishness in his composition. A true lover of Nature, his mind was commonly absorbed in his delightful studies; and he was thus elevated above all meanness. Regardless of praise or reward, he humbly laboured in that field of science which he made his own. In the death of Mr. Wilkinson the town of Scarborough has sustained a great loss.—‘*Scarborough Gazette*,’ April 20, 1876.

Errata.—P. 103, line 3 (present number), “Fourray” should be “Fourcrocy;” lines 8 and 9, after “*S. gibba*” read “is coarsely, that of *S. rufescens* finely, punctured.”—Edward Newman.

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No. 156.]

JUNE, MDCCCLXXVI.

[PRICE 6d.

Descriptions of Oak-galls. Translated from Dr. G. L. MAYR'S
'Die Mitteleuropäischen Eichengallen' by E. A. FITCH, Esq.

(Continued from p. 117.)



Fig. 48.—*DRYOPHANTA SCUTELLARIS* (and in section).

48. *Dryophanta scutellaris*, Oliv. (*Cynips folii*, Hartig, Schenck, Schlechtendal).—The gall of this species, which is universally known and to be met with throughout Europe, is large, juicy when recent, and spherical. It appears on the under side of the leaves of *Quercus sessiliflora* and *Q. pedunculata*; it only adheres to the leaf in one spot, which is the reason it does not show on the upper side. It varies in size from one to two centimetres in diameter, and is of a green, yellow, or—if exposed to the sun—red colour; its surface is either smooth or more or less covered with small papillæ. Even when dry the gall somewhat resists the dividing knife; however, it exhibits in section no actual inner gall, only a spongy, loose, gingerbread-like parenchyma, which contains

the larva-cell in the centre. The gall-makers emerged from the end of September to the middle of December. It is impossible to mistake this species for the one next described, —*D. folii*, *L.*,—as it strictly keeps to the above-mentioned oaks.—*G. L. Mayr.*

The galls of this and the next species have been much confounded together; but as Mayr says that the true *D. folii* of Linné *only* occurs on the South European species of oak, —*Q. pubescens*,—it is hardly possible that it can be British. I have specimens of *D. folii* received from Dr. Mayr, and can certainly say I never saw galls like them in this country: they are spherical, as *D. scutellaris*, with the texture and smoothness of the common *D. divisa* galls. Our common cherry-galls must, therefore, be referable to *D. scutellaris*, and possibly, in a few cases, to *D. longiventris*. They occur commonly in Britain, ranging as far north as Perthshire. I found them exceedingly abundant last autumn twelvemonths, on the large sappy leaves of the stubs and pollards of the Undercliff, in the Isle of Wight, from which I bred *D. scutellaris* from 1st to 21st January, *Synergus pallicornis* in May and June, *Decatoma biguttata* in May, and *Callimome regius* from May to August. Mayr mentions three species of *Synergus* and two species of *Torymus*, as connected with this species, *viz.*—*Synergus pallicornis*, *H.*, appearing in May of the second year; *Synergus Tscheki*, *Mayr*, in April of the second year; and *Sapholytus connatus*, *H.*, as inquiline; and *Callimome abdominalis*, *Boh.*, on the authority of Hartig; and *Callimome regius*, *Nees*, which occurs from October of the first year throughout the summer of the second year, as parasites. In the galls of this species, as also in those of *Cynips glutinosa*, *C. Kollari*, and *C. lignicola*, *Callimome regius* is in some cases a parasite of the inquiline, when it is generally rather smaller. Mayr received one specimen of *S. connatus* from Tschek, labelled—"From *D. scutellaris* gall;" but possibly it might have emerged from a gall of *A. noduli*, occurring in the leaf. In Germar's 'Zeitschrift' (vol. ii. p. 192), Hartig describes *Neuroterus inquilinus*, and says:—"I once bred a single female from a gall of *Cynips folii*" = *scutellaris*, *Ol.* Whether this has been confirmed since, I cannot say. We often find single *Synergus* larvæ living in small chambers made in the

substance of these galls, and in no way connected with the inner gall or dwelling proper of the *Cynips*. This I have also observed in the galls of *C. Kollari*, and in the cup of the galls of *A. gemmæ*, in which case the tenant is one of the *Cynipidæ*—*Andricus trilineatus*, *H.* It is an interesting case of parasitism, showing most clearly, although now proved beyond doubt, the vegetal subsistence of *Synergus* larvæ. It also has a bearing on the mode of life of different species, and its presence in such a situation in no way interferes with the production of the gall-maker. *Schlechtendal* describes four varieties of this gall, tenanted by the *Dyrophanta*, *Synergi*, and *Pteromalidæ*. He also observes that—"In galls which pass the winter under the leaves I can never find a *Cynips*." The British inhabitants of these galls, bred by *Mr. Rothera* and named by *Walker*, were, besides the gall-maker, *Synergus* (sp. ?), *Eurytoma nodularis*, *Megastigmus dorsalis*, *Callimome elegans*, and *Callimome antennatus* (? female, ? *versicolor*). *Mayr* does not seem to have received *M. dorsalis* as an inhabitant of the cherry-galls. *Walker* observes that the specimens from these are rather larger than *Terminalis*-bred specimens. *C. elegans* is a willow-frequenting species. In addition to the above record of parasitism we have three species of *Ichneumonidæ* mentioned by *Ratzeburg*, as connected with this species, two of which were bred by *Bouché* and one by *Brischke*, *viz.*—*Porizon claviventris*, *Gr.*; *Bracon aterrimus*, *Ratz.*; and *Orthostigma gallarum*, *Ratz.* He also bred or received the two species of *Torymidæ*, mentioned above; his *T. nanus*, *Först.*, "from oak-leaf galls," were probably from the galls of some other species. Two species of *Pteromalus*—*P. fasciculatus* and *P. jucundus*—are mentioned by *Förster*; and, as noticed at p. 42 of this volume of the 'Entomologist,' an *Aphis*—*T. dryophila*—may sometimes be found feeding on the incipient galls of this species.—*E. A. Fitch.*

49. *Dryophanta folii*, *Linné* (non *Hartig*).—The gall of this species is moderately common. It only occurs on *Quercus pubescens*. It appears on the under side of the leaves about the beginning of June; it is of about the size of a pea, and is a dull, bare, brownish yellow, moderately hard ball; it is covered with scattered inconspicuous flat papillæ, adheres to the leaf only at one point, and is not visible on the

upper side. When mature it exhibits in section a dry, but not dense, radiating parenchyma, and contains in the centre a cavity for a larva-cell, but no inner gall. Late in the

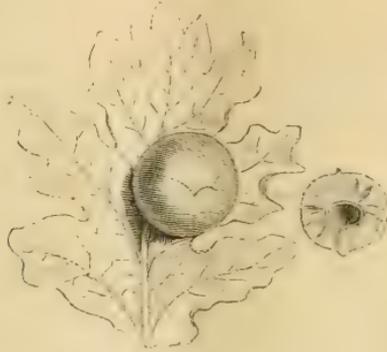


Fig. 49.—*DRYOPHANTA FOLII* (and in section).

autumn we find some galls fall off, while others still adhere to the leaves. From galls kept in a room the flies appeared from October to December.—*G. L. Mayr.*

The inquilines and parasites of this species, given by Mayr, are as follows:—*Synergus pallicornis*, *H.*, in the spring of the second year; *Syntomaspis lazulina*, *Först.*, Mayr and Haimhoffen bred over two hundred specimens of this species, mostly in May and June of the second year; *Callimome abdominalis*, *Boh.*, in March of the second year; and *C. regius*, *Nees*, from March to June of the second year. Mayr also notices an interesting case in which he collected a specimen of this gall on July 18th, then quite immature, which produced *Synergus pallicornis* in the following spring.—*E. A. Fitch.*

Easter at Witherslack. By J. H. THRELFALL, Esq.

ON Friday, the 14th of April, Mr. J. B. Hodgkinson and myself went to Witherslack on the old errand. The weather during the week had been anything but propitious; and during our stay, until Monday night, cold winds to some extent neutralised the heat of an April sun. As far as the perfect insect was concerned, Mr. Hodgkinson's usual perseverance was rewarded with several specimens of such

insects as *Dasystoma salicella*, *Micropteryx purpurella* and *M. unimaculella*, *Depressaria pallorella* and *D. capreolella*, *Butalis incongruella*, *Gracillaria phasianipennella* and *G. clongella*, with others of less note.

My own attention was to a great extent confined to larvæ, and the following fell to our united efforts:—*Coccyx hyrciniana* was very plentiful in spruce-firs, in the same plantations as *Coleophora laricella* in the larches; the latter so abundant that almost every bursting shoot was whitened by its occupants. The oxeyes along every road were twisted by *Dicro-rampha acuminatana* and *D. consortana*; but they are yet too young to take, except for special observation. *Lampronia prælatella* was in some quantity under wild strawberry-leaves near the plantation; it appears very local, as, although its food-plant occurs plentifully all over the district, we only found it in a space of perhaps one hundred yards. *Laverna miscella*, mining the *Helianthemum*, was too young; but *Depressaria assimilella*, in united broom-twigs, was full grown, and no doubt would have left in a few days. *Rumex acetosella* yielded its usual variety of *Gelechiæ*; the larva of *G. tenebrella* is certainly a most curious one, in no respect like any other of its family that I have seen, perhaps on account of its habit of feeding internally in the stems (the larva is stout, rosy red, and inactive; perhaps it may turn out something else). On the bank *Anthyllis* shoots betrayed the presence of *Gelechia anthyllidella* by their bleached appearance, although the surrounding vegetation still retained its wintry appearance. Whilst collecting *Ocnorostoma pinia-riella* in the leaves of Scotch fir, we were surprised by finding a larva drawing the same together in a web, which is supposed to be *Cedestis farinatella* or *C. gysselinella*. Can anyone oblige by describing the difference between the habits of these larvæ? Selecting the warmest night, we obtained—by beating heather, *Myrica gale*, and cranberry, into an umbrella—various larvæ of *Noctuæ*, *Geometridæ*, and *Coleophoræ*, including *C. pyrrhulipennella* and *C. juncicollata*, the latter in abundance. Instead of wasting time by endeavouring to select these on the spot, we tumbled the beatings into a sack, and carefully sifted them at home, by which means most extraordinary spiders, bugs, &c., were exposed. *Elachista gleichenella* was abundant on a stiff,

narrow grass, which grew only under the shelter of some juniper bushes in a dry stony field; but *E. serricornella* was unobtainable: probably it is a late feeder, as it does not appear before July.

This was the result of our holiday; and in the coming months no doubt we shall be furnished with ample material for observation and reflection, and less usefully with perfect insects for the setting-board.

The collector should regard the net as useful only when it directs him to the locality of an insect, and gives a clew to the discovery of its larva; and if he should discard it for an entire season, possibly on looking over the year's work, during the inaction of winter, he would find his cabinet certainly no poorer, and his mind replenished with an amount of information no mere collecting can afford.

J. H. THRELFALL.

4, East Cliff, Preston.

Lepidoptera collected at Great Malvern in 1875.

By Mr. W. EDWARDS.

April 24th.—*Argiolus*, *T. Rubi*, *Napi*, *Rapæ*, *Brassicæ*, and *Cardamines*.

May 29th.—*Sinapis* (scarce), *Geryon*, *Ulmata*, *Euphorbiata*, *Omicronaria*, *Punctaria*, *Adustata*, *Marginata*, *Sylvanus*, *Alveolus*, and *Tages*.

May 30th.—Started for *Sinapis*; very scarce to former years; captured twenty-nine after walking twelve miles or more.

May 31st.—Tried sugar; insects abundant. Amongst my captures were *Ocularis*, *W. Latinum*, *Batis*, *Plecta*, *Rurea*, *Thalassina*, and *Prasinana*; while *Trilinea* and *Strigilis* were swarming. Wind north-east.

June 4th.—Insects at sugar; one fine male *Alni* taken by a friend. My fresh captures were *A. Ligustri*, *Bella*, *Rumicis*; snails, beetles, and centipedes, a pest. Wind north-west.

June 7th.—Fresh captures: one *Alni*; *Anceps*, *Megacephala*, *L. Comma*, *Furuncula*, and *Fasciuncula*. Wind south-west, and muggy.

June 8th.—Tried for *Alni* in same woods, without success.

June 16th.—Sugar; took Derasa. Glow-worms most brilliant.

June 24th.—After much rain beat for Geometræ: captured Marginata, Albulata, Bisetata, Blomeraria, Thymiaria, Rhomboidaria, Elutata, Albicillata, and Ocellata.

June 28th.—Tried sugar; no success.

July 1st.—Tried sugar; saw Dentina.

July 10th.—Perla swarming on the walls in Malvern.

July 12th.—Captured at sugar, A. Ligustri (in fine condition); likewise Brunnea, Festiva, Nebulosa, Conigera, and Lithargyria. Wind south-west, muggy.

July 16th.—Took Adippe, Aglaia, Paphia, G. C-Album, Argiolus (second brood), Semele, Urticæ, Bisetata, Margaritata, and T. Quercus (first time taken in this locality by myself). Insects very numerous. A hot, muggy day, with occasional glimpse of sun.

July 19th.—Went in search of Iris, where I had the pleasure of taking it last year; but no success.

July 26th.—Tried sugar again; nothing fresh but Lucipara.

July 28th.—Tried again the quarters for Iris; but in vain. Fritillaries and worn Linea in abundance.

August 3rd.—Tried sugar: took Nictitans, Putris, Cytherea, and Puta. Wind cold, north-west.

August 9th.—Took Diluta, Fimbria, Janthina, and Plecta, at sugar.

August 17th.—Diluta abundant; captured some fine dark varieties. Trapezina, snails, earwigs, centipedes, and woodlice, a pest.

August 23rd.—Tried sugar; nothing fresh; but was very much astonished to find L. Egeria, with wings extended, evidently sipping away with great gusto the repast which was laid for its nocturnal ally. My friend Mr. Onslow, who has spent many evenings with me this season, was as much surprised as myself to find such an unusual visitor to sugar. Among other lovers of sugar, I have once seen a toad, a dormouse, and common mouse; the two latter upon several occasions. Wind south-west.

September 9th.—Captured Citrago, Silago, Cerago, Aurago, and Ferruginea, at sugar. Wind south.

September 13th.—Nothing fresh; Xanthias plentiful.

September 24th.—Cæruleocephala at the lamps; likewise Pennaria.

September 30th.—Captured a fine specimen of *Convolvuli*; *Grapta C-Album* very abundant; while *Urticæ* and *Io*, with *Agestis*, I never saw more plentiful—almost every bramble blossom had a specimen.

Edusa has been taken on the railway-banks but sparingly. I think this locality may boast of the number of butterflies: I have taken forty-two out of the list within a radius of eight miles. I was very unfortunate at ivy bloom, owing to so much rain and cold nights.

W. EDWARDS.

Great Malvern.

Entomological Notes, Captures, &c.

Atypus Sulzeri in the North of London.—Some time ago I was studying ‘Blackwall’s Spiders,’ and have been very much interested in the various accounts, but none gave me so much pleasure as that of *Atypus Sulzeri*; and ever since I have “had it in my head,” and always look for its tubes whenever I have a chance; and last week, in my rambles in this lovely north of London, I saw what at first appeared like a piece of dirty tape, hanging from the sides of an overhanging bank. My “heart was in my mouth” directly I saw it, for I felt sure it was the nest of *Atypus*; so I very carefully dug it out, and at the bottom was the owner,—a female, a most ferocious animal, ready to show fight if touched. I generally like to feel how hard a spider can bite; and *Atypus* would take the prize, for I could not stand it. I examined the bank and found several others, the tubes varying from four to seven inches, each containing a female, and at the bottom of one I found the remains of a beetle of some kind. This interested me much, as I read in the ‘Entomologist’ that Mr. Moggridge thought they fed upon worms. I venture to think that the jaws are better formed for feeding upon Coleoptera than soft worms. I send the nest just as I found it, after taking the females out, upon which I am operating to show jaws, &c. I left several nests for future examination; and on paying a second visit I noticed one blown up, and just as I was taking a fly out of my net I noticed a small spider; and upon bringing my pocket-magnifier upon it found it a young *Atypus*, but could

not think how it got into my net: certainly I had been sweeping. About half an hour after I observed a web, which I thought was a gossamer; but, on closer examination, was surprised to find it covered with a number of young *Atypi*, the same size as the one found upon my net. I counted those on the web, and found about forty or more: they were passing and re-passing each other upon the threads; the web was upon some wild sage. I boxed a dozen, and left the others for future examination, for I mean to "keep my eye" upon them, and learn all I can. I examined one under my microscope, and was much surprised to see the eyes move round, as though set upon a universal joint.—*Fred. Enock; 30, Russell Road, Seven Sisters Road, April 3, 1876.*

[Of course I was greatly interested in this communication, and I confess felt extremely sceptical as to the eyes moving round, "as though set on a universal joint;" but not feeling competent to express any opinion on a subject so new and so unexpected, I forwarded the communication to Dr. Bowerbank, whom I have ever found ready to assist me in the editorial comments which I find I am expected to append to very many of the communications received for publication. As a matter of course I solicited Dr. Bowerbank's sentiments on the subject, which, with his unvarying courtesy, he sent me as under:—

"I have two very fine cast skins of the garden spider, and in both these the eye appears to have been skinned along with the rest of the organs. If it had not been a fixed organ this could scarcely have happened. I have always felt convinced that spiders, like snakes, shed the skin of the eye along with the rest of the dermis. Of course I cannot contradict the assertion of Mr. Enock, as I have not the specimen he refers to; but I presume that the same structural law obtains through the whole tribe of spiders; and I do not think that it is in the power of a hand-lens to determine whether the eye does move or not, and I think it more probable that the reflection of the lens in the eye of the spider has deceived the observer, and a very slight movement of the creature's head would cause the appearance of a movement of the eye. In the compound eyes of the dragonfly, beneath the microscope, the reflection of a pin, placed between the object-glass and the eye, may be seen in every

one of the lens by a little management; and this fact is well known to old microscopists when the eye is viewed by direct light. I should have replied sooner to your note, but I had to find and examine my spider-skin objects.—*J. S. Bowerbank; 2, East Ascent, St. Leonard's-on-Sea, April 10, 1876.*”

Notwithstanding Mr. Enock's firm conviction of the value and validity of the discovery, and notwithstanding also the very rational doubts thrown out by Dr. Bowerbank, I have thought it desirable to bring the whole subject under the notice of entomologists, hoping that, in the brief intervals they may snatch from the worship of the potato-bug and the vine-pest, they will find a solution of the most interesting question that has for a long time claimed their attention. It is fortunate that the 'Entomologist' should have been the first to record both the burrowing of trap-door spiders into the bark of trees, and the possession of a revolving eye by any member of the octopod exosteates. With regard to Dr. Bowerbank's example it can scarcely be considered a parallel case, for the reptiles, and emphatically the chameleon, shed their skins entire, eyes and all; and yet they all possess a rotating motion in the eye, and the chameleon more than any other. Of course the discussion cannot end here, and it is, moreover, desirable that it should receive the most searching investigation.—*Edward Newman.*]

Instinct of Bees.—An interesting exhibition of the instinct of bees occurred to me during the summer. I had been professionally engaged in the town, about a mile from my residence, and upon returning in the middle of the day I found my bees had swarmed. I always kept empty hives ready, and forthwith hived the bees, placing a white cloth over the hive, because the day was very hot, the sun powerful. I set the hive at one end of a table close to the spot upon which the bees had fixed. At the time of hiving I had not a hive-board ready to place the hive upon, but had one carefully prepared in readiness for the evening, when I proceeded to place the hive upon the board, preparatory to setting it in its position in the bee-house. Upon lifting the hive to set it upon the board, I observed the table, where the hive had stood, covered with numbers of bees, which soon began to run about in all directions, from their having been thus suddenly disturbed. I did not feel inclined to interfere

with them, but simply placed the hive on the board with the entrance towards the bees, and waited to see the result. They continued to run about the table for about half a minute as if bewildered, not knowing where to find the hive, when I heard a peculiar vibrating and buzzing sound proceeding from the hive. In an instant all the bees faced about, with their heads towards the hive; and in half a minute not a bee was to be seen upon the table,—they had all marched into the hive in regular procession. The above sound appears to have been produced by the queen summoning her subjects to take possession of the hive in its new position, and they immediately responded to the call.—*W. B. Clarke; 9, Marine Terrace, North Shields, May 10, 1876.*

[This seems at variance with the observations of our best observers, who deny to bees the sense of hearing.—*Edward Newman.*]

A Red-Letter Day.—A red-letter day in this season of black frosts, white frosts, persistent north-easters and clouds of dust, is something to give us a little encouragement and raise our drooping spirits. Time present offers nothing to cheer the entomologist, for a long season to-morrow has not failed to be like to-day, so that it seems almost useless to look forward,—biting winds and chilling frosts still prevail. We must, therefore, solace ourselves with a thought of the past; and so a day which would not, in an ordinary spring, be considered worthy of a chronicle, starts forth into vivid remembrance, and seems to ask for a notice it would not otherwise obtain. While penning this I am recalling April 4th,—a lovely day of an extremely pleasant week,—a day reminding us of a line of Horace:—

“*Solvitur acris hyems, gratâ vice veris et Favoni.*”

The balminess of the atmosphere, after a succession of wind, snow and hail, induced me to pay a visit to some shallows in full blossom about four miles distant. Armed with lanterns, boxes, and a wide-spreading dusting-sheet, I set forth with three friends (two of whom are correspondents of yours—Messrs. S. O. and H. N. Ridley) hoping for success,—at least in the number of our captures, if not in their rarity. Nor were we disappointed; at every shake of the gold-coloured branches numberless catkins, and almost as many moths,

came tumbling down upon the sheet: *Gracilis* and *Rubricosa* came down plentifully; *Stabilis*, *Instabilis*, *Cruda* and *Gothica* in abundance; nor did *Exoleta*, *Satellitina*, *Vaccinii* and *Spadicea* fail to put in an appearance. "Here's *Gracilis*,"—"There's *Rubricosa*,"—"Here's *Exoleta*," followed in quick succession. The consequent excitement and the soft air of the evening have stamped the day upon our recollection as peculiarly enjoyable; and now that May is come—charged with March winds, March dust, and March frosts—we look back upon it with the greater pleasure. I only hope many of our friends took advantage of it, and, while deriving equal pleasure with ourselves, were still more successful; and they who allowed it to slip by will, I hope, be reminded by our experience, when *sallows* are again in blossom, to seize the opportunity, and seek occasion to chalk out a good "red-letter day."—[*Rev.*] *P. H. Jennings; Longfield Rectory, Gravesend, May 15, 1876.*

Early Emergence of Reclusa.—It may be of interest to you that a specimen of *Reclusa*, in my possession, emerged before the 25th of March, though kept in an atmosphere only two or three degrees above the external air. I see some authorities give May as the time of its emergence.—*T. H. Ormston Pease; Cote Bank, Westbury-on-Trym, May 1, 1876.*

Correction of Error.—Lampides Bætica.—In the 'Entomologist' (*Entom.* ix. 92) it is stated that I took "two" specimens of *Lampides Bætica*; it should have been "one," which I have always understood to be the only one ever recorded.—*Neil McArthur; 6, Ashton Street, Brighton, April 24, 1876.*

The Use of Yellow Glass for Zoological Collections.—At a recent meeting of the Entomological Society of Belgium, M. Capronnier read a paper giving an account of some experiments which he had made bearing on the question as to how public collections of insects may best be exhibited so as to satisfy all the purposes for which they are intended. M. Felix Plateau, at a former meeting, proposed to substitute yellow for colourless glass in lighting rooms containing entomological collections. In the discussion which followed it was suggested that experiments should be made by submitting insects to the influence of glasses of various colours.

M. Capronnier was entrusted with carrying out these experiments, and the paper referred to contains his report. Everyone knows that among the Lepidoptera it is the green and carmine colours which are most rapidly destroyed by daylight. M. Capronnier wished to obtain insects of the year's hatching, but could only obtain sufficient quantities of *Euchelia Jacobææ*, L. The inferior wings of this insect are of a deep carmine, uniform in tone,—an important point in the experiments. The principal colours of the solar spectrum are the yellow, the red, and the blue. M. Capronnier rejected the red as giving a tint too dark, and added the mixed colours, violet and green. He had thus four tints chosen with the same degree of tone, and of a moderate shade—yellow, violet, green, and blue, besides a colourless glass. He made five small square boxes of .08 centimetres square and 1 centimetre in depth; the whole surface was covered with one of the above-mentioned glasses. Each wing was fixed in the middle of the box, and floated in a bath of very bright light, but protected from the rays of the sun. Each of the wings was partly covered by a band of black paper, and their position was so arranged as to leave exposed successively each of the parts during a period of fifteen, thirty, and ninety days. The following are the results:—*Colourless glass.*—After fifteen days of exposure the carmine tint was visibly attacked; after thirty days the alteration was more sensible; and after ninety days the work of destruction had rapidly advanced, and the carmine had passed into a yellowish tint. *Blue.*—With this tint the same alterations took place as in the case of colourless glass. *Green.*—This colour preserved the carmine during the first fifteen days; a change was indicated on the thirtieth day; and on the ninetieth the alteration was marked. *Yellow.*—During the ninety days the yellow alone left the carmine colour almost intact. M. Capronnier says *almost*, for a slight alteration in the tint could be noticed at the end of the ninety days. This last observation proves that there is no absolute preservative, and that collections must be kept in darkness, under penalty of seeing them seriously changed at the end of a given time. Nevertheless, it is evident from the above that the yellow is the best preservative against alterations in the colours of insects. M. Capronnier consequently concludes that a

yellowish colour should be preferred and combined in every arrangement of an entomological room. Moreover, the cloths that cover the show-cases ought to be yellow rather than green, and, what is important and indispensable, the window-blinds ought to be absolutely yellow.

[I have preferred to give the translation of this paper, which appeared in 'Nature' of April 20th, to the original French, which I regularly receive from Brussels, through the courtesy of the secretary, Mons. A. de Born.—*E. Newman.*]

Answers to Correspondents.

E. R. Sheppard.—*The Hop Weevil.*—A friend of mine, a farmer in North Kent, has asked me to get named for him the beetles, which I send you by this post. They have been doing terrible damage in his hop gardens. I send you a short account of what he told me concerning them:—"The beetle appears at dusk in the evening; it eats the hop-bine in small holes; sometimes eats the outside skin the whole length of the shoot. They first appeared two years ago; this being the third year of their appearance. They are more numerous this year; sometimes as many as fifteen of these beetles being found on one hop-shoot at a time. They bury themselves about two inches and a half in the mould, in the middle of the hop-stool, during the day lying dormant on their backs. They are round every hop-stool in a garden of four acres of hops, and they have commenced to advance to another adjoining hop-garden. They were never seen before in the neighbourhood. They have not been seen in any other hop-garden near, although there are many other large hop-gardens in close proximity. Three years ago black-currant bushes were planted in between the hops, but these were subsequently removed, and then the beetles appeared. The hop-garden is by the side of Darenth Wood." I send you with the beetles pieces of the hop-shoots, eaten into holes by these destructive insects. I am not a collector of beetles myself, hence my taking the liberty of sending them to you, thinking that you would kindly name them for me; and if you could inform me what remedy would be best to adopt for their destruction I shall be much obliged. I follow, and

have followed, Entomology most of my life, and have seen many destructive insects, but I never saw anything like this before. They injure fresh shoots every night; so you may judge of the wholesale destruction they are causing. My friend has put soot round each stool, but they seem to like that. Now is the time for tying the hop-bine, but of course that would be useless.—*E. R. Sheppard*; 13, *Limes Villas, High Road, Lewisham, Kent, S.E., May 3, 1876.*

[The beetle is *Otiorhynchus picipes*: it is entirely nocturnal in its perambulations, hiding in the earth by day, generally close to the stool of the hop-plant, where it is secure from observation. The hop-bine is hollow like a reed, and hexagonal; its outside wall or coating being very rough to the touch. The beetles emerge from their hiding-place at dusk, and climb up the bine, each commencing nibbling just where it suits his inclination, holding on during the operation by the tenacious claws or hooks, with which all his legs are furnished; and indeed so tight does he cling with them that it is difficult to remove him against his will; but, notwithstanding this, he will frequently feign death, and throw himself to the ground, there to remain perfectly motionless, and exactly like a little lump of earth, until he believes all danger past, when he will slowly and deliberately ascend the bine as before. He seems to possess but a small mouth: this is situated at the extremity of a snout or rostrum, and is furnished with a pair of corneous jaws, with which he digs a way into the wall of the bine in many different places, seldom passing entirely through, but being apparently quite content with having stopped the circulation of the sap, and thereby suspended vitality in that particular bine, and defeated all its endeavours to produce hops. The particular bine becomes flaccid, and to all appearance lifeless; yet this by no means interferes with the ability of the stool to produce more bines, although these, being later, are very rarely so productive, neither are they so likely to bring their hops to maturity. I always find the strongest, largest, and most succulent bines selected for the attack; and I have also remarked that when the attack has proved fatal to one particular bine, and it has become flabby and flaccid, it loses all the attraction it possessed for the weevil, and is neglected, in order that another more healthy victim, one fuller

of sap and vigour, may be found to attack. Thus, one after another, a third or more of the stools may be destroyed through the repeated weakening of the bines. But the stools suffer from another mode of attack by the same insect; and this introduces me to another section of its life-history, which I have studied the more intently because my late friend, John Curtis, has, as I believe, in his admirable—I must say beautiful—work on ‘Farm Insects’ left it entirely unnoticed. Greatly puzzled at the omission of a plant so important to farmers as the hop, and an insect so ruinously destructive as the hop-weevil, I thought I must have overlooked it, and have diligently consulted the excellent alphabetical index, and fail to find either the words “hop,” “hop-weevil,” “*Otiorhynchus notatus*,” or any mention of an insect which is especially injurious to the hop. I therefore think a notice of its life-history may not be unacceptable to hop-growers, seeing that I have made it the object of especial attention. The insects may be seen united in pairs in almost every hop-garden in Herefordshire or Kent at the period of hop-picking, the bines being then removed, and the weevils thus exposed the more readily to view. Immediately afterwards the fecundated female enters the earth in close proximity with the stool, and in this she excavates or gnaws a little hollow, in which to deposit her eggs, which are from half a dozen to a dozen in number: these have no particular character, and are sure to escape notice unless purposely sought after, by the summary process of taking up the stool and shaking it over a sheet of dark paper, when the eggs—small, whitish, and nearly round—tumble out and are perceptible; otherwise, the eggs left to themselves soon hatch and become maggots, without any apparent head, or legs, or antennæ, and almost colourless; indeed, they have a semi-transparent look, that rather reminds one of colourless jelly. They remain together in little companies or colonies all through the winter and spring, and probably families are the produce of one act of oviposition. They continue to grow all through the winter, feeding on the substance of the stool, in which they make very evident excavations; they continue thus until May, June, or July, when they separate and retire singly, for the great purpose of transformation. At this time they become chrysalids, very closely resembling the

larvæ in their size and whiteness, but differing from these, inasmuch as the legs are now distinctly pronounced, and separate from the body, except at one point of attachment, and each leg is enclosed in a skin or case of its own, and quite transparent. After a fortnight or three weeks, more or less (I do not pretend to say the exact time), the legs begin to assume a brownish hue, and the eyes are clearly perceptible as black points, one on each side of the head, a certain sign that the final change is approaching. The cases or covering of the several limbs then open, and the limbs themselves make their appearance through the fissures, the legs stretching themselves, and with the terminal hooks or claws take hold of any object that may answer the purpose of a fulcrum; then they seem to deliver themselves of the leg-cases, antenna-cases, and wing-cases, and stand revealed as weevils in their proper form, but for a short time continue to retain their white colour, excepting the eyes, which still have the appearance of black specks; the exterior covering of the weevil soon assumes consistency and colour. It is quite idle to propose a remedy, or to pretend that I can propose a remedy, for the destructive propensities of this insect. It is a great mistake also to suppose that it is any novelty. I have been familiar with it for many years, and have not observed either an increase or diminution in its numbers. Ferns in cultivation have a similar beetle—*Otiorhynchus sulcatus*—dependent on them for support; so have roses, of which I shall have more to say forthwith; so has the lily of the valley. The process of picking them off with the finger and thumb is too tedious to recommend, otherwise it would be attended with certain success; but how can we be remunerated for the time employed in picking off the weevils from a hop-garden,—they are scarcely larger than a large grain of wheat, and it would require thousands to fill a quart measure.—*Edward Newman.*]

W. H. Kynaston.—*How to Relax Butterflies and Moths.*
—Will you kindly inform me in next month's 'Entomologist' the best method of relaxing butterflies and moths after they have become stiff?—*W. H. Kynaston; Montpellier Lodge, Cheltenham.*

[Prevention is better than cure. I do not advance this as an entirely new or original idea, yet it is so true and so

incontrovertible that I feel it will bear repetition. I will address myself therefore, in the first place, to prevention. In my early collecting days, when cyanide was unknown, I used to half-fill my collecting-box with bruised laurel twigs,—twigs I always preferred to leaves, as being more juicy, fuller of sap. I used a tin box to prevent evaporation. I spread a piece of muslin over the laurel twigs to keep them from moving; then, to keep both laurel and muslin in their places, I introduced transverse strips of thin cork and fitted them tightly,—so tightly, indeed, that they were unable to move. On these strips of cork I pinned my captures. The lid of the box may also be fitted with these strips of cork, but there is no occasion for a second supply of laurel. A strip of India-rubber on the inside of the lid, glued firmly down, assists in preventing evaporation. On reaching home I have always found that the process of desiccation had been arrested, and that both butterflies and moths were in a suitable state for what is called setting. So much for prevention; now for the cure. When the moth is stiff,—incorrigibly stiff,—pin it on a piece of cork, and float the cork on the surface of water in a milk-pan, soup-plate, foot-bath, or basin of any kind; a wet napkin should be spread over the top to prevent evaporation. I would recommend the manufacture of relaxing bath on this wise, to be always kept ready: first, the milk-pan, then a hoop, which should just cover the milk-pan, and over the hoop a cloth saturated with water may be strained tight, so that the hoop and cloth can be removed together at once. During the course of each day remove the hoop, examine the insects, and take out those which are sufficiently relaxed, replacing the others, for if left too long they will inevitably become mouldy, a calamity which it is almost impossible to mitigate or remove. Eschew laurel leaves on all occasions, except for killing, because of their promoting mould and grease; but laurel twigs have not the same effect,—the sap is expressed more readily, and ever after they remain in a dryer condition. I am aware there are a number of novel expedients, as ammonia and camphor, both for killing and relaxing, and earnest recommendations for using them. I incline to say “dout.” I find Mr. Greene’s ‘*Insect-Hunter’s Companion*’ the only good adviser in entomological matters; but there are some points on which I strongly differ from him. The

better way is to ask questions, as Mr. A. M. Brown and Mr. Kynaston have done, and they will be sure to elicit useful replies, and not the less useful because a slight difference of opinion may occasionally find expression. I trust I shall always be ready to give the best counsel within my reach; and if not in my own personal possession, it is certain to be within the reach of one or other of my numerous readers.—*Edward Newman.*]

Preserving Larvæ.—Perhaps the alum solution employed by Mr. Sharp was not sufficiently strong, for after steeping larvæ in it I have always found their skins hard enough to prevent unnatural distention, when subjected only to very slight pressure.—*H. A. Auld.*

Preserving Caterpillars.—I am sure Mr. Auld will pardon my suggesting one or two slight improvements which may be made in his mode of preserving larvæ (*Entom.* ix. 78, April). When I first began to practise this branch of Entomology, I did so from Mr. Auld's instructions, but I soon discovered two points on which there appeared a need for improvement. The first difficulty was with the two pieces of watch-spring affixed to the blowpipe, for, however well they were fastened, they were sure very soon to become sufficiently loose to slip either too much on one side or the other; or sometimes they were so tight that the skin of the last segment was broken; or else they did not fit sufficiently close to keep the distended skin air-tight when blown into. To get rid of this difficulty a very simple remedy suggested itself to Mr. S. L. Mosley, of this town, namely, to use fine cotton or silk instead of watch-spring: the cotton is simply wrapped round the blowpipe a few times, one fold, then being wound round the very smallest bit of the last segment, which is sufficient to hold it much more closely and firmly than the watch-spring does. The other difficulty I had was with what Mr. Auld terms the "oven." With his plan I found it rather difficult to get a sufficient amount of heat inside; but a still greater objection arose from the necessity of holding the face quite over it when blowing, which made it impossible to work long without feeling that one's eyes would soon be almost burnt out. In place of this I dispensed with the "oven," and simply placed over the tripod-stand a flat piece of fine wire gauze, through which, of course, however near the lamp may be placed

underneath, the flame will not pass through, but will allow all the heat from it to do so. The larva may then be blown over it from the side, and thus altogether avoid the unpleasantness of the other method.—*Geo. T. Porritt; Huddersfield, April 5, 1876.*

A. M. Brown.—Preserving Moths from Mites and Grease.
—Can you tell me whether you have found dipping moths and butterflies into a solution of corrosive sublimate in spirits of wine a good plan for preserving them, instead of camphor? I tried the experiment the other day on two butterflies (*Brassicæ* and *Napi*), and found that even after they had been thoroughly dried at an open window, the silky hair on the thorax was matted together, and the sublimate had crusted in small cakes all over the wings, which cannot be removed by a camel-hair brush. I should be glad if you or any of your correspondents could tell me the cause of this, and suggest a remedy, or a more efficient way of preserving the insects. The objection to camphor is that, since it must evaporate, in such a small space as a cabinet-drawer the little particles will settle on the wings of the specimens.—*A. M. Brown; The Grammar School, Great Berkhamstead, Herts, May 9, 1876.*

[My plan is to wash the under side, that is the side not exposed to light, with the solution, using a camel's-hair brush, and afterwards making it thoroughly dry.—*Edward Newman.*]

E. F. Clark.—How to prevent Grease in Moths and Mites with Beetles.—Can you tell me how to best prevent grease in moths and mites with beetles? I find Mr. Greene's method in his book very difficult, for in taking the inside out I generally spoil the insects.—*E. F. Clark; Ufton Rectory, Southam, Warwickshire, May 1, 1876.*

[I know of no better instructions than those in Mr. Greene's 'Insect-Hunter's Companion;' they appear to me to be excellent.—*Edward Newman.*]

Robert Service.—Name of Moth.—I shall feel greatly obliged if you can tell me the name of the small moths, a male and female, which I send you by this post. I regret to trouble you, but just now I have no books in which the Micro-Lepidoptera are described. These moths were very abundant in an oak plantation at Malice, near Dumfries, on

the 14th of April. They began to fly between five and six o'clock p.m.; earlier in the afternoon two or three of them were sitting on every oak-trunk. My companion and I were much interested in watching the intelligent way in which the males sought out the nearly-wingless females. We noticed two males rising out of the brushwood, at a distance of at least ten yards from where a female was sitting on a branch, and going straight to her in a curious, hesitating sort of flight, reminding us very much of the manner of a pointer-dog when taking up a difficult "scent." In another instance I was looking at a female crawling on a tree, when a male flew off another tree at a few yards distance, and, alighting close beside her, copulation at once took place. In these and other cases the males flew against the wind, and almost in a straight line to the females; and we therefore concluded that it was the sense of smell, or something very like it, that was guiding them. It was certainly not sight.—*Robert Service; Maxwelltown, Dumfries, N.B., April 20, 1876.*

[*Diurna fagella*]; the most abundant of spring moths.—*Edward Newman.*]

W. Thomas.—*Asthenia pygmæana*.—I have *Asthenia pygmæana*, my own capture, in my cabinet, and should be most happy to show it to you or your correspondent Mr. Thomas.—*Charles Boden; 127, Tooley Street, April 19, 1876.*

Does Crocallis elinguaris hibernate?—Mr. Newman's reply to Mr. E. Holton (*Entom.* ix. 88) would lead us to infer that the larva of *Crocallis elinguaris* usually does hibernate. Is not this a mistake? I never knew an instance of this species hibernating in any other than the egg state.—*Geo. T. Porritt; Huddersfield, April 5, 1876.*

———— Mr. Holton's notice of the hibernation of *Crocallis elinguaris* in the egg state (*Entom.* ix. 88) is in strict conformity with my experience of that species. I have bred the species four years from eggs deposited by captured females. I have invariably found them hibernate in that state, and commence hatching the last week in February. The hatching generally extends over a period of from three to four weeks.—*Thos. H. Hedworth; Dunston, Gateshead, March 9, 1876.*

W. A. Forbes.—*Is not Zygæna nubigena a Scottish Insect?*
—In a conversation I had with you some weeks ago about our British Zygæna, you doubted whether *Z. nubigena* had occurred elsewhere in these isles than in Ireland. At the time I stated to you my belief that it also occurs in Scotland; and in a letter I received from Dr. Buchanan White, dated March 9th, he says, amongst other things:—"Nubigena is not uncommon (I believe) near Oban, whence I have specimens, and I have seen a specimen that was taken in Forfarshire." This species is also noted as occurring in one or more localities in Scotland—all maritime, I believe—in the "Insecta Scotica," now publishing in the 'Scottish Naturalist.'—*W. A. Forbes; 32, Gower Street, W.C., March 29, 1876.*

[I have received several specimens of *Zygæna* from Scotland under the name of *Nubigena*, but they were so wasted that they might be almost anything. As I enacted the part of sponsor to Mr. Birchall's Irish *Nubigena*, I can positively say that I have seen no example of that species from Scotland, and I have rather fallen into the way of not trusting to the names kindly sent me without the specimens. I prefer, therefore, leaving the matter as it stands for the present. I believe Mr. Birchall and Mr. Carrington have seen the so-called Scotch specimen of *Nubigena*; and I shall be satisfied, and, more than that, gratified, if they will establish the claim of *Zygæna nubigena* to be considered indigenous to Scotland.—*Edward Newman.*]

G. Edwards.—*Hatching of Saturnia Carpini.*—I have some eggs of *Saturnia Carpini*, laid the second week in April. Will you tell me when the young larvæ ought to be out, and also if they can be fed upon anything that grows in London? Heath is difficult to procure.—*G. Edwards; 10, Gloucester Terrace, April 23, 1876.*

[Try them with blackthorn; I think the leaves are exposed now.—*Edward Newman.*]

Despatch of Humble Bees to New Zealand.—I send you cuttings from the 'Weekly Press' of January 15, 1876, of Christchurch, Canterbury, New Zealand, received by last mail, announcing the failure of Mr. John Hall's experiment to introduce the humble-bee into New Zealand,—a failure which many of your readers will be sorry to hear of.—

R. G. D. Tosswill; Shirley Villa, Rugby Road, Leamington, March 23, 1876.

"We regret to say that, as far as we are in a position to judge, the experiment of introducing humble-bees to this province has not been attended with success. The bees in question were carefully packed by Mr. F. Buckland, and forwarded by Dr. Featherston to the Hon. John Hall, at Plymouth, with full instructions as to their treatment on the voyage. The box containing them was slung right aft; there was a thermometer on the box to show the temperature, and when the weather was cold the Hon. John Hall took the bees into his own cabin, and kept a lamp burning night and day to keep up an equable temperature. Mr. Hall states that the lowest degree shown by the glass was 53°; there was no ice used, Mr. Buckland stating that the heat would not injure them. In spite of all these precautions, however, there is every reason to fear that the bees are dead, as last Sunday week is the last time that Mr. Hall heard them give any signs of life."

[See Mr. Smith's advice on the subject (Entom. ix. 15, No. 151). Directly I heard of the scheme of sending bees to New Zealand I entertained misgivings as to the success. It is absolutely necessary to know what species you are sending, what are its habits, what its food, and, finally, what its scientific name, in order that you might communicate with others what you were doing, and if possible obtain their co-operation. Now, as I said at the time, "the published observations" of Mr. Buckland and of the editor of 'Nature' conveyed no idea to my mind on these points, nor do I think they would to the minds of entomologists generally. The failure of the scheme was therefore certain.—*Edward Newman.*]

T. R. Archer Briggs.—Oak Galls.—The galls sent are those of *Aphilothrix corticalis*, *Hart.* (Germ. Zeit. ii. 190) = *A. Sieboldii*, *Hart.* (Germ. Zeit. iv. 406), a species widely distributed in England, but occurring nowhere, as far as I know, abundantly enough to be called common. The galls are of a dull red when fresh, and are tolerably conspicuous and curiously interesting. I have known them to be taken for fungi more than once; thus being something of a "set-off" against the large number of fungoid growths which are

constantly being associated with the idea of insect-work. Where is the analogy or anomaly of influence? A copy of Mayr's beautiful figure and his description has appeared in the 'Entomologist,' vol. vii. p. 52. I am now (middle of April) breeding the Aphilothrix from galls collected last autumn, in six or seven widely-separated localities in Essex, Suffolk, Surrey, Middlesex, and Hampshire, whence it has also been recorded by Mr. Moncreaff (Entom. vii. 93). It had been added to the British fauna four years previously by Mr. Müller ('Gardener's Chronicle,' 1870, p. 1312).—*Edward A. Fitch.*

W. A. Forbes.—*The Doubleday Collection.*—I paid a visit to Mr. Doubleday's collection at Bethnal Green a short time ago, and was of course exceedingly interested and gratified. Permission, however, to examine his types of European species, which are in book-boxes, was denied me, as it seems that for this purpose it is necessary to have an order from Mr. Owen, director (I believe) of the South Kensington Museum. As this would take a day or two to obtain,—and the entomologist cannot always fix beforehand a day for the purpose,—this regulation will, I fear, seriously invalidate against the use of this part of the collection. My object in writing this to you now is to ask if you cannot, by the exertion of your powerful influence in entomological circles, get the regulation repealed. As access to the collection at all is only allowed in the presence of one of the officials of the museum, this additional precaution seems to me superfluous. In any case, I think permission from the superintendent of the Bethnal Green Museum, who is of course on the spot, to view this part of the collection, ought to be sufficient. At present he is, I believe, powerless to give this.—*W. A. Forbes ; 32, Gower Street, W.C.*

[I am perfectly satisfied to leave the matter in the hands of the three Trustees. They are gentlemen of unquestionably sound judgment in such matters, and I should be very reluctant to interfere with their arrangements. I will, however, consider the matter, and from time to time report in the 'Entomologist.' It is obvious, or rather it ought to be obvious, that open boxes without lock or key cannot safely be placed in the hands of every applicant.—*Edward Newman.*]



Yours most truly
Edward Newman

EDWARD NEWMAN

BORN May 13th, 1801.

DIED June 12th, 1876.

It is my sorrowful duty to record the death, after a short illness, of him who founded this Journal, and has conducted it during the term of its existence. Not only those who knew him personally, but that wide circle who knew him as a correspondent or through his writings, will feel a shock that one so long beloved has passed away, and will mourn him as a dear friend. As ready as he was able to impart information on every branch of Natural History, he will be regretted by many who sought—and as certainly obtained as sought—his kindly help. Even this number of the 'ENTOMOLOGIST' contains some of his numerous answers to correspondents.

His labours are finished, and his earthly career of usefulness is completed; but his memory will remain bright in the minds of those who had the benefit of his friendship.

THE ENTOMOLOGIST.

No. 157.]

JULY, MDCCCLXXVI.

[PRICE 6d.

Descriptions of Oak-galls. Translated from Dr. G. L. MAYR'S
'Die Mitteleuropäischen Eichengallen' by E. A. FITCH, Esq.

(Continued from p. 124.)



50. DRYOPHANTA LONGIVENTRIS.

51. D. DIVISA
(and in section).

52. D. AGAMA
(and in section).

50. *Dryophanta longiventris*,
Hart.—Up to this time I have
only found this gall on the com-
mon oak. It agrees with the
last-described species in size,
shape, substance, surface, at-
tachment, and inner structure,
but differs from it in colour.
50 The gall of this species is red,
and has rather broad, often a
little raised (rarely projecting
like papillæ), mostly circular,
52 yellow stripes. Another small
distinction is that it is flattened
at the base. Should the gall
51 be gathered in an unripe state
it shrivels up between the rings,
so that the rugose surface ex-
hibits red furrows, with yellow
tortuous borders; whilst the galls
of *D. folii* would, in such cases,
exhibit irregular tubercles. The
gall appears at the beginning of
June. Herr von Schlechtendal

states the flight time of the gall-fly as varying from the beginning
of August to the end of October. I found great numbers of
this species in the Leithagebirge mountains, but only bred a
single fly in the winter, and extracted a living specimen from
one of the galls in November.—G. L. Mayr.

Von Schlechtendal observes of this gall:—"It often happens that the galls of this species are distorted by inquilines before they are matured; in such cases they hardly attain the size of a pin's-head." I have frequently noticed these dwarfed specimens in the next species—*D. divisa*. The controllers of *D. longiventris* are *Synergus pallicornis*, *Syntomaspis cyanea*, *S. lazulina*, *Callimome abdominalis*, and *C. regius*; also *Elachestus Cyniphidum*, according to Ratzeburg: This species has been recorded as British by Mr. Müller (*E. M. M.* vii. 108), who met with it rather sparingly in the neighbourhood of Norwood.—*E. A. Fitch.*

51. *Dryophanta divisa*, Hart.—Like the preceding, the gall of this species is also found on *Quercus pedunculata*. It is spherical, but distinctly flattened at the top and bottom, so that it has in the centre a perpendicular diameter of five millimetres, and an horizontal diameter of seven millimetres. It adheres at one point to a side rib, rarely to the midrib, on the under side of the leaf, and is not visible from the upper side. Its surface is glossy, smooth, bare, brownish yellow, and frequently red on the side which is exposed to the sun; it has a few very flat, scattered papillæ of a darker colour. In section it exhibits a radiating, but not close, parenchyma, and has a large larva-cell without an inner gall. It is distinguished from the two previously-described species by its smaller size, its flattened spherical shape, its shining surface, and by the size of its larva-cell, which is very large with respect to the size of the gall. Frequently there is a tolerably well-defined flat papilla opposite the basal attachment, which is a little darker than the surrounding colour. I have not bred the fly as yet.—*G. L. Mayr.*

There has been much uncertainty and confusion as to the specific differences in the galls of the three preceding species of *Dryophanta*. This has also been the case with this and the following species. The distinctive marks of the latter three are as follows:—The galls of *Divisa* are thick-walled, those of *Agama* are thin-walled, whilst *Disticha* exhibits a double cavity in section. Speaking of *Agama*, Von Schlechtendal says that in some years it occurs in such great numbers as to bend the twigs. With me *Agama* has occurred sparingly; and such I believe to be generally the case in

Britain, although, doubtless, like all the *Dryophanta* galls, it does occasionally occur in profusion; but it is *Divisa* which is so often met with, and in such great numbers. I have in my collection a small twig with eleven leaves, on which are ninety-four galls; and I believe Mr. Newman had specimens of leaves more densely populated than that. The range of *Divisa* in Britain is commensurate with that of the oak. Does Schlechtendal, in his notes, refer in part to *Divisa*? as he only mentions *Disticha* and *Agama* in the 'Zeitung,' from which we might infer that he had not then separated the two species, *Agama* and *Divisa*; for in Mayr's two essays on the *Synergi* and *Torymidæ* we have three species of *Synergi* and two species of *Torymidæ*, bred by Schlechtendal from *Divisa* galls; and only one species of *Synergus*, and none of the *Torymidæ*, from *Agama* or *Disticha*; clearly showing that *Divisa* must occur in Saxony, and, from the above, might reasonably be considered the commonest species of the three. Formerly he might have been following Hartig, who says of *Agama*,—"Sometimes in very great numbers on the leaves of young oaks;" and of *Divisa*—"Not common, near Brunswick." Under *Agama* we also have from Schlechtendal some interesting remarks on the inmates of the galls; he says—"Out of one hundred galls, which I collected for breeding from, eighty-eight were fully matured, and twelve remained small: the former only produced twelve specimens of the fly, and ten parasites and inquilines, in the same year; the remaining sixty-six wintered, and produced in the spring partly *Pteromalidæ* and partly *Synergus* species; no *Cynips*. Of the twelve small galls three produced parasites and inquilines in the same autumn; the remaining nine wintered." Here, again, we have evidence of *Divisa*, as reference is made to inquilines, both in autumn of the first year and spring of the second; a state of things, according to Mayr, existing commonly but in *Divisa*, where we have *Synergus albipes* occurring in August of the same year, and *Synergus Tscheki* and *S. pallicornis* in March and April of the second. All three species were received from Schlechtendal; *S. pallicornis*, also, from Reinhard (Saxony). In the 'Scottish Naturalist' (vol. ii. pp. 62, 161) Mr. Cameron has two notes on the mode of life of *Synergi* in these galls. The recorded parasites of this species are—*Syntomaspis cyanea*, *Boh.*,

spring of the second year; *Callimome abdominalis*, *Boh.*, August of the same year; *Callimome regius*, *Nees*, in the autumn of the same year, according to Mayr; *Pteromalus Saxesenii*, *Ratz.*, in the autumn of the same year; and *Pteromalus incrassatus*, *Ratz.*, in May of the second year, according to Ratzeburg. Kaltenbach gives the following parasites of *Agama*, but on what authority is not stated:—*Eurytoma signata*, *Ns.*; *Torymus pubescens*, *Frst.*; *Eupelmus urozonus*, *Dlm.*; *Pteromalus fasciculatus*, *Frst.*, and *Pteromalus fuscipalpis*, *Frst.* (of these the *E. signata* of *Nees* is a compound species; *T. pubescens*, *Frst.*, is also a doubtful species, now restricted to a rose species of *Syntomaspis*; *E. urozonus* occurs in many of the oak-galls, and the *Pteromali* are best left untouched).—*Germer's 'Zeitschrift.'* The other inhabitants of this gall are the same as those of the preceding species. Hartig, in support of his theory that the genus *Cynips* was agamic, relates his experience in breeding this species and *D. folii*. He says of *C. divisa* (called *C. disticha* at first, in error):—" *Cynips disticha* was so rare in 1839 that I could not discover a single specimen in my excursions. I first found it myself in 1838. In the summer of 1840 I found it in such immense numbers that with little trouble I collected about 28,000 galls. On an average, about every third gall contained a *Cynips*; but out of these 9000 to 10,000 flies there was not a single male." "In the summer of 1840, as mentioned above, I bred 9000 to 10,000 females of *C. divisa* from 28,000 galls. Notwithstanding this I found the galls quite as abundant in 1841 and 1842; and from galls collected, again bred nothing but females. The galls were not collected from one tree, but received each year from a large expanse of country." He also bred from 3000 to 4000 examples of *D. folii*, all females. The question of parthenogenesis in some of the genera of *Cynipidæ* still remains a puzzle, although it seems nearer solution with some of the entomologists of America, where a male *Cynips* has been found; but if the European species are not asexual, how exceedingly rare must be the occurrence of the male element to elude detection for so long in the fifty species or upwards, known only in the female sex. I have not found the proportion, which the *Cynips* bred bear to the number of galls, to be anything like so near as in Hartig's

case. The following is a record of parasitism in these galls; galls collected 30th July, 1875, inmates emerged as follows:—July, 1875: one *Eurytoma squamea*? *Walk.*, male. August, 1875: twenty-one *Synergus albipes*, *Hart.*; fifteen *Eurytoma squamea*? one *Decatoma biguttata*? *Swed*; one *Callimome abdominalis*, *Boh.*, female; six *Pteromalus Saxesenii*? *Ratz.*; three *Pteromalus* sp.? September, 1875: two *Callimome regius*, *Nees*, male and female. November, 1875 (10th to 22nd): four *Dryophanta divisa*, *Hart.*, females. April, 1876: one *Synergus Tscheki*, *Mayr*, male. May, 1876: ten *Eurytoma* sp.? nine males and one female; two *Decatoma biguttata*? ten *Syntomaspis cyanea*, *Boh.*, males. June, 1876: one *Eurytoma* sp.? male; eight *Syntomaspis cyanea*, females. Number of galls collected (including several double and many immature), two hundred and forty-eight; number of insects bred, eighty-six.—*E. A. Fitch.*

52. *Dryophanta agama*, *Hart.*—This gall, of the size of a hemp-seed, occurs on the side veins of the under side of the leaves of *Quercus sessiliflora* and *Q. pedunculata*. It appears first in June, when it is of a yellowish white colour, but later on changes to a more or less intense yellowish brown. It has a bare; smooth, slightly shining surface, and is covered with scattered, flat, brown and inconspicuous nodules. It is moderately hard, transversely oviform, and is much flattened next the leaf, to which it closely adheres, although only attached at the centre, and does not show on the upper side. In section it exhibits a loose parenchyma, from half to one millimetre in thickness, which surrounds a comparatively large larva-cell without an inner gall. Herr von Schlechtendal states October and November to be the flight time of the gall-fly.—*G. L. Mayr.*

Synergus pallicornis and *S. albipes*, *Syntomaspis cyanea* and *Torymus regius*, are the attendants of this species recorded by *Mayr.*—*E. A. Fitch.*

Entomological Notes, Captures, &c.

Relaxing, Grease, &c.—The following method of relaxing insects may be recommended for its extreme simplicity and handiness. Take a common glass cylinder,—say four inches

in diameter and eight inches in height; cut a piece of cork, so as to fit easily within it; soak the cork *thoroughly* in water; and having pinned on to it as many insects as it will conveniently hold, place the cork on any flat surface,—as a table, &c.,—and cover it over with the cylinder. Nothing more is required; and the whole operation may be effected in a couple of minutes. Twelve hours will be sufficient to relax most Noctuæ and all Geometræ. Sometimes in this and, as I suppose, in all other methods, the insect will become more or less damp. It is, therefore, desirable, after it has been re-set, to thoroughly dry it by exposure, at a safe distance, to the warmth of a fire. It may be observed that it is almost impossible to *re-set* a moth, and still more so a butterfly, so as to please a fastidious eye;—at any rate, I have failed to do so. While admiring, therefore, Mr. Newman's modest disclaimer of "originality," I must thoroughly endorse his motto—"Prevention is better than cure." As regards Mr. Brown's question about the employment of the solution of corrosive sublimate, the injury done to his insects arose from two causes:—first, the solution was too strong; and secondly, he used it improperly. The following extract, from a letter written to me by the late Mr. H. Doubleday, will give Mr. Brown the necessary information on these points:—"I am not an advocate for the use of camphor; it unquestionably tends to make moths greasy. If the *under sides* of the thorax and abdomen, and the antennæ, are carefully touched with a camel's-hair pencil dipped in a weak solution of corrosive sublimate, they are for ever proof against mites and mould. I believe that when insects are carefully touched with a weak solution of corrosive sublimate in pure alcohol, they will never mould or be destroyed by mites. A small piece of sublimate, about the size of a hemp-seed, is sufficient for an ounce of alcohol. It should never be strong enough to give visible crystals on a non-absorbing substance (black),—a piece of blackened ivory, for instance,—when it is wetted with the solution and allowed to evaporate. The best method of applying it is to take a small camel's-hair pencil and dip it in the solution, pass it along the antennæ, and then apply it to the under side of the thorax and abdomen." N.B. (by myself).—Extreme care is required in applying the solution

to the *antennæ*. I do not agree with Mr. Doubleday's opinion about camphor causing grease in insects. To speak more correctly, I should say that insects *will* grease, quite irrespective of camphor, which very probably may cause its more speedy appearance. Once more to quote Mr. Newman; to nothing is the aphorism—"Prevention," &c.—more applicable than to grease. I am sorry Mr. Clark finds my method of "prevention" so difficult. I am *quite* sure that the difficulties may be overcome by anyone gifted with an ordinary deftness of fingers. Let me urge him to try, and try again. Begin on some of the *common*, stout-bodied moths, having first carefully studied the directions. The method, doubtless, requires some little skill, and *much* patience; but he will be amply rewarded by seeing his insects, after the lapse of years, as fresh and neat as the day they were set. Lastly,—I have used camphor for twenty-five years, and find it quite guiltless of the many sins laid to its charge. I have always thought it, and still think it, the best preservative. Mr. Brown's objection—"As camphor must evaporate, little particles must settle on the wings of the specimens"—is new to me. Will not the particles themselves evaporate?—[*Rev.*] *J. Greene; Clifton, Bristol.*

Relaxing Butterflies.—In No. 156 of your valued 'Entomologist' (Entom. ix. 137) one of your correspondents wishes to know a good method of relaxing butterflies. Through the kindness of a Lepidopterist, Mr. Pickel, of Landsberg, I am able to give you a description of an apparatus for this purpose, communicated to me for my 'Entomological News.' The apparatus consists of an oval zinc-box, seven inches long by four inches wide, and two inches and a half deep, and is closed with a lid, which has an edge of half an inch to draw over it; in one of the sides of the box there is a hole half an inch from the upper edge, through which a zinc tube, quarter of an inch in breadth, is passed slantingly from the inner to the outer side, and is soldered in such a manner that the upper half of the tube reaches about half an inch on the inside of the box, but does not touch the lid, whilst the lower end terminates in a downward direction, about an inch and a half on the outside. In order to be able to place the pinned butterflies in the box there are cork strips on the bottom, which are held by thin

strips of tin soldered to the sides of the box. Before using the apparatus the spaces between the cork strips must be filled with water; then the butterflies are placed in the box, and the apparatus is locked. A circulation of air then takes place through the tube, and saturates the space inside with moisture, so that in a few hours the butterflies are just as pliable as if they had been just caught. But the chief use of the machine is that, when a Lepidopterist comes home tired at night from all the day's hunting, he need not sit up for hours in order to set his insects. Perhaps it will be useful to some of your readers to know of this apparatus. You are welcome to make use of my note.—*Dr. Katter; Putbus a. Rügen, June 3, 1876.*

Relaxing Insects (Entom. ix. 137).—One of our leading entomologists said many years ago that a well-set collection was worth a pilgrimage to look at; and I, for one, most cordially agree with the remark. It is, however, a thing never to be attained, unless one religiously re-sets something like fifty per cent. of the specimens received from correspondents. Many collectors, especially country ones, seem to think that the pin leaning—like Major Wellington De Boots's chimney—"several degrees from the per-pen-di-cu-lar," in any direction, is a matter rather to be admired than otherwise; while, of course, bodies, antennæ, and legs, are always left to shift for themselves. A good systematic plan of relaxing specimens, previous to re-setting, is consequently of considerable interest to those who take a pride in the appearance of their collections, and Mr. Kynaston's query leads me to recommend the method I use; a rather long experience enabling me to speak highly of it. A deep wooden box, with a loosely-fitting lid, is lined to the depth of an inch or so with plaster of Paris: this is easily managed by turning the box alternately on each side, and pouring in sufficient plaster (mixed to the consistency of cream) to cover it to that extent, keeping the plaster in its place till set by a slip of wood held against the box. By repeating this process for all the four sides, and filling up the bottom to the same depth, the box may be very neatly finished. The lid is, of course, to be coated in a similar way inside. The insects operated on are pinned on a tablet of wood coated with cork, which is mounted table-wise on little legs and placed inside the box,

so that in no part does it touch the plaster sides. When the box is used pour water on the plaster, so as to thoroughly saturate it; stick the specimens on the table, put on the lid, and place the whole in the pantry or cellar to be kept cool. To guard against fungi appearing in the box some corrosive sublimate (bichloride of mercury) may be dissolved either in the water mixed with the plaster or in that first used in damping the box; the former plan is perhaps preferable. From one or two days to a week, according to the size of the insect, will be needed for the specimens to get into fit condition for effective setting. The great point is to have them thoroughly relaxed, or they are apt to spring. To prevent this, also, they should be left for a long time on the boards,—a week or ten days at least is required; but with the above precautions I have never found it necessary to use any such clumsy contrivance as sticking the wings in position with liquid-glue, &c. This can only be required when the insects have not been sufficiently relaxed. Of course I claim no originality for the above method. I believe it is used by many entomologists, but I think it possesses several advantages compared with the plans mentioned in most books. Although immersed in a very moist atmosphere the specimens never become saturated with water, as is often the case when a simple wetted box is used. The bichloride of mercury seems effectually to prevent any appearance of mould, and the rapid evaporation from the porous plaster keeps the air in the box at so low a temperature that even in the height of summer no signs of decomposition are perceptible, while the neatness of the affair and its constant readiness for use are additional recommendations. I have employed one for several years, and it is still as serviceable as ever. When carefully manipulated, relaxed insects, particularly butterflies, &c., look quite as well as those set in their original state. I have hundreds of Diurni and Bombyces in my collection prepared in this way, and he would be a bold man who would undertake to pick them out from the others. Indeed, there is one element in connection with such perfect methods of relaxing worthy of consideration: inasmuch as the insects retain all their pristine beauty after undergoing the process, unscrupulous collectors and dealers are enabled to pass off foreign specimens as "true Britons" with impunity.

to those extraordinary brothers of the (silver) net who seem to think it a pleasure to be cheated, and who are willing to pay a high price for the doubtful gratification of spoiling their collections for all scientific purposes by the introduction of German specimens with a false pedigree. Tastes differ, of course; but were I infected with this comical phase of the "amor-habendi" mania, I should prefer manufacturing my own "true British specimens" myself, rather than pay some enterprising gentleman a premium of nineteen and sixpence in the pound for performing so simple an operation for me.—*B. G. Cole; The Common, Stoke Newington, N., June 7, 1876.*

Mode of Relaxing Insects.—A correspondent asks (Entom. ix. 137) how best to do this. I venture to offer the following suggestion, from the experience of an old collector. The plan I have adopted for some years, and found very successful, is at any rate a very simple one. I lay fine sand, about an inch deep, on the bottom of a common vegetable-dish, and saturate it with water. On this wet sand I lay a piece of cork, and distribute over it the specimens to be relaxed, always taking care that the wings do not touch the sand; and then put on the dish-cover to concentrate all the damp air. In twenty-four—or at most forty-eight—hours the insects will be quite sufficiently relaxed for laying out. I have in this way relaxed hundreds of specimens sent from abroad, chiefly from India, which came to me with their wings folded together and slipped into envelopes, and thus packed in cigar or biscuit boxes. I once relaxed above one hundred specimens from China, which had laid in their envelopes above twelve years. I found the most obstinate of them give way after being under the influence of this cold vapour-bath a couple of days.—[*Rev.*] *J. Cave-Browne; Detling Vicarage, Maidstone.*

Mites and Grease (Entom. ix. 140).—The use of corrosive sublimate is, in my opinion, always to be avoided: it rarely fails to seriously damage the appearance of the specimens to which it has been applied; causing, moreover the subsequent corrosion and brittleness of the pins. "En passant," it has often occurred to me to ask what the supposed advantage may be in the extreme pliability of the entomological pins; rather than an advantage, it seems to me a very great defect, as

should there happen to be (which is often the case) a hard place in the cork the pin doubles up, and thus many a valuable insect has been destroyed. When mites are detected, the spot where the little dust that betokens their presence is collected underneath the specimens should be well saturated with phœnic acid, or an alcoholic solution of carbolic acid, which will do as well and is cheaper; the body of the insect also, except in the case of green insects, when benzine should be employed. Grease, though troublesome, is by no means impossible to get rid of. In this case exception is to be taken to the established rule that "Prevention is better than cure." It is far better to let the specimens get greasy than try to prevent it, as with the most skilful manipulation stuffed bodies cannot but look unsightly. When they have become greasy the bodies must be broken off, and soaked for a time—varying according to size—in benzine. My friend Mr. Corbin showed me in his cabinet such large bodies as those of *Acherontia Atropos* treated in this way, every trace of grease being removed. He gave it as his experience that *Atropos* is very liable to grease: this varies with my own; I have never had a greasy specimen. It is well, unless absolutely necessary, not to saturate the wings with any preparation, as it frequently results in the disarrangement or matting together of the cilia, which cannot afterwards be put right. Dr. Lees tells me that he considers grease rather as a preservative than otherwise. To quote his words:—"I do not regard it as a putrefactive change, but in its nature rather the opposite (though it spoils the look of specimens), and more analogous to a peculiar fatty production which takes place in dead human and other bodies, after they have been interred some time. The whole body often becomes changed into this peculiar solid, greasy matter, which is very imperishable."—*Joseph Anderson, jun.; Chichester, Sussex.*

Grease and Mites.—I see several correspondents enquire about grease and mites. I am now pursuing a course with my collection which I believe to be a perfect preventative of both, and intend to replace all my common moths this season. My plan is this:—When the insect is killed I clip the body open (underneath), and take out the inside; I then fill the skin with plaster of Paris, and place it on the setting-board. When it is fit to remove I take it off the board, and,

by means of the setting-needle, poke all the plaster out again, and wash the inside of the dried skin with a solution of corrosive sublimate and spirits of wine. The body may then be filled with cotton, if thought proper. I have specimens of *Dicranura vinula* done in this way three or four years ago, which look as fresh as if bred but yesterday; and the person who gave me the hint had a long series of *Salicis*, every one with bodies as white as snow.—*S. L. Mosley; Almondbury Bank, Huddersfield.*

Preserving Larvæ.—I am glad to see entomologists are turning their attention to this branch of study. I do all mine by inflating over a spirit-lamp, and have preserved larvæ from *Ligniperda* down to a *Depressaria*, including *Chrysorrhœa*, *Auriflua*, &c. My greatest difficulty has been with the green larvæ, such as *Pieris Rapæ*, *Plusia chrysitis*, &c., which not only lose their beautiful green tint, but assume a very ugly brown. I have tried colouring, both internal and external, but with very little success; and have many times been very vexed when correspondents have sent me such larvæ to operate upon, and have had to return them in such an unsatisfactory state. I disagree with Dr. Knaggs, when he says that preserved larvæ, pupæ, &c., should be kept in cases separate from the imagos; I think it is the very use of them, that they should be placed side by side in the same drawer. I not only do this, but include the food-plant as well, dried in a natural position, and the larvæ mounted upon it.—*Id.*

Podalirius and Machaon.—Having only quite recently returned to England from the Continent, I find a large accumulation of the 'Entomologist' at my house, which have not been forwarded to me by my friends during my absence; and, upon looking over them, I see numerous questions and answers relative to *Machaon* being double-brooded. In the neighbourhood of Coblenz, where I have been for the last two years and a half, *Machaon* is undoubtedly double-brooded. I find on reference to my last year's diary (1875, which was an extra good year for both *Machaon* and *Podalirius*, 1874 being quite the reverse) that I captured my first *Machaon* on the 13th of May, and captured them almost every day up to the 24th, when they ceased altogether, and did not reappear until August 10th, when they occurred in

equal profusion as in spring up to the 17th. During the intervening two months and a half numbers of the larvæ were found feeding on *Euphorbia Esula*. The difference in the size of the vernal and autumnal specimens was very striking, the earlier brood being so very much smaller. *Podalirius* absolutely swarmed during May. Of course, I am aware that it does not follow from the fact of *Machaon* being double-brooded on the Continent that it must also be the case in England; but anyhow it goes some way towards showing the probability of it. I have written these few remarks thinking they may interest the gentleman making enquiries about *Machaon*.—*George Eastham; 13, Manchester Road, Southport.*

Zygæna nubigena, Mann.—With reference to the occurrence of this species in Scotland (*Entom.* ix. 142) Mr. Birchall (*Ent. Mo. Mag.* iii. 33) says: "The specimens of *Zygæna* taken in Argyleshire, and noticed in the 'Zoologist' for 1861, p. 7716, as *Minos*, are *Nubigena*. I possess a pair of them, through the kindness of Professor Wyville Thomson.—*H. Jenner Fust, jun.; Hill Cottage, Falfield, Gloucestershire.*

Xanthia gilvago a Cannibal.—Early in June I beat from a wych-elm tree four larvæ of *X. gilvago* and two of *T. W-Album*. On reaching home the chip-box containing them was mislaid for about a week. On reopening it to-day I found not only the few seeds and leaves of elm had disappeared, but also the *Thecla* larvæ. I failed to find the slightest trace of their remains. To the best of my knowledge the larva of *Gilvago* has not been recorded as a cannibal, and was no doubt forced in this case by the mere necessity of hunger to content itself with this strange diet.—*Gilbert Raynor; Hazeleigh Rectory, Maldon, June 12, 1876.*

Oporabia filigrammaria and Larentia cæsiata near Bury, Lancashire.—Wishing to obtain larvæ of *L. cæsiata*, and, if possible, those of *O. filigrammaria*, I visited two localities in this neighbourhood, where I hoped to obtain both species; nor was I disappointed, although *Filigrammaria* was not known to have previously occurred at one of the places worked. Some of the larvæ, especially those of *O. filigrammaria*, were found feeding quite exposed; others at rest; but the majority were obtained by beating ling (*Erica vulgaris*).

Although taken on ling both species will eat whinberry (*Vaccinium myrtillus*) quite as freely in confinement. On referring to my notes I find my first captures were made May 20th, *viz.*—three *O. filigrammaria* and sixteen *L. cæsiata*. My last and most successful attempt was on June 4th, when my bag amounted to one hundred and forty-two *O. filigrammaria* and thirty-six *L. cæsiata*. Larentia didymata larvæ were very numerous along with the above, and equally common feeding on whinberry.—*R. Kay; Bury, Lancashire, June 9, 1876.*

New British Tinea.—I forwarded a few *Tinea* insects to Mr. Stainton to name, which he very obligingly did. Amongst them was a *Tinea angustipennis*, “an insect,” to use his own words, “very rare on the Continent, and unknown as British.” Also *Tinea* n. sp. ? “unless it is an aberration of *T. rusticella*, which I do not believe.—*H. S.*” Both were captured in the summer of 1874, amongst a wilderness of weeds, near the Acton railway; since ploughed up—alas! *T. angustipennis* feeds on rotten wood; size $5\frac{1}{2}$ lines; prettily marked with black, orange, and purple, transversely; orange tuft on head. *Tinea* — ? 9 lines; markings as nearly as possible similar to *Ferruginella*.—*Thomas Sorrell; Bolton House Collegiate School, Turnham Green, Chiswick, May 16, 1876.*

Bees.—Bees seem very uncertain in their appearance; in some seasons certain species appear in numbers, and the next season none, or next to none, are to be found anywhere. *Nomada Jacobææ* abounded last year, whilst this year I did not see a single specimen. *Andrena Smithella* was tolerably abundant this year, and before I had only taken a single female. Bees are only to be found during the really fine weather of spring, summer, and autumn, when the country is in its loveliest state; and the situations they take one to are the most attractive,—where the wild flowers bloom. Can anything be more delightful than to find oneself in such a place? the air laden with the perfume of many flowers, and alive with these industrious little creatures, many of them humming over their work with as much variation in their notes as there is in an Eolian harp (I say many of them, for some are silent flyers). Their hum on such occasions as these is the contented hum of a self-satisfied bee; but they

have far different notes to these: just disturb them, and they will sometimes fly about one's head with an angry, shrill, piping note; then, again, take them in your fingers, and they will emit quite a piteous whine; some, instead of the easy, comfortable drone, hum with an eager, restless note, as if they thought every minute ought to have ninety seconds instead of sixty; and all intermediate notes may be heard.—*J. B. Bridgman (in President's Address, Norfolk and Norwich Naturalists' Society).*

The Hop Weevil (Entom. ix. 134): Postscript.—My friend has employed about a dozen men and women, night and day, to hunt his hops for this destructive creature. They remove the soil round the hop-stool in the day-time, and at night (having a light) they pick the weevils off the hop bine. This they have been continually doing for some time. Prior to my having written you on the subject, I had advised him to try hand-picking by night.—*E. R. Sheppard; 13, Limes Villas, High Road, Lewisham, Kent, S.E., May 24, 1876.*

Entomological Pins.—I have for some time thought that there is need of a rearrangement of the sizes of entomological pins. I applied to Messrs. Tayler last year to know if they would make me a new size, but they declined. I think if you appealed to the entomological world, through the 'Entomologist,' as to whether the need is universally felt, and they replied in the affirmative, no doubt Messrs. Tayler would meet their wishes. The new sizes I suggest are—one same length as No. 10, one between No. 10 and No. 15, one same length as No. 5,—all the same strength as No. 7 (or No. 15; I am not sure whether these two are of the same strength or not). This would give a graduated scale from length of No. 10 to length of No. 5, all the same strength; a strength which I think is best suited for all specimens, except some of the larger moths.—*C. Lemesle Adams; Walford Manor, Shrewsbury, June 23, 1876.*

Answers to Correspondents.

S. Bradbury.—Name of an Insect.—I enclose you a fly which I found in my pupæ-box. How it came there is quite unknown to me, as I do not think it is one of the Ichneumon

tribe, and I do not recollect seeing its like before.—*S. Bradbury*; May 22, 1876.

[The name is *Rophidia Ophiopsis*, a Neuropterous insect.—*Edward Newman*.]

T. H. Ormston Pease.—*Margaritata Buff-coloured*.—Is *Margaritata* often found of a buff tone? One specimen of this moth came to my window last autumn, of about the same colour as *Elinguaria*; and though I am aware they are to be seen faded to almost the same shade, I have not hitherto come across a living specimen.—*T. H. Ormston Pease*; *Cote Bank, Westbury-on-Trym, May 1, 1876*.

[I have seen specimens of the colour described, but they are not frequent.—*Edward Newman*.]

————— *Name of a Micro*.—Can you tell me the best method of preserving pupa-cases in a collection? I find that gum will not hold the more polished ones, while they are so light as to blow away with the least breath if not fastened down. Could you identify the following description? *Male*.—Entirely of a dusky black, wings narrow and rounded, posterior wings slightly fringed. *Female*.—Apterous, scaly, with a brush of fine hairs on the last segment, giving the body a truncated appearance. Antennæ of female very short. I found two cocoons of a dirty white colour attached to the top of some park-railings, from which the above-described moths emerged last autumn.—*T. H. Ormston Pease*.

[I scarcely like to mention or suggest a name. Will any correspondent kindly help me?—*Edward Newman*.]

G. Tucker.—*Food of Saturnia cynthia*.—Will you kindly inform me, through the columns of the 'Entomologist,' of the food-plant of the larva of *Saturnia cynthia*? a species of silkworm moth.—*G. Tucker*; 242, *Prospect Place, High Street, Sheerness-on-Sea, April 21, 1876*.

[I have never bred this species, but have seen it feeding greedily on oak and plum: I cannot say with what ultimate success. Perhaps some entomologist who has successfully cultivated it will kindly give the required information. At the same time, information respecting the other silkworms, now so commonly cultivated, will be acceptable.—*Edward Newman*.]

Food of Saturnia carpini.—Mr. Edwards (*Entom. ix. 142*) may be interested to know that last season I fed up some

larvæ of *Carpini* on chestnut, which they seemed to prefer to anything else, as they would leave both heath and birch for it.—*H. Jones; Hawley, Farnborough Station.*

Extracts from the Proceedings of the Entomological Society of London.

JANUARY 5, 1876.

Sir Sidney Smith Saunders, C.M.G., President, in the chair.

Lepidoptera of the Higher Alps.—The Rev. R. P. Murray exhibited a collection of Lepidoptera taken by himself in the Higher Alps, amongst which were some interesting mountain varieties.

Æschna mixta at Norwood.—Mr. S. Stevens exhibited a specimen of a dragonfly, rare in this country (*Æschna mixta*), which he had picked up, nearly dead, in his garden at Upper Norwood, in the middle of November.

British Coleoptera.—Mr. Champion exhibited specimens of Coleoptera, *viz.*, *Aleochara hibernica*, *Rye*, taken at Slieve Donardh, Ireland; *Homalota egregia*, *Rye*, from Caterham; and *Cryptophagus subfumatus*, *Gyll.*, taken in the London district.

Remarkable Species of Attacus.—Mr. W. H. Miskin, of Queensland, communicated a description of a new and remarkable species of moth belonging to the genus *Attacus*, of which a male and a female specimen had been taken in the neighbourhood of Cape York. He had named the species *A. Hercules*. The expanse of the wings measured nine inches, and the hind wings were furnished with tails. The specimens had been deposited in the Queensland Museum.

JANUARY 24, 1876—ANNUAL MEETING.

Sir Sidney Smith Saunders, C.M.G., President, in the chair.

[The President gave an able summary of the progress of Entomology during the year, from which the following are extracts.]

Bees and Wasps.—Sir John Lubbock has recorded in the 'Journal of the Linnean Society' (May, 1875, No. 69) various interesting experiments in continuation of his "Observations on Bees, Wasps, and Ants:" tending to show that bees "do

not communicate with their sisters, even if they find an untenanted comb full of honey ;” that, far from exhibiting “any evidence of affection, they appear to be callous and utterly indifferent to one another ;” that even “their devotion to their queen is of a most limited character ;” and that their perception of differences of colour is incontestible,—a deduction equally applicable to wasps. Some experiments were also made “with the view of ascertaining whether the same bees act as sentinels.” Having found that particular scents had the effect of calling the bees out, he marked twelve, in all, of those which first appeared on several successive days ; and, in nine such experiments, “out of ninety-seven bees which came out first, no less than seventy-one were marked ones.” He likewise tested some of the faculties attributed to ants, and especially their “power of communicating facts to one another,” which his first recited experiments served to corroborate ; although “some appeared to communicate more freely with their friends than others,” which did not summon their companions to assist them. By a further series of “Observations” on these races, more recently read before the Linnean Society, and communicated by the author to ‘Nature’ (No. 315, November 11th), we are also informed that one ant made no less than one hundred and eighty-seven journeys in a day to carry off larvæ one by one, without bringing any other ant to assist her ; but, in other instances, a different result was witnessed, the ants which had the heaviest task to perform having “brought far more friends to their assistance than those which had apparently only two or three larvæ to remove ;” these latter being replaced by others from time to time as each was carried off. Thus, “of thirty ants which were observed, those placed to a large number of larvæ brought two hundred and fifty friends, while those placed to two or three larvæ under similar circumstances only brought eighty.” We also find that ants prefer a beaten track, however circuitous, to hazarding a short cut by dropping even “one-tenth of an inch ;” but had retreat been cut off altogether, their ingenuity to devise some other mode of escape might have been more sorely tested. In these and other experiments upon the aforesaid social tribes, the most striking evidence is afforded of the indefatigable industry with which such observations

have been closely followed up from early morn to "dewy eve," and recorded with a precision rarely, if ever, surpassed; thus affording an admirable illustration how time may be stolen, as it were, for such objects, from other vocations, by activity and perseverance.

An interesting account of the habits and metamorphoses of a new species of *Sitaris* (*S. Colletes*), parasitic, as its name implies, on a species of *Colletes* (*C. succincta*, *L.*), has been given by M. Valéry Mayet in the 'Annales' of the French Entomological Society (Ser. 5, tome v., 1875), with two plates exhibiting the various stages of both these insects, from larva to imago; and of *Epeolus tristis*, *Sm.*, obtained from the cells of this *Colletes*. The primitive larva of the aforesaid *Sitaris*, as carefully described and delineated in this memoir, is furnished with *triunguiculate* tarsal claws, like that of *Meloë*; whereas, in M. Fabre's remarkable life-history of *Sitaris humeralis*, the tarsi of the latter, in this stage, are represented as terminating in a single powerful claw (*un ongle puissant, long, aigu, et très mobile*). The young larva of *S. Colletes* is supplied with a caudal apparatus (*appareil fixateur*, V. M.), consisting of two upcurved spiked appendages attached to the base of the eighth abdominal segment on the dorsal region, having a simultaneous action up and down, between which are two tubular processes emanating from a superincumbent plate, and directed backwards, from whence filaments issue from time to time when the larva desires to affix itself to a hair of the bee or other object. Fabre, however, appears to consider such filaments, in the larva of *S. humeralis*, as ordinary caudal setæ, which he describes as attached to the exterior margin of the ninth abdominal segment (*l. c.*, p. 310). The *Colletes*-egg is readily accessible to the young *Sitaris*, not being deposited by the bee, as in the cells of *Anthophora*, upon the honey-store itself, but affixed above this to the wall of the cell, whereby the difficulty and danger to be incurred in reaching the same, and the necessity of effecting this manœuvre at the moment of oviposition, are avoided. As this *Colletes* constructs her cells and deposits her eggs in the autumn, the *Sitaris*-larvæ, soon after their birth, attach themselves to their victims, instead of remaining, like those of *S. humeralis*, seven months fasting in suspense, from the end

of September to the end of April, waiting for the Anthophoræ to emerge from their hybernacula. When more than one of these larvæ occupy the same cell of the Colletes, they fight with great ferocity until one alone remains, the others being killed and thrown into the honey; although it not unfrequently happens that even the victor in this strife, finding the egg partially consumed by one of his former adversaries, and consequently insufficient for his maintenance, shares the fate of the vanquished; but no such pugnacious dispositions are evinced at other times when consorting together in multitudes. Such contests are avoided in the cells of Anthophora, where a single Sitaris-larva obtains possession of the egg unmolested at the moment of oviposition on the honey itself; a circumstance upon which M. Fabre comments as a wonderful display of instinct on the part of these larvæ (*l. c.*, p. 326). The secondary larva of Sitaris Colletes, which plunges into the honey, continues to feed thereon until April or May of the following year. It is destitute of eyes or ocelli, but still retains the vestiges of legs, and is furnished with spoon-shaped mandibles, acting alternately in the feeding-process. Eight or ten days after ceasing to feed, the adult larva assumes the pseudo-chrysalis stage of corneous consistency, within the detached, but still closely-enveloping, larval pellicle, which Fabre aptly compares to a bag of fine gauze. M. Valéry Mayet designates this stage as the "*pseudo-nymph*,"—an appellation which he incorrectly attributes to Newport; for the latter, in his several memoirs on the transformations of Meloë (Linn. Trans., vols. xx., xxi.), always speaks of the "adult or *pseudo-larva*," referred to in his last memoir as the only intermediate stage in which he had found this insect (*l. c.*, p. 177),—for which stage M. Fabre has substituted the more appropriate denomination of "*pseudo-chrysalide*" (p. 356), as not giving birth at once to the imago form, but evolving, within the indurated tegument, a semi-active larval form, followed by an ecdysis of the latter preparatory to assuming the condition of a true pupa or nymph (p. 338). Neither he nor Newport ever allude to a *pseudo-pupa* or *pseudo-nymph*, applicable rather to the aforesaid semi-active stage, which Fabre was the first to notice, and which, from its close resemblance to the antecedent larva, he designates as "*la troisième larve*."

The pseudo-chrysalis of *Sitaris Colletes* exhibits this interior metamorphosis—as seen through the semi-transparent corneous tegument—after about ten weeks, towards the end of July or the middle of August; the perfect beetle emerging usually the following month; although in some rare instances—attributable, as M. Valéry Mayet conceives, to insufficient nutriment in the primitive stage, when the *Colletes*-egg has been partially tapped by other competitors—the ultimate metamorphosis is protracted until the autumn of the following year. In *Sitaris humeralis*, however, such retardation is the general rule; it being only in exceptional cases that some of these remain scarcely more than a single month in the pseudo-chrysalis state, completing their metamorphoses in August, and emerging shortly after. But they usually *hibernate* in the former stage; and it is only in June of the second year that the interior quasi-larval form is separated from the pseudo-puparium, and about five weeks later becomes transformed to a true *pupa-nymph*; the same month, in fact, when the adult larva had assumed its corneous tegument in the previous year (Fabre, *l. c.*, pp. 339—343). M. Valéry Mayet recognises this pupa as “*la véritable nymphe*” (p. 75); therefore the antecedent stage, or “*troisième larve*” of Fabre, and not his “*pseudo-chrysalide*,” can alone constitute the *pseudo-pupa* or “*pseudo-nymphe*.” Thus the *Sitaris humeralis* usually requires two years to complete its metamorphoses, hibernating the first year in the primitive larval condition, and the second in that of the pseudo-chrysalis; whereas the *Sitaris Colletes*, commencing its operations seven months earlier, generally attains maturity within a single year. The early transformations of two other species of *Meloïdæ* have also been investigated by M. Jules Lichtenstein, of Montpellier, who succeeded in nurturing one of the primitive larvæ of *Meloë cicatricosus* on the egg of a *Vespa vulgaris* placed upon honey in a glass tube, and in witnessing its first metamorphosis five days later, when it plunged into the honey, but died after feeding thereon twelve days. This secondary form differed essentially from that of *Meloë*, described and figured by Fabre, apparently constituting an intermediate stage, closely resembling the antecedent larva, but destitute of caudal setæ, with lacteous head and black eyes (the subsequent stage being blind), looking like a

minute salamander, with its legs distended on the honey. Experiments were also tried with the primitive larvæ of the blister-beetle (*Cantharis vesicatoria*), which could not be induced to feed on the eggs of *Vespa* or *Polistes*, nor on simple honey, beyond a few feeble attempts; but eventually they accepted the honey-bag of the hive-bee as an available substitute for their ordinary food, affixing themselves to this and thriving thereon. In one instance also a compound of honey and young *Polistes* larvæ proved equally successful. These primitive larvæ are of a brownish black colour, with the second and third thoracical, and the first abdominal segments, more or less pallid, having the usual long caudal setæ and triunguiculate tarsal claws. After the lapse of nine days they changed to the secondary form as aforesaid. Three of these attained the third stage, having still well-developed legs (*pattes assez bien conformées*), but with no indication of eyes, coinciding in this respect with those of *Meloë* and *Sitaris*. After a time, becoming restless as adults, they were placed upon some earth, wherein they hastily buried themselves, for the supposed purpose of completing their transformations, but contrary, as it would seem, to their accustomed habits. Here they appear to have perished, being no longer discoverable; their death being attributed to insufficient moisture. From the localities frequented by this *Cantharis*, where the burrows of *Halicti* also abound, M. Lichtenstein considers it probable that the larvæ of the former are reared in the cells of these bees; but, in such case, they could not quit those abodes to undergo their ultimate metamorphoses in the earth.

Spiders in the Bark of Trees.—Our attention has been called to a new trap-door spider from South Africa, which forms its nest in the bark of trees, recently described and figured by the Rev. O. P. Cambridge in the 'Annals and Magazine of Natural History' (November), under the name of *Moggridgea Dyeri*. The nests, however, figured by Mr. Pickard Cambridge, differ essentially from two which were exhibited at the July meeting of this Society; these being wholly imbedded in the solid bark, and having a hinged lid closely resembling the surrounding parts of the cuticle itself, as if retained *in situ*; whereas, according to a fuller description of the nests submitted to Mr. Pickard Cambridge,

published in the 'Field' newspaper of the 28th August, they were stated to "consist of a silken tube, scarcely more than an inch in length, rugged on the outside in such parts as may be exposed, and formed in the folds and interstices of the rough bark ('Annals and Magazine,' *l. c.*, pl. x., fig. A); the outer side of the lid, like that of the exposed parts of the tube, exactly resembling the surrounding surface of the bark." One of these tubes was "constructed in the channelled groove of a piece of wood which had apparently formed part of some building" (*l. c.*, fig. B). Other nests, somewhat similar to those referred to by Mr. Pickard Cambridge, were exhibited by M. Lucas, at a meeting of the French Entomological Society (November 10th); the silken tubes—carefully concealed by, and interwoven with, particles of bark—constituting a longitudinal distension above the surface, and ceding to pressure. No reference, however, has been made in any of these descriptions to tubes entirely hidden within the solid bark, having only the lid exposed. From the occupants of these novel abodes being destitute of the spines with which the anterior extremity of the falces is crested in allied races, assisting them to burrow in the earth, Mr. Pickard Cambridge considers that these spiders, "not being furnished with the necessary implements," fix "upon a position where excavation is needless." But in the other instances referred to, where the tunnel is equally short, scarcely penetrating beyond an inch, and not corresponding, therefore, with that of any wood-boring larva of similar dimensions, the fortuitous discovery of such a retreat would seem open to question; the fangs being possibly more available than the spines on the falces for operating upon the fibrous tissues, and an economy of labour being effected by utilising any convenient receptacle, as frequently witnessed among other excavators. Some doubts have been entertained whether the access to these domiciles is from above or from below. Mr. Pickard Cambridge now inclines to the opinion that the lid is placed at the upper extremity of the tube as usual, although evidence is wanting upon this point. An instructive account of the habits of this and other allied species, comprising also the preliminary details published in the 'Field,' has been given in 'Newman's Entomologist' for November last by the talented Editor of that periodical.

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Agrotis tritici and *Agrotis aquilina*.



Fig. 1.—*AGROTIS TRITICI*.



Fig. 2.—*AGROTIS AQUILINA*.

As there is often some little difficulty in identifying these two species, I think it desirable to point out the difference, with the aid of the above figures.

Agrotis tritici usually appears a few days before its ally; and, although not invariably the case, it is generally more littoral in its habitat; for though frequently found with *Agrotis aquilina* inland, the latter is seldom found in the same numbers near the coast. In fact, *A. aquilina* is a more scarce species, and I have never found it in large numbers in any locality; whereas *A. tritici* may usually be

taken from the last week in July to the second week in August in profusion, either at sugar or on the flowers of the ragwort, even by day, on all our sandhills and heaths from the North of Scotland to the south coast.

A. tritici may be distinguished by the colours being more sharply bright than in *A. aquilina*; the ground colour of the fore wings is grayish brown,—that is, the gray is more visible than in *A. aquilina*, where it is suffused with a brownish tint, having a strong inclination to ochreous. In *A. tritici* the streak, from the base near the costa, is more sharply defined and lighter in colour. The subterminal line in *A. tritici* is much more distinct than that of *A. aquilina*; also the hind margin of the reniform stigma is much better defined; whereas in many specimens of *A. aquilina* it is scarcely visible.

A. tritici is much more variable than *A. aquilina*: it varies from a strongly-marked, clean, black and white form,—very like *Agrotis obelisca*,—to an almost unicolorous brownish gray, without any distinct marking; while *A. aquilina* only varies in intensity and depth of colour. *A. aquilina* is larger, and a generally stronger moth.

Let me advise all who have any doubt about the identity of either species to rear each from its early larval state. The larva of *A. tritici* may be found commonly during May at the roots of the various species of stonecrop which abound on our coasts, especially *Sedum acre*, as well as at the roots of grass and of almost any flowering plant; while that of *A. aquilina* more frequently feeds upon the leaves than the roots. The larvæ of both species feed at night.

Agrotis tritici.

The head of the LARVA is shining pale brown, marbled with darker brown; the 2nd segment has a dark brown smooth plate; along the back is a broad gray-brown stripe, followed by a narrower line considerably paler, and a narrow lateral stripe on each side, also pale brown; the

Agrotis aquilina.

The LARVA of *Agrotis aquilina* is slightly larger than that of *Agrotis tritici*: the head is light gray-brown, marbled with very dark brown; the back dingy brown; the dorsal line pale brown, which with the subdorsal line runs through the blackish plate on the 2nd segment; below this

sides of the larva are dingy green, divided by a narrow gray stripe; spiracles black. Full fed middle to end of May.

The size of the IMAGO is 1 inch 1 line to 1 inch 4 lines. Fore wings grayish brown, a very pale gray streak from the base of the wing near the costa; stigma much paler; hind edge of the reniform stigma being well and distinctly marked; three black wedge-shaped spots precede the somewhat distinct subterminal line. The perfect insects appear end of July to middle of August.

is a line of blackish green, then a thin gray-brown line, followed by another broad stripe of dingy dark green; the black spiracles being beneath its lower edge: the whole aspect of the larva of *A. aquilina* being dingy. Full fed end of May.

The size of the IMAGO is 1 inch 4 lines to 1 inch 5 lines. Fore wings pale brownish, with a strong tendency to ochreous; a pale ochreous-brown streak from the base near the costa; stigma much paler, with the hind margin of the reniform stigma scarcely defined, or lost; three or four blackish wedge-shaped dashes precede a very indistinct subterminal line. The moth appears late in July and early in August.

JOHN T. CARRINGTON.

Descriptions of Oak-galls. Translated from Dr. G. L. MAYR'S 'Die Mitteleuropäischen Eichengallen' by E. A. FITCH, Esq.

(Continued from p. 150.)

53. *Dryophanta disticha*, Hart.—This gall appears on the under side of the leaves of *Quercus sessiliflora*, and is not visible on the upper side. It is of a cylindrically-spherical shape, and grows generally to a height of four millimetres, with a little longer transverse diameter. It adheres to a side rib by means of a very short pedicle, and is much compressed at that spot; it is also flattened at the top, and has in the centre an umbilicated papilla. It is

Fig. 53.



D. DISTICHA
(and in section).

rather hard, bare, somewhat shining; at first (July and August) of a yellowish white, which changes later on to a yellowish brown, and often slightly rosy. This gall differs from the preceding species in having two cavities in the interior, one placed above the other, the lower of which contains the larva, and is only confined at the base by a thin wall; the small, upper cavity, however, is surrounded with a thick and loose layer of gall-substance, and separated from the larva-cell by a thin cellular diaphragm. The gall-fly is developed late in the autumn; and, according to Von Schlechtendal, leaves the gall in October and November; while Schenck gives spring as its flight-time.—*G. L. Mayr.*

Fig. 54.



D. CORNIFEX (and in section).

54. *Dryophanta cornifex*, Hart. —This horn-shaped gall appears in June on the under side of the leaves of *Quercus pubescens*. It is at first green, but becomes yellowish brown, often with a reddish tinge; it is shining and moderately hard, and on an average attains to one millimetre in length by two millimetres in diameter; its base is situated in a cup, of from two and a half to three millimetres in diameter, the margin of which is angular, with a more or less depressed centre. It adheres to the rib of the leaf in such a manner that the point of attachment is not visible from the upper side. The gall is sometimes

a little narrowed below the middle. In rare cases it has a small lateral strobile or cone, and is also conical at the top. Interiorly the gall contains a vertically-placed larva-cell, without an inner gall. From galls collected in October, and kept in a room, the flies emerged in November and December, but they require to be kept rather moist.—*G. L. Mayr.*

This species is Hartig's *Cynips carnifex*, *Kollar* (*Germ. Zeit.* iv. 406). One specimen of *Synergus pallicornis* was bred by Tschek, as recorded by Mayr. The gall does not occur in Britain.—*E. A. Fitch.*

Doings and Observations among the Aculeate Hymenoptera during 1875. By J. B. BRIDGMAN, Esq.*

THE past season has been the worst I have had for working the Aculeate Hymenoptera since I commenced the study, for though in novelties and rarities I have had no reason to complain, yet the days on which they could be collected have been very few: a few in April, the end of May and beginning of June, and a fortnight in August, were about the only occasions when there was a succession of fine weather.

Many causes probably combined to render these insects so scarce. To the want of fine weather must be added, in some degree, the long-continued cold of the previous winter, which lasted till late in spring, the first fine warm day we had occurring on the 29th of April. Another cause may have been the unprecedented drought of the summer of 1874, which materially interfered with the growth and flowering of many plants, thereby causing a great falling off in the quantity of pollen and honey, both of which are essential for food for the larvæ of the bees. Still another fruitful cause of their scarceness was, no doubt, to be found in the prevalence of north and east winds, and sometimes the two combined. Cold winds or dull weather are very prejudicial to these insects: they will not stir from their burrows while either prevail; should a cloud even pass between them and the sun they will remain quiet on whatever flower they may happen to be till it is passed, and if of long duration they seem to fall into a deep sleep, or to be almost entirely numb.

In consequence of the cold spring all vegetation was backward; but when it did burst into bloom, and sunshine came, the early bees, which had been retarded by the cold, swarmed in some species. Amongst them was the hitherto unknown female of *Andrena bimaculata*, a beautiful insect belonging to the division with red or partial red abdomens; the male was named by Kirby, who took it twice at Barham. Mr. Smith says in his book there are only two specimens known, and these are in the collection of the British Museum. I was fortunate enough to take a few males on

* 'Transactions of the Norfolk and Norwich Naturalists' Society' (President's Address), 1875—6. Norwich: Fletcher & Son. Price 3s. 6d.

Mousehold three years ago; this year they literally swarmed, not only on Mousehold, but all round Norwich. This species seems to be free from the attacks of the parasitic *Stylops*. I suppose I handled over a hundred, but not one of them had a *Stylops*, although they were in abundance in *Andrena atriceps* and *A. convexiuscula*, both of which insects were found in the same place, at the same time.

Another *Andrena* was found in tolerable plenty at the shallows. The male and female of this bee greatly resembles the same sexes of *Andrena dorsata*, an insect not uncommon at the flower of the bramble during July and August. No bee like this latter has yet been recorded, that I know of, as having been captured in the early spring. Mr. F. Smith has identified this as *A. combinata* of Kirby, at one time thought to be a variety of the former insect. Kirby, unfortunately, frequently omitted to give the date of capture, which has in this and another instance given rise to a slight confusion of species.

I have not troubled you with a more lengthy description of these insects, because Mr. Frederick Smith is preparing a second edition of his 'Catalogue of British Bees,' and it will then be done by a far abler pen than mine, and, what is more important, correctly so. With these, at the shallows, the rare *Andrena Smithella* was not uncommonly found.

At Brundall, in the middle of April, I took a *Nomada*, which, I believe, is new to Britain. It is not much unlike *N. lateralis*; the latter, however, occurs about a month later. I am sorry to say the rough bank on which I found the two specimens (females) is now cut away to make a railway-siding. Though these species of *Andrena* were plentiful, many of the early ones were hardly represented: of *Andrena Gwynana* and *A. parvula*, which generally abound on the first fine day towards the end of March, scarcely a specimen was to be found. Kirby divided these little bees into three species,—*Parvula*, *Nana*, and *Minutula*; but recent writers have considered *Parvula* as simply a variety of *Minutula*. This appears to me to be an error, probably caused by the absence of a record of dates of the appearance of these species of *Andrena*. This genus, as I have before observed, has, as a rule, but one brood in the year, and the three species appear successively, commencing with the earliest

day of spring and continuing to the end of August. The black-faced male appears with *Parvula* at the end of March or beginning of April, and lasts till about the end of May. In the middle of May are to be found white-faced males, and the female *Nana*; and, at the end of June or beginning of July, there is another white-faced male, which differs from the previous one, and with this male appears a female, which at first sight might be mistaken for *Parvula*; but, as Kirby says in a footnote, the abdomen is of a different shape, and it is less hairy. These three species, being found in abundance close to the city, have enabled me to get a good series, with the dates of capture; and a close examination of these has led me to believe that Kirby was right in his belief of the three species.

Amongst the early bees is found one whose habits are veiled in mystery; it is a bee without the necessary hirsuties for conveying pollen. These are invariably absent in the parasitic bees, but it does not necessarily follow that all bees without these appendages are parasitic; for example,—the genus *Prosopis*, or *Hylæus*, is entirely without them, but are, nevertheless, constructive bees; the parasitic bee lays its eggs on the honey and pollen collected by another bee, when it finds one suited for its purpose. Many of these parasites are constant in their attacks on certain species of constructive bees; others (of which perhaps the best example is *Nomada ruficornis*) attack several species varying greatly in size, and consequently in the quantity of honey and pollen they collect for the future young. The *Nomada* vary in size according to the species they attack, the size being influenced by the quantity of food. The above-mentioned insect varies from three to six lines. As a rule there is not a great variation in the size of the constructive bees, but amongst the *Sphecodes* there is just the same variation in size as there is in the *Nomada*; these insects are generally found running or flying about the dry banks infested by the *Halicti*, which, in the different species, vary as much in size as the specimens do in the species of *Sphecodes*.

And it is not *Halictus* only that *Sphecodes* attacks (that is supposing it to be parasitic), for in May last I found a large colony of *Andrena albierus*, which had made their holes in the hard ground by the side of a road, and flying about the

burrows were several large specimens of *Sphécodes rufescens*, busily hunting about the burrows, the entrances to which were not exposed, but each was covered by a little heap of dry dust, which is pushed out by the insect when forming the hole. Presently I saw a female *Andrena* turn its head downwards into one of the little heaps of dust, as they did when they wanted to enter the burrow; at the same instant up flew a *Sphécodes*, and, by tugging at its legs and wings, tried to pull the *Andrena* out, which at last—I suppose annoyed by the persistence of the *Sphécodes*—turned out and flew away, when the latter quartered the ground in all directions, as if searching for something it had lost, and, not being successful, prepared to fly away, when I captured it. These *Sphécodes* were large, and fairly corresponded in size to the *Andrena*, but there were no small ones about; and, as far as my recollection goes, I have not found large *Sphécodes* without finding large *Halicti* or *Andrenæ* in its vicinity, and small *Sphécodes* without small *Halicti*. Of course this may be only a coincidence, although I think it is more than that. Mr. Smith tells me he has seen them burrowing. This certainly goes far to prove that they are constructive bees; but still my opinion is that they are not so.

In the early spring I was struck with the enormous quantity of female wasps that were met with in every direction. This was not confined to this district, as many correspondents to the gardeners' periodicals noticed the same thing. One of them, who signs himself, "P. Grieve, Bury St. Edmunds," writing to the 'Gardeners' Chronicle' of June 19th, says:—"It has been his duty for the last twenty-eight years to count the slain wasps and hornets, for which one penny each is given, up to the end of the month of May. This season the numbers reached the enormous quantity of two thousand five hundred and sixty-six, and the sum paid for them was £10 13s. 10d.; about five or six per cent. of them were hornets. The numbers captured during the former seasons has varied from five hundred to six hundred, up to the unprecedented number of the present season." Several others have given statistics of numbers killed or paid for, all proving that the number of these insects has been enormous. The nests, however, in this neighbourhood, as far as my observation has gone, were not so plentiful as I expected they

would have been; many of the females must have been killed by the cold weather which occurred during the spring and summer.

The leaf-cutter bees, which make a thimble of pieces of leaves for their nest, and then close the entrance with circular pieces after having put in a sufficient mixture of honey and pollen, are said by Shuckard to fix the circular pieces in and hold them in their places by slightly springing them; but in a cell I examined of *Megachile maritima* the pieces were certainly cemented in their places round the edge with a substance which looked like wax laid on very thinly, but still clearly perceptible.

At Brundall, at the end of July, I had the good fortune to take another male specimen of *Macropis labiata*; it was at the little thistle. This makes the fifth specimen taken in Britain, which are all males; and I think, without doubt, establishes this as the locality for the one Mr. Brown took last year. There is hardly any doubt but that the female will yet be taken there, if looked for. At the same time and place I took two females of the rare *Nomada xanthosticta*; the bad weather, which prevailed at the time, most likely had something to do with my not taking more of either species. The day I took them the sun shone for full half an hour, when, as usual, a storm came on, and I got—instead of more insects—a wetting. *Andrena decorata* again abounded at the flowers of the bramble in this neighbourhood; and, though most plentiful, the red variety were very scarce indeed, nearly all being dark.

* * * * *

The flowers I have found most frequented by bees are willows, sallows, blackthorn, dandelions, veronica, sycamore, brambles, thistles, ragwort, hawkweed, heath, and the Umbelliferæ.

In conclusion, should any feel inclined to study this very interesting branch of natural history, I shall be most happy to render them any assistance that lies in my power.

J. B. BRIDGMAN.

Description of the Larva of Nola albulalis.—The larva of this insect has been known for some time past, but hitherto

no description has appeared in entomological journals, and no record of its habits has been supplied for the benefit of entomologists. During the present summer I have been able to search in the locality where Dr. Allchin and Mr. Chaney first captured this species twenty years ago, and I succeeded in finding a sufficient number of larvæ to take descriptions from, and to enable me to observe the method of pupation. Length half an inch when at rest, longer when crawling. Width one-fourth the length, nearly uniform; this gives the larva a short and stout appearance. Ground colour,—two very distinct varieties,—(1) pale yellowish green; (2) bright orange. There are six raised tubercles on each segment, forming two rows on the dorsal area, and two rows on each side; from each tubercle springs a tuft of long whitish hairs. The tubercles themselves are usually of the ground colour, but an intermediate variety of the larva occurs with the ground colour pale yellowish green and the tubercles orange. The markings are confined to the dorsal area. There are two rows of irregular-shaped black marks, forming in some instances well-defined lines, and in others merely rows of dots, each row being placed between the dorsal and second row of tubercles. In addition, the 7th and 11th segments possess a black band joining the two rows of markings together. The above markings vary much in distinctness. The head is small, sometimes of a pale brown colour, and in other instances almost black. Food-plant the dewberry. When full fed the larva selects a dry twig or culm of grass, upon which it spins its cocoon, formed of silk and portions of bark or grass interspersed. It commences by spinning the base of the cocoon in the shape of a flat boat, and when of sufficient size the edges are drawn together as a covering, fitting very closely round the larva. In this cocoon the change to pupa takes place, and the imago is prepared to emerge within the space of three weeks, or thereabouts.—*J. Platt Barrett; 34, Radnor Street, Peckham, July 12, 1876.*

Description of the Larva of Strenia clathrata.—Last year, at the end of May, the Rev. P. H. Jennings, M.A., of Longfield Rectory, kindly sent me a few eggs of this species: they were oblong-oval, and indented on the upper surface; the colour grass-green. On the 8th of June they hatched,

and the newly-emerged larvæ were dingy green, with the extremities tinged with yellow, and the head pale brown. On being supplied with the common white Dutch clover, they fed well until July 19th, by which time they were full grown, and description taken as follows:—Length about three-quarters of an inch, and of average bulk in proportion; the head has the lobes globular, is shining, rather hairy, and slightly notched on the crown; body cylindrical, and of nearly uniform width throughout; skin smooth, clothed with a few, almost imperceptible, very short hairs; segmental divisions distinct. The ground colour is bright green, darkest along the sides; the head green, with the mandibles brown; two parallel white lines extend through the centre of the dorsal area, enclosing between them an almost hair-like, white dorsal line through the centre of a band of the ground colour; the subdorsal lines are also white, as are also the broad spiracular lines, and there is another finer white line between the dorsal and subdorsal ones; segmental divisions yellowish; the spiracles very minute, black; ventral surface green, longitudinally striped with numerous very fine darker lines. Changes to pupa below the surface of the ground. The pupa is three-eighths of an inch long, rather stout, but tapering sharply towards the anal segment, which finishes with a fine point; the eye-, leg-, and wing-cases prominent; colour dark mahogany-brown. Part of the imagos emerged in the middle of the following month (August), but most remained over the winter, appearing as moths at the end of May and beginning of June last.—*Geo. T. Porritt; Huddersfield, July 10, 1876.*

Life-history of Agrotora nemoralis.—The eggs of this beautiful species are deposited on the twigs of its food-plant, *Carpinus Betulus*, singly or in small batches, about the first week in June, and are extremely flat and inconspicuous; on first seeing them one could hardly imagine them capable of containing life. Even when deposited on a smooth surface, like a pill-box, they are difficult to see, and when on the stem of the food-plant would almost defy the best pair of eyes to detect. The young larvæ hatch in about ten days, and at first feed on the under side of the leaves, beneath a loosely-spun web. After the second moult they gnaw little round holes in the leaf, just large enough for them to crawl

through on their feeding excursions, and through which they re-enter to their little silken abodes for rest and shelter. If touched or irritated, they crawl very quietly either backwards or forwards, Tortrix-like. When full grown they are about nine-tenths of an inch long, of a pale yellowish green colour, the head being of a slightly warmer tint of ochreous, and shiny; a few colourless bristly hairs are sparsely dispersed over the body, mostly along the spiracles. The larva spins up on a leaf, by neatly and compactly folding up a portion of it, in shape something like a "turnover-tart;" this it lines with silk, making it, doubtless, a secure and water-tight abode, to pass the winter, when of course it is detached from the tree, —a sport to the winds. The imago appears about the 20th of May following. It is extremely local, and I believe is entirely confined in this country to East Sussex, the reported capture at Willesden not being universally accepted. —*W. H. Tugwell*; 3, *Lewisham Road, Greenwich*.

Entomological Notes, Captures, &c.

Relaxing Moths and Butterflies.—If not over-working the subject, allow me to offer a few suggestions on the subject of relaxing moths and butterflies; as though your other correspondents say much that is most valuable on the subject, yet their various plans may not suit all hunters, especially those who have occasionally to trust their apparatus to a mule's back over high mountain-passes; and, notwithstanding all that has been written, one great principle, and which it appears to me is the principal one, appears to have escaped them,—that is, speedy relaxing and speedy drying. I find one of the ordinary pocket zinc boxes, corked top and bottom, the very best of all relaxing cases: damp both corks to saturation, place the box over a gentle heat (never more than you can bear your hand upon), and in six hours you may relax the most obstinate insect; shake off the dew-drops, or paint them off with a very soft brush, or even use blotting-paper carefully. Specimens thus relaxed dry in a very short space of time, and lose none of their freshness, because no putrefaction has time to commence. I have lately thus relaxed a large number of specimens sent me

from India with perfect success. For one large specimen I had to take the largest saucepan our small kitchen afforded, and by placing a piece of wood and cork across the middle, and filling the bottom with water, gave him a gentle vapour-bath, which relaxed him in five or six hours; and the specimen was perfectly dry on the setting-board in three days. Any plan which for five or six hours keeps the specimens in a gentle warm vapour will relax more speedily and dry more quickly than any other plan I have tried, and I do not find it affect either colour or plumage. For killing moths of all kinds I invariably use cyanide (poison) bottles of different sizes, filled very lightly with cotton-wool, which is placed in the bottles in small pieces, so that the contents may be carefully drawn out piece by piece. The moths bury themselves in the cotton-wool, and may be carried without shaking. Some, I know, have found this plan fail, and that small moths are rubbed. Much of this damage is caused in taking the cotton-wool out, if not placed in the bottles in small detached pieces. With all care some may possibly be damaged slightly. By what other plan can we ensure invariable success? Then I shall be answered: The process stiffens the specimens, and you cannot afterwards set them. I grant that it does, for twelve, and even twenty-four hours afterwards; but leave them in the bottle twenty-four hours and every specimen will be perfectly pliant, for the *rigor mortis* has ceased. I found this out by leaving some specimens by accident in a bottle for more than a week, and they set beautifully. When out for several days I pack all my small moths in layers between cotton-wool in one of my poison bottles (I drop one or two drops of water on the bottom and damp the cork), and can set them all with perfect ease at the end of a week: in fact, you might leave them three weeks without damage; and I find them travel admirably in this manner. I now never touch a moth with my fingers, except to insert the pin for setting; and the amount of midnight labour spared after a hard day's hunting on the mountains is a relief not to be despised. Can any of your correspondents give a hint as to the best means of handling the antennæ in setting? I mean the antennæ of Nocturæ, Geometræ, &c.; I cannot keep them straight on the setting-boards, do what I will. I have tried pins; small pieces of paper over them; but no plan satisfies

me: they will curl, or take the impress of the pins or paper.—[Rev.] *C. J. W. Tasker; Aigle, Canton de Vaud, La Suisse, July 13, 1876.*

Relaxing and Grease.—It long since occurred to me that if the common, cork-lined zinc collecting-box would, when the cork was damp, keep moths for hours in a fit state for setting, it would also relax those already stiff: and so it does—excellently, and in a short time; especially if, in winter, the box be placed a little way from the fire. Have any of your correspondents tried “Dyer’s spirit” for removing grease? It is more powerful than benzine; but, “Cave!” very inflammable. I just pour a little into a saucer and place the insects in it, and let them stay (in a draught) till the spirit is evaporated. A very greasy *C. ligniperda*, which benzine failed utterly to cleanse, yielded to the action of the above spirit.—[Rev.] *Windsor Hambrough; Worthing, July 6, 1876.*

Colias Edusa near Dublin.—It may doubtless interest the entomological readers of your journal to hear of the occurrence of this lovely butterfly in the immediate vicinity of the city. On the 25th of June I observed several individuals of this species newly-emerged from the chrysalis,—very brilliant insects,—in a locality where I had obtained this butterfly about nine years ago. I was then fortunate enough to capture both this species and the pale variety, *Colias Hyale*. Since that occasion, till the above-mentioned date, I have never seen the insect on the wing, although looked for yearly.—*Edward Williams; 2, Dame Street, Dublin, July 5, 1876.*

[*Colias Edusa* has often been reported from Ireland. We are glad to see another collector’s name from Dublin, as the lack of Irish collectors is to be deplored.—*Ed.*]

Colias Edusa.—*Colias Edusa* seems to be out rather early this season. I have already seen several in the neighbourhood of Plymouth; the first, June 23rd.—*J. Gatcombe; 8, Lower Durnford Street, Stonehouse, Devon.*

Early appearance of Colias Hyale.—On the 8th of June, while out collecting on the Folkestone Hills, I took a beautiful specimen of *Colias Hyale*. Is not this early? I never remember seeing it so early before.—*Charles Boden; 127, Tooley Street.*

Macroglossa stellatarum and *Chærocampa porcellus*.—Last August I was fortunate enough to find a number of the larvæ both of *Stellatarum* and *Porcellus*, which I was anxious to distribute amongst those who wanted them; but by the time the September number of the 'Entomologist' came out, nearly all had spun up, and consequently very many who were most anxious to obtain them were disappointed. As I believe I most likely shall find more, I should be glad to receive the address of correspondents wishing to obtain the larvæ I have before mentioned.—*H. Neale*; 22, *St. Martin's Church Street, Salisbury, July 22, 1876*.

Heliothis peltiger at *Blackpool*.—It may perhaps interest entomologists to learn that my brother captured a fine female of *Heliothis peltiger* on the 22nd of June, at Blackpool.—*J. W. Aspinwall*; 1, *Oak Bank, Withington, June 23, 1876*.

Leucania vitellina in the *New Forest*.—It may be interesting to record the capture of *L. vitellina*, at sugar, by Mr. George Tate, in the New Forest, in September last. He remained, however, in perfect ignorance of the importance of his capture, till the insect was recognised by a London entomologist. Mr. Tate has transferred it to my cabinet.—*J. G. Ross*; *Bathampton Lodge, Bathampton, near Bath, July 17, 1876*.

Cossus ligniperda at *Sugar*.—With reference to this species (as I do not think that it is generally known to be one of our sugar-visitors) I would just remark that I captured a fine specimen on the 20th July, which was freely partaking of the sweets; indeed, it seemed feasting upon the luxury to the same extent as a *Dersa* or *Batis* would.—*H. T. Dobson, jun.*; *New Malden, Surrey, July 24, 1876*.

Tillus unifasciatus and *Nyctotrogus brunneus*.—On the 9th of July I detected a specimen of *T. unifasciatus* on some oak palings in this neighbourhood; on the following day I took another; and on the 12th two more, and lost another; on the 15th I missed another, as it fell amongst the long grass and escaped; on the 17th I took two more. *Lycetus caniculatus* was very abundant, and amongst them I detected seven specimens of the rare *Nyctotrogus brunneus*. Is anything known in what trees these three species feed, as they evidently only come to suck the new wood? As the locality is close at hand, I visit the spot daily, morning and afternoon;

but most have occurred in the morning. Although I have been on the look-out for both of these species for the last thirty-five years, I never took them before.—*Samuel Stevens*; “*Loanda*,” *Beulah Hill, Upper Norwood, July 18, 1876*.

Entomological Pins.—I do not think Messrs. Tayler & Co. need make any additional pins for the use of British entomologists, but may safely cease making several sizes which are constantly used by some of my good-natured, but unpractical, correspondents. May I suggest to Mr. Adams, who writes upon this subject (*Entom.* ix. 160), that if he and other entomologists use the following pins for something like the purposes mentioned below, they will soon like these sizes to the exclusion of all others. Such is my own case, after having used them for about nineteen seasons. No. 6—gilt; for largest butterflies, Sphinges, &c. No. 8—gilt; for *Noctuina*, and other stout-bodied moths and larger Geometers. No. 10—gilt; for small Geometers, Pyralides, and large Tortrices. No. 18—gilt; for small Tortrices, and all Tineæ, excepting smallest. No. 20—gilt; for small Tineæ. The No. 18 is an especially useful pin. I wish if Messrs. Tayler & Co. are making any change, it would be to make the heads of all the pins somewhat smaller.—*John T. Carrington*.

Answers to Correspondents.

Eustace F. Clark.—(1) Can you tell me to what country the *Papilio*, *Helenns*, *Stalacthis*, *Susanna*, *Heliconea*, *Phyllis*, *Danais*, *Plerippus*, and *D. Chrysippus*, belong, as I have got them, but know nothing of their economy or habitat? (2) Do you know of any competent entomologist who would be willing to name beetles if I sent some to him? I prefer to go by the classification at the end of Mr. Rye's book. I can identify but few of my insects, and I know no entomologist—in fact, I doubt of there being many—in this neighbourhood. I have also many *Lepidoptera* I do not know by name. (3) I send you several wings of moths, found by me lying about all together on two successive days. I suppose they had fallen victims to some spider or beetle. Can you tell me to what moths they belong? There is one dark gray, with the

reniform and orbicular clear, and a zigzag line on each side of them, which I particularly want to ascertain among those I have sent.

[(1) You will readily ascertain the countries of your foreign Lepidoptera from Staudinger's list, which may be obtained through Trübner & Co., Ludgate Hill. (2) Any entomologist will be glad to name your captures, after you have done your best to do so for yourself from books; but it is hardly fair to depute *all* the labour to others; nor would such a course be useful to yourself, for you would learn much less from being told than from finding out by study. Newman's 'British Moths' and 'British Butterflies' will materially assist your labours, so far as Lepidoptera are concerned. (3) The wings are so damaged that—excepting *Noctua augur*, *Agrotis exclamationis*, and *Aplecta advena*, all of which you will be able to make out from 'British Moths'—it is impossible to identify the species. There was an interesting controversy, as to whether such a destruction of moths as you mention was caused by spider, or mouse, or bat, in the volume of the 'Zoologist' for 1866; and some additional notes were published in that journal in 1871.—*Ed.*]

S. Bradbury.—*Epunda nigra.*—Can you inform me if this species is double-brooded? as all the pupæ I have had emerged in May last year: one on the 11th this year; a very fine male on the 26th. I enclose a case, and I am of opinion that they feed upon the hawthorn, as I have only found them under that tree, and there is no other but ash. These trees grow in the middle of a fifteen-acre sheep pasture, with no herbage but turf. I will endeavour to find the larvæ as a proof.

[*Epunda nigra* is not double-brooded. You will see that the food given in the 'History of British Moths' is the great hedge bedstraw (*Galium mollugo*); also other herbaceous plants. The pupa having been found near the hawthorn is not proof that the larva feeds upon this tree. Many low-plant feeding larvæ go to the base of trees when turning to pupæ.—*Ed.*]

James Mudie.—*Insect Anatomy.*—I shall be obliged to you if you can tell me if the anatomy of insects is a subject which has been investigated to any extent, and, if so, what works would be the best guide for me in studying it?

[The subject of insect anatomy is treated in Newman's 'Grammar of Entomology,' and later, in his 'Familiar Introduction to the History of Insects.' Both these works are, however, out of print. There appears a demand for the latter, and it is to be hoped the publisher will eventually reprint it.—*Ed.*]

Saturnia Carpini.—In reply to Mr. Edwards and Mr. Jones (*Entom.* ix. 161), the larva of *Saturnia Carpini* will feed upon whitethorn as well as on anything; and, indeed, is sometimes found on the lower shoots of those whitethorn bushes which happen to be on or at the edges of our heaths.—*Geo. T. Porritt; Huddersfield, July 10, 1876.*

Extracts from the Proceedings of the Entomological Society of London.

JANUARY 24, 1876—ANNUAL MEETING.

Sir Sidney Smith Saunders, C.M.G., President, in the chair.

[The following is an extract from the President's Address.]

Relation of various Groups of Hymenoptera.—Dr. Müller has recently published a paper in the 'Bienen Zeitung' (July 2nd), whereof a summary appears in 'Nature' (No. 314, November 4th), to which a sequel is promised hereafter; wherein he treats of various groups of Hymenopterous insects, "in which we find a series of forms presenting more and more complex life-relations, accompanied by a higher and higher mental organisation;" the consideration of which gradations he considers "calculated to throw much light on the question—How has the honey-bee acquired its remarkable instincts?" Commencing with the Tenthredinidæ, as "amongst the lowest of Hymenoptera," exhibiting the simplest instincts in their mode of oviposition on the plant upon which they themselves subsist; he passes on to the Cynipidæ, where we meet with a new mode of life, their incision giving rise to the well-known galls; after which, proceeding to the "insect-piercing species," he considers that "this passage from phytophagous to carnivorous habits has not only led to the formation of many new species, but also to a greater complexity in the relation of the parents to

their young, and to a higher intellectual development, which is shown especially in the arrangements made for the nourishment of the larvæ; since it requires both greater energy and more intelligence to discover and attack a particular species of insect than merely to lay an egg on the plant which has served the mother herself for nourishment," the passage from the one to the other having, as he conceives, "been slow and gradual;" and, "on the basis of this increased energy, intelligence, and adaptability," a still further advance was made by other groups, which, to secure their eggs from molestation, transport their victims to a place of security, involving certain difficulties with which many may have found it impossible to cope. "Thus the ovipositor of the *Tenthredo* became the sting of the wasp; and thus those species which carried off their victim to a place of concealment would abandon the habit of laying their eggs inside the victim." But the *Tenthredinidæ* can in nowise be regarded as inferior in intellectual capacity to the *Cynipidæ*, which exercise no constructive ingenuity in the production of their gall-tenements, as exhibited by some of the former in the weaving of their reticulated cocoons and other artistic performances; while the admirable construction of their double-saws, whose "various modifications might furnish ideas for improved mechanical instruments," their multicellular wings, and, in some instances, highly developed furcate and pectinate antennæ (*Schyzocerus* male, *Lophyrus* male) stamp them as infinitely superior in structural organisation to the *Cynipidæ*. Yet the natural affinities of these respective families prescribe their relative sequence and precedence in inverse ratio to their faculties and endowments. As regards the "insect-piercing species," their restrictive action being diffused over a vast extent of insect-life, as compensating influences against excessive fecundity, a multitude of these, distributed throughout the whole range, serves to maintain due equilibrium on either side; which is oracularly interpreted as having "led to the formation of many new species:" but this group consists of several very distinct races, the *Ichneumonidæ*, especially those consorting with the *Aculeate* tribes, being conspicuously superior in energy and intellectual development to the *Chalcididæ*, next in succession, reputed higher in the scale of structural

organisation and affinity. With respect to the further advance from the ovipositor to the sting, the non-existence of the first-mentioned instrument necessarily involves *external* deposition of the egg, with all the concomitant requirements of protection for the latter in a closed cell, and provision for the future progeny; but Dr. Müller would have us believe that, contrary to all analogy, some of the aforesaid "insect-piercing" races "carried off their victim to a place of concealment," and were thus led to abandon the habit of laying their eggs "*inside* the victim," when (as it would seem) *still furnished with the terebra*, whose presence or absence must necessarily determine, *ipso facto*, the mode of oviposition with its accessories; this organ, however (as we are taught), becoming converted into a sting by "slow and gradual" degrees, while, of course, in the active and essential exercise of its appropriate functions as an ovipositor, or otherwise not a single generation of these reforming groups, now become industrious constructors and purveyors, could have survived such transitional period! Moreover, it is not to the sting alone, but to the whole structural development, that such contrasts extend; comprising, *inter alia*, peculiar differences in the venation of the wings, corresponding among species allied in other respects, but having no functional advantage in the conservation of the race according to the modification theory; such characteristic exponents, in this and other orders, symbolizing the members of each kindred association with remarkable precision, and serving, coincidentally with other indications, to determine their otherwise natural alliances. Nor can it be averred that the relative expansion of wing or velocity of flight offer any solution of these diversities in the alary system; for the Tenthredinidæ, with their dilated wings and complex venation, are among the most sluggish of these races; while the Oxyuri, the Chrysididæ, and some of the Fossores, less amply endowed in these respects, are eminently prone to energy and vivacity. Dr. Müller, however, eventually demolishes his own superstructure, of progressive acquirements as a reliable principle of continuous advance to "more and more complex life-relations, accompanied by a higher and higher mental organization," by finally expressing his "opinion that the various proceedings by which the solitary wasps thus protect

their young against contingencies to which the insect-piercing species are liable, must have at first been arrived at with a consciousness of the object to be effected, but that they have gradually become instinctive, and are now unconsciously inherited from generation to generation." Thus the "increased energy, intelligence, and adaptability," which he adduces in the first instance as the "basis" of such advances made with a conscious object, have gradually lapsed into a retrograde stage of degenerate unconsciousness of purpose, merging into the more familiar phases of hereditary habit; although, as he subjoins, "it is impossible to watch a wasp at work without feeling that, with these inherited customs, or so-called instinct, much individual effort also comes into play." We have yet to wait for his ulterior comments on the instincts of the honey-bee, which, by a parity of reasoning, must be considered to emanate from conscious intellectual antecedents, since degraded to unconscious inheritance. Meanwhile another athlete, Dr. Anton Dohrn, has sprung up to contest the palm in a new arena, having published a pamphlet wherein he maintains the principle of universal degradation and retrogressive development, as opposed to, and entitled to supersede that of, universal progress!

"Who shall decide when doctors disagree?"

FEBRUARY 2, 1876.

Sir Sidney Smith Saunders, C.M.G., Vice-President, in the chair.

Habits of Cychrus cylindricollis.—Mr. M'Lachlan directed attention to an article, by M. Flaminio Baudi, in the 'Petites Nouvelles Entomologiques,' respecting the habits of *Cychrus cylindricollis*, which he had taken on Monte Codeno feeding on the body of a snail (*Helix frigida*), into the shell of which the beetle was enabled to thrust its head and long narrow prothorax. Some interesting remarks were made by Mr. Bates and others on the peculiar structure and habits of the insect, which appeared to have been found only on a very sterile portion of the plateau of the mountain, and in no other part.

Staphylinidæ of the Amazon Valley.—A valuable paper was communicated by Dr. D. Sharp, entitled "Contributions to an Insect Fauna of the Amazon Valley—(Staphylinidæ)."

Of this important group of Coleoptera 487 species were enumerated as inhabiting the valley, of which 463 were described as new, suggesting forcibly how little is really known of the Staphylinidæ of Tropical America. Dr. Sharp also stated that he had devised a method of covering and hermetically sealing the type specimens, which, he believed, would accomplish their almost complete preservation, and that he hoped soon to be able to publish a description of the method. The author concluded with remarking on the great importance of certain sexual characters in distinguishing the species.

MARCH 1, 1876.

Prof. J. O. Westwood, M.A., F.L.S., &c., President, in the chair.

Habits of Cychrus cylindricollis.—Mr. Bates read a letter from Mr. Trovey Blackmore to Mr. M'Lachlan, stating that he was much interested in observing a notice in the 'Proceedings' of this Society respecting the habits of *Cychrus cylindricollis*, reported by M. Baudi to feed on snails. He had already called attention (in the 'Entomologist's Monthly Magazine,' vol. xi., p. 214) to the fact that *Carabus stenocephalus*, Fairm., fed on snails, which in Morocco were so very abundant as to form a marked feature in the landscape by covering the bushes so thickly as to resemble, at a distance, clusters of blossom. He had captured in all eighteen specimens of this scarce *Carabus*, and of these fifteen were obtained either feeding on snails or climbing up bushes of *Retama*, which were covered with snails, especially *Helix planata*. The *Carabus* having an unusually long head, and the prothorax being narrowed anteriorly, enabled it to thrust its head and prothorax a considerable distance within the shell in search of its food. It belonged to a group comprising several species found in North Africa, which much resembled *Cychrus* in appearance, and which possessed characters sufficiently marked to entitle them to form, if not a genus distinct from *Carabus*, at least a subgenus of *Carabus*. One of them (possibly a *var.* of *C. stenocephalus*) occurred in the more northern parts of the Atlantic coast of Morocco, and had been named by Fairmaire *C. cychrocephalus*; and another species (*C. Aumonti*, Lucas) had been found at Oran

and in the Angera Mountains near Ceuta, which had a far narrower prothorax; but, as he had not met with it himself, he was unacquainted with its habits. He believed that other Carabi might be found whose habits were similar to those of *C. stenocephalus*.

Spring and Autumn Broods of Lepidoptera.—The President drew attention to a subject now being much discussed in Germany and the United States of America, with reference to the spring and autumn broods of Lepidoptera, which proved to be modifications of the same species. He was much interested in the subject, and would be greatly obliged to any entomologist who would furnish him with observations and notes as to the different broods.

APRIL 5, 1876.

Prof. J. O. Westwood, M.A., F.L.S., &c., President, in the chair.

Xylina lambda and Ebulea stachydalis.—Mr. F. Bond exhibited a specimen of *Xylina lambda*, taken near Erith, in September last, by Mr. W. Marshall, being the fifth instance of its having been taken in Britain. Also *Ebulea stachydalis*, taken by himself at Kingsbury, Middlesex, in June, 1862.

Common Gnat.—The President made some observations respecting the habits of the common gnat, in continuation of his remarks at the meeting of 4th November, 1872. [See 'Proceedings,' 1872, p. xxxi.] Large numbers of females had again appeared in his house at Oxford, not a single male having been observed; and he believed that they had hibernated in the house, appearing during the first warm days of spring. He also remarked that Dr. Leconte's valuable collection of Coleoptera had been presented to the University at Cambridge, Massachusetts.

Stylops Kirbii.—Sir Sidney S. Saunders exhibited two examples of *Stylops Kirbii*, taken on the wing by him at Hampstead, in the forenoon of the previous day. He had found eighteen males in all: one *Andrena* contained three undeveloped males. Mr. Enock followed up this exhibition by an account of his own captures of male *Stylops* at the same time. He captured eleven on the wing, and one *Andrena* was taken with four individuals.

The Ephemeridæ.—Mr. Eaton stated that he was preparing

a Supplement (dealing with the limitation of the genera) to his "Monograph on the Ephemeroïdæ" (Trans. Ent. Soc., 1871). A considerable amount of new material had been most kindly submitted to him by Mr. Robert M'Lachlan, of Lewisham, and M. Herman Albarda, of Leeuwarden, comprising specimens from almost all parts of the world. Amongst the most interesting were some specimens in fluid from South America, and a collection from Sumatra. From the Amazonian collection in spirits, it would appear that the deficiency in legs in *Campsurus* and some of its allies was due to their being shed with the pupa-skin when the insect obtained well-developed wings. In some forms all the legs were then cast off by the female (this was apparently the case with *Euthyplocia* also); in others the anterior pair of legs was retained by the female, as it was seemingly by all males. The separation of the legs cast off takes place between the femur and the trochanter. The posterior legs would be useless to them, as on attaining the complete winged stage of development they retain the submarginal pellicle, and live but a few hours in the air. From Lahat there were subimagines of a *Cronicus*, a genus known previously only from a fossil in amber from Prussia. Several new forms, whose existence was expected from analogy, were in these collections. The whole family seems to consist of associated series of genera. In every series the forms differ from one another in the number of setæ or wings; while in tarsi and neuriation and eyes they are very much alike. Such are a form distinguishable from *Lachlania* by the female possessing three long setæ instead of two only; another differing from *Potamanthus* (restricted) in the middle seta being extremely short and minute; and another which resembled *Siphurus*, excepting in the possession of a long intermediate seta instead of a minute rudiment of one. There were many new genera allied to the typical *Leptophebia*, in addition to the series of species associated with it in the Monograph as sections, which will now be separated as genera from it.

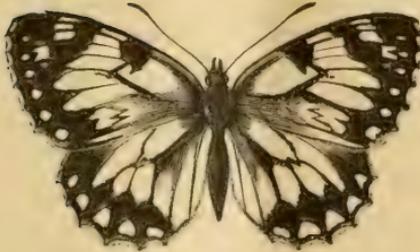
Japanese Butterflies.—The Rev. R. P. Murray stated that he was preparing a *resumé* of all the species of Japanese butterflies hitherto noticed, and that he would be grateful to any entomologist who could assist him with the loan of specimens.

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No. 159.]

SEPTEMBER, MDCCCLXXVI.

[PRICE 6d.



MELANAGRIA GALATHEA (varieties).

Varieties of Melanagria galathea.—The three specimens figured above were selected by the late Edward Newman from my collection, and have been carefully drawn by Mr. Willis. The upper specimen is a very singular *light*

variety, and is so very dissimilar from the type form that I need not describe the difference: the figure itself is, if anything, rather too dark, otherwise most beautifully represented; the under side is very light and remarkable: this specimen was taken on the south coast of Wales in the summer of 1871. The middle specimen is also a light variety of the insect; but its greatest peculiarity is the \geq mark placed sideways on the superior wings, and the form of the dark, somewhat triangular patch near the upper edge: this is a specimen I have had for some years, and was taken in Devonshire. The last, which is a very *dark* form of the insect, was captured near Dover three years ago: the white spots are mostly wanting round the superior, and partly round the inferior, wings. All the specimens are males.—*Samuel Stevens*; “*Loanda*,” *Beulah Hill, Upper Norwood, August 18, 1876.*

Descriptions of Oak-galls. Translated from Dr. G. L. MAYR'S ‘*Die Mitteleuropäischen Eichengallen*’ by E. A. FITCH, Esq.

(Continued from p. 172.)

Fig. 55.



A. URNÆFORMIS (and in section). In section the gall exhibits

55. *Andricus urnæformis*, Fonscol. —From July to late in the autumn we frequently meet with leaves of bushy *Quercus pubescens*, the upper sides of which are either turned down or partly rolled up, and more or less twisted and folded. On opening the leaf we find on the middle rib, at the point where it is thickest and most tightly rolled, a row of small, hard, barrel-shaped or oviform galls, of about the size of hemp-seeds, at first green, then of a rosy or reddish brown colour, with longitudinal striations. The gall is generally firmly attached to the midrib by a short peduncle, and has at the opposite end a saucer-shaped depression, with up-turned edges and a small wart in the

a moderately thin but hard wall, consisting of an outer layer, originally green in colour, but afterwards brown, covering the thin, brownish yellow, oviform inner gall. Most of the galls have fallen by the beginning of November; but in the following spring we often meet with leaves that have galls at their basal half, and have been prevented from falling by the thickening of the midrib. We have not been successful in breeding the gall-maker as yet. However, I have extracted a dead specimen from a gall.—*G. L. Mayr.*

The description of this specimen—a female—is given in a footnote. The gall is figured by both Malpighi and Réaumur. It does not occur in Britain. From the galls of this species, and from *N. ostreus* galls, Dr. Mayr bred a new *Synergus*,—*S. tristis*, *Mayr.*—a species closely allied to *S. nervosus* and *S. Tscheki*. It occurred in the spring of the second year, as do also the other inquilines,—*Synergus vulgaris*, *Hart.*, and *Ceroptres arator*, *Hart.*—*E. A. Fitch.*

56. *Andricus curvator*, *Hart.* (*A. perfoliatus*, *Schk.*, *A. dimidiatus*, *Schk.*, *G. axillaris*, *Hart.*).—This very common gall appears by the end of April, when the leaves of *Quercus sessiliflora*, *Q. pedunculata*, and rarely those of *Q. pubescens*, begin to develop themselves. It appears on both sides of the leaf, often causing it to curl up, and looks like a green spherical swelling, of about the size of a pea. It often occurs at the margin of the leaf, when we find on the outer or exposed side a more or less distinct furrow, extending in a curve from the centre of the lower side to that of the upper side. This furrow is absent in those galls which grow in the middle of the leaf, and are surrounded by the parenchyma (*A. perfoliatus*). This gall is bare above, and covered with fine, short, sparse hairs below; only when on *Q. pubescens* is the gall piliferous on both sides. It is somewhat cartilaginous, and has a moderately thin wall enclosing a large cavity, to the sides of which the small, brown, thin-walled inner gall, which is scarcely the size of hemp-seed, loosely adheres.

Fig. 56.



A. CURVATOR (& in section).

Two or three galls frequently grow together; then they all have but one cavity, with two or three inner galls. If the gall is developed at the petiole and extends to the base of the leaf, then the latter generally curls up, and does not fall off in the autumn, but, remaining somewhat undeveloped, decays in the course of the winter down to a few remains which adhere to the gall; and the axillar bud belonging to the leaf is developed into a short, crippled, bud-bearing axis (see Entom. ix. 51, fig. 38*a*). This is the gall described by Hartig under the name of *C. axillaris*, and by Schenck of *Andricus inflator*. In other cases the gall is developed so near the base of the petiole that the whole stalk is affected by it and grows very crooked, and, being unable to develop itself any further, produces a swelling at the end of the small twig, which, on a superficial inspection, bears a strong resemblance to a curved gall of *Andricus inflator*. The gall-fly appears at the end of May or beginning of June.—*G. L. Mayr*.

This, as *Mayr* says, very common gall occurs throughout Britain, and its producer may be bred with very little trouble. It is particularly common in May; but I believe there is a second brood, rare compared with the first, the galls of which may be found in the autumn. *Synergus albipes*, *Hart.*, *S. facialis*, *Hart.*, *S. radiatus*, *Mayr*, are three inquilines occurring in its galls; *S. albipes* is by far the most frequent inhabitant of the three. *Hartig* also bred it from these galls, and I have frequently bred both it and *S. facialis*, with *Callimome auratus*, *Fonsc.* (= *C. mutabilis*, *Wlk.*, *Zool.*, 1846, iv. 1458), *Callimome abdominalis*, *Boh.*, and *Platymesopus* (*Pteromalus*) *tibialis*, *Westw.*, from English specimens, all appearing in June and July of the first year. The following reference may also refer to parasitism in this gall:—"Eurytoma gracilis, a parasite, is from a gall formed on the midrib of an oak-leaf, which gave the leaf a very crumpled appearance; collected, August 3rd; imago out, August 10th." (*F. Walker* and *H. Moncreaff*, *Entom.* iv. 77.) *Ratzeburg's* information is as follows:—*Entedon scianeurus*, *Ratz.*, very common in *Terminalis* galls, but bred from *Curvator* by *Tischbein*; amongst eighteen specimens so bred there was not a single male. This species is probably synonymous with *Olynx gallarum*, *L.* *Eulophus lavissimus*, *Ratz.*, also bred by *Tischbein*: it was bred by *Bouché* from

Ornix avellanella; the male only is described. *Eurytoma* spec. *Pteromalus Cordairii*, *Ratz.*, bred by Tischbein, also from *Terminalis* galls. *Siphonura viridiænea*, *Ratz.*, one female, bred by Tischbein from "*Cynips curator*." *Torymus propinquus*, *Försk.* = *Callimome auratus*, *Fonsc.* *Mesopolobus fasciventris*, *Westw.*, a *Pteromalus* bred from many oak-galls: "Herr Tischbein again sent me some males in 1850, and they were from *Cynips fecundatrix* and *C. curator*." Although there is some little confusion in the above, all the specimens being bred by Tischbein show that we have several species of Chalcididæ parasitic in this gall.—*E. A. Fitch.*

Description of the Larva of Hemerophilla abruptaria.—Length an inch and a half; head prone, same size as the 2nd segment; body cylindrical, gradually increasing to the 11th segment; colour very light brown, mottled with various shades; the medio-dorsal line increases in width from its commencement to the middle of the 5th segment, and also deepens in colour; it then assumes a much lighter shade to the 8th segment, becoming darker on the folds of the segmental divisions; on the lighter portions there are two black dots above the middle of each segment, placed transversely; the 9th segment is again darker in colour, especially towards the edges of the line, which is irregularly defined; the 10th and 11th segments are darker on the divisions; on the 12th there is a black line running transversely, and assuming the shape of a bow; the sides are mottled with various shades of brown, being darkest towards the anterior portion of each segment, especially the 6th, 7th, 8th, and 9th; the spiracles are dark brown; the ventral surface is more mottled than the dorsal, with a black V-shaped mark appearing at the commencement of the 5th, 6th, 7th, 8th, and 9th segments; claspers slightly tinged with green, a black line on the first pair; the bow-shaped line on the 12th segment continues on the 11th, running under the 8th spiracle; a mark of the same colour runs under the 9th spiracle. I am indebted to Mr. R. L. Rolph, of Walthamstow, for the eggs of this species.—[*Rev.*] *P. H. Jennings.*

Description of the Larva of Hyria auroraria.—I am much pleased to be able to send a description of this species; and

for the opportunity of doing so I have to thank Mr. John Harrison, of Barnsley, who gave me a dozen larvæ on the 4th of September, 1875; and further sent me a supply of eggs on the 19th of July last. The egg is large for the size of the moth, is oblong-square, with the edges rounded, and considerably depressed on the upper side; the colour at first pink, afterwards olive-brown. The young larvæ fed, but grew slowly, on knotgrass until autumn, when they ceased feeding, and remained rigid on the sides of the cage or on bits of stick, &c., through the winter, and well into the summer of the present year; as, at the time in spring when most other hibernating larvæ were waking up, they persistently refused to show any signs of vitality beyond moving the front portion of the body backwards and forwards when touched. At this time they were about five-eighths of an inch in length, and were about the most soberly-attired larvæ I ever had, being in colour almost uniformly very dark dull brown (almost black in some specimens), and with the exception of a still darker double-dorsal line, and being a little paler at the segmental divisions, there was no other colour or marking. The latter part of May having arrived, and finding they did not seem disposed to avail themselves of the various kinds of plants I endeavoured to induce them to accept as food, including *Plantago major*, *Anemone nemorosa*, &c., besides the *Polygonum aviculare*, I took them up into a warm room, and again gave them a plentiful and varied supply of provender. Here I had soon the satisfaction of finding that one of them had evidently set to work with a will, again on *Polygonum aviculare*, and by the 1st of July it was full grown, when I described it as follows:—Length three-quarters of an inch; can scarcely be called slender, though not stout; head the same width as the 2nd segment; it has the face flat, and is distinctly notched on the crown; body somewhat flat when viewed from above, but rounded ventrally; the 9th segment is the widest, and from it each becomes narrower to the head; the four posterior segments are of nearly uniform width, and about as wide as the 6th; the segments overlap each other considerably, rendering the divisions distinct, and also forming on each side a conspicuous lateral ridge; the skin is ribbed transversely throughout, and has a tough wiry appearance; in shape and habits it bears a very strong resemblance to many

larvæ of the *Acidaliæ*; ground colour a medium shade of brown, with a very faint pink tinge, and also appears to be slightly powdered with grayish; head brown, marked with grayish,—from it extends the distinct black double dorsal line; there are no perceptible subdorsal or spiracular lines, but the lateral ridge on each side is faintly outlined with pink; the ventral surface is a mixture of dull brown and smoke-colour, with a distinct slate-coloured median line. This larva spun up next day, and was the only one I reared to maturity; the cocoon was loosely constructed in an upper corner of the cage. I had no opportunity of describing the pupa until after the emergence of the imago, which event took place on the 18th of July. Afterwards I found the empty case to be five-eighths of an inch long, the wing-cases prominent, and the anal tip sharply cut; colour reddish brown, the wing-cases conspicuously streaked longitudinally with black.—*Geo. T. Porritt; Huddersfield, August 4, 1876.*

Entomological Notes, Captures, &c.

Pieris Rapæ var. *Aurea*.—Upon reading the paper, "On the Introduction of *Pieris Rapæ* into North America," by the late Mr. E. Newman, I was anxious to discover the origin of the yellow variety now found there, and was induced to make experiments with a view to that discovery, and now send you an account of them, together with the results; but first I will quote Mr. Newman. After speaking of the rapid progress made by this destructive insect, and the ravages it has committed, he says:—"One curious circumstance attending the invasion of this butterfly is that in many parts of the country which it has colonised a new variety of a bright sulphur-yellow, called by Mr. Schudder *P. novangliæ*, has made its appearance. American entomologists are still in doubt whether this is a climatal or food change. It has been noticed by some of them that when the larvæ hatched from eggs laid by white individuals have been fed upon mignonette, the produce has been this yellow variety; whether the food was the cause or only an accidental coincidence is still under consideration. We do not know whether the experiment of rearing the larvæ of *P. Rapæ* entirely on mignonette

has been tried in this country, nor with what success, although, from the above facts being well known to our English Lepidopterists, it seems almost a foregone conclusion that the experiment has been tried." About the first week in June I planted a young cabbage in a pot, and taking a couple of females that were depositing their eggs placed them all under a bell-glass. They laid about thirty eggs; and after a week had elapsed I examined them every morning for the hatching of the larvæ, which appeared on the 18th. I then removed half and placed them upon a mignonette plant, also in a pot; these I bred under a bell-glass in the shade of a tree in the garden. The other half were left on the plant and placed in a hothouse, where the temperature was 65° to 70° , rising to 80° by day, and 85° when the sun shone: they changed to pupæ from the 30th of June to the 3rd of July, and emerged as perfect insects from the 9th to the 13th of July. The others, fed out of doors, were exactly a week later in changing to pupæ, and came out from the 18th to the 21st. Now for the results. I could not perceive any difference in colour between those fed upon mignonette and the others fed in heat: they were all the ordinary form of *P. Rapæ*; therefore it seems improbable that the food has anything to do with the change, as mine never tasted anything but mignonette from the day they were hatched. Now, it is well known that the variety of *Gonepteryx Rhamni* called *Cleopatra*, in which the orange spot on the upper wing is so enlarged as to be spread over nearly the whole of it, is found only in the south of Europe, and especially on the shores of the Mediterranean; and I think probably the yellow variety of *P. Rapæ* proceeds from the same cause, and is only another instance of the effect of increased warmth of climate in intensifying colour. Perhaps the failure of my experiments was due to my not having sufficient heat at command, as it was nothing like the temperature of some parts of North America. Mr. Curtis, in his 'Farm Insects,' mentions the capture near Oldham, in Lancashire, of a male specimen which had all the wings of a bright yellow colour. Have there been any similar captures in this country? If any readers of the 'Entomologist' have made similar experiments to mine, and been successful, I hope they will let us know the results; also any information with respect to where this

variety is most common, and the temperature of those parts would be most acceptable, and perhaps help to clear up what appears to me a very interesting question.—*R. A. Rolfe; Stuffynwood, near Mansfield.*

Vanessa Antiopa near Basingstoke.—A fine specimen of this insect was captured for me near this place, by a young friend, on the 17th inst. When given to me it was not quite dead.—*W. D. Milson; Southern Road, Basingstoke, August 23, 1876.*

Vanessa Antiopa at Cheltenham.—This, like most other rarities, fell to my lot quite by accident, and when I was least expecting to make a capture. It was feeding upon the juice which was running down an elm tree, from a place where *Cossus* larvæ were feeding, in one of the public streets of Cheltenham. I climbed up the tree and endeavoured to catch it with my hat, as I had no net with me. It escaped, and flew into a gentleman's garden. Despatching a messenger for a net, in the cause of science I climbed over the palings, and pursued it over the flower-beds, capturing it eventually on some ivy. It was a fine female, and newly emerged. The date of the capture was the 5th August, 1871. Five other specimens were reported, as seen, to our College Natural History Society at Cheltenham; but mine was the only capture.—*E. K. Robinson; Sandcliffe, Rake, near Petersfield.*

Vanessa Antiopa in Filey Bay.—Yesterday, August 15th, whilst in a boat fishing in Filey Bay, I caught a *Vanessa Antiopa*, which settled on the sail of the boat.—*G. D. Armistage; North Dalton, Hull.*

Colias Edusa and var. Helice in Carmarthenshire.—My brother-in-law, Mr. C. A. Lord, this morning captured the first specimen of *Colias Edusa* that I have seen taken in Carmarthenshire since 1870, in which year males of the species were plentiful in this locality. The specimen taken by Mr. Lord is a female *var. Helice*, and was seen flying along the turnpike road. In the afternoon we repaired to the spot where *Edusa* had formerly been so abundant,—a steep hill-side covered with former bushes, with here and there patches carpeted with flowers, and swarming with insect life. There were butterflies innumerable; but, being rather late on the ground, we only saw one *Edusa*, and that of the ordinary type. I have never seen this butterfly on the wing after four

o'clock in the afternoon.—*Owen Wilson; Cwmffrwd, Carmarthenshire, August 22, 1876.*

Colias Hyale—*Is it Double-brooded?*—Noticing several records of the occurrence of *C. Hyale* and *C. Edusa* in the 'Entomologist,' 'Field,' &c., for this year, as "early appearances," the question suggests itself whether it is generally thought they are specimens of a spring brood: this, I think, is undoubtedly the case. Last autumn *Hyale* was especially abundant in this neighbourhood; and Mr. G. H. Raynor had the good fortune to see one female deposit six eggs, which he collected. From this we can infer that the species does not hibernate; and from its appearance in May and June, and again in August and September, it must certainly be a double-brooded species, the spring generation, as with many other species, being much the rarer. My earliest *Hyale* taken this year was on the 10th June,—a beautifully fresh specimen; and since then I have seen five or six others. Last spring many specimens were seen and taken. It was abundant in the autumn that year. Should the weather be favourable we may expect a plentiful supply of the autumnal brood of both species—*C. Hyale* and *C. Edusa*.—*Edward A. Fitch; Maldon, Essex, August 7, 1876.*

Food-plants of Gonepteryx Rhamni.—After the statement of such an experienced entomologist as Mr. E. A. Fitch (*Entom.* viii. 302), that *Gonepteryx Rhamni* could be reared on "apple, pear, and medlar," I have this year made the experiment; and—whatever they may do in a wild state—in confinement, in this locality, the larva of this insect will not partake of any of these trees. Mr. G. C. Bignell was good enough to send me a larva, and I at once, and "without much trouble," set before it a tempting supply of the three trees mentioned by Mr. Fitch, leaving also a small portion of a somewhat dried-up leaf of buckthorn. By the following morning the scrap of buckthorn was entirely devoured, and not one of the other plants was touched. Having no buckthorn procurable in the neighbourhood, I sent to Mr. W. Holland, of Reading, for some; and for a day or two poor *Gonepteryx Rhamni* was left with nothing but the stale stalks of its natural food-plant. Apple, pear, and medlar, were all supplied with total unsuccess; not a particle was tried or tasted; and the unfortunate larva was compelled to seek a

resting-place on the side of the glass jar in which it was confined, and in which the stale stalks of the buckthorn remained, rather than take up a position on the other plants. Its food, however, arrived in time: Mr. Holland's supply was received on the morning that *Gonepteryx Rhamni* stood a good chance of starving. The buckthorn was placed in the cage; the larva soon ascended the stalk, and that night rested happily in the midst of plenty. It is now a healthy pupa, and will probably be liberated shortly in the imago state to seek to propagate its species in a country where few are to be found.—*Owen Wilson; Carmarthen, July 21, 1876.*

Hermaphrodite Argynnis Adippe.—I have taken a perfect specimen of an hermaphrodite *Adippe*: the two right wings male, and two left wings female. Can you tell me if this is unusual?—*R. J. Stent; 70, Queen Street, Portsea.*

[This is both unusual and interesting.—*Ed.*]

In Search of Chortobius Davus, and what I obtained.—On my visiting the Albert Museum, at Exeter, to see the collection of insects of the late Mr. D'Orville, of Alphington, the curator in conversation informed me that *C. Davus* was taken many years ago on Yes Tor, near Okehampton, by a gentleman who collected butterflies, when on his school holidays. Knowing this to be an out-of-the-way place for entomologists to get at, I laid up the conversation in my breast, and determined to see for myself at the first opportunity. Thanks to the railway opening last autumn, that opportunity occurred this summer. Yes Tor is said to be the highest tor on Dartmoor; by the ordnance map it is 2050 feet in height. I started from Plymouth, 12th July, by the 10 o'clock train; and after passing through lovely valleys, woods, and moorland scenery,—for which the south of Devon is so famed,—I arrived at Okehampton at 11.40; and a beautiful bright day it was. I at once started for Yes Tor, net in hand, and ready for the first insect that turned up. On I trudged until I got on the top of the Tor, about 2.30; not a single *Davus* to be seen. While on the Tor I captured the only two insects I saw; after one I had a good run,—the wind blowing very fresh at that altitude, while 200 yards down it was a dead calm: they both turned out to be *L. pectinaria*. On my way up and down I only saw about fifty butterflies, nearly the whole of which were *C. pamphilus*.

I therefore conclude that the captor of the supposed *C. Davus* very likely was mistaken, and his *C. Davus* was *C. pamphilus*. Now, for what I obtained: not a single specimen for my cabinet, but on myself I was able to show the result of my walk, for the gnats (*Culex pipiens*) had served me most unmercifully, having bitten me on my neck, face, and hands, in about fifty places, each place swelling as big as a pea.—*G. C. Bignell*; 6, *Clarence Place, Stonehouse, Aug. 12, 1876.*

Lycæna Arion.—I went to Bolthead for *L. Arion* on the 17th of July, and only took one specimen. I was informed by a gentleman I met there, also collecting, that Mr. G. F. Mathew had visited it on the Friday before, and only took one. I should like to know Mr. Mathew's opinion as to whether it is likely that *L. Arion* will be exterminated in that locality.—*J. Brown*; *Exeter, August 7, 1876.*

Trochilium allantiformis.—A fine specimen of this rare insect was taken here by my cousin, Master S. W. Jenney, on July 15th, whilst basking in the hot sunshine on a laurel leaf.—[*Rev.*] *H. Harpur Crewe*; *Drayton-Beauchamp Rectory, Tring, July 28, 1876.*

Acronycta strigosa.—I have pleasure in recording a new locality for *Acronycta strigosa*. I took a single specimen flying at dusk along the side of a hedge of whitethorn and blackthorn, in Chatteris, on the 10th July last. A single specimen was also taken at sugar here two years ago. It does not seem to occur in any abundance here, as I subsequently sugared several times near the spot where mine was taken; but, as is usual with sugar this year, the result was a blank.—*A. Harold Ruston*; *Aylesby House, Chatteris, Cambridge-shire, August 12, 1876.*

Acronycta Alni.—I have had the good fortune this year also to breed *Acronycta Alni* from a larva, taken at Chatteris on the 18th August, 1875, the capture of which was recorded in the 'Entomologist' for October, 1875 (*Entom.* viii. 228). The insect emerged from the pupa on the 15th April, and is a female in perfect condition.—*Id.*

Acronycta Alni in Carmarthenshire.—On the 28th of July last my wife was so fortunate as to beat a larva of *A. Alni* from an oak tree, near here. This is the first time I have heard of this species having been taken in Carmarthenshire.—*Owen Wilson*; *Cwmffrwd, Carmarthen.*

Is Scopula decrepitalis Double-brooded?—In the last week of May this year I was in the Trosachs, in Scotland, beating the bushes, amongst which the whortleberry (*Vaccinium vitis-idaea*) grows in profusion: I then started three fine specimens of *Scopula decrepitalis*. I am not aware of its occurrence there before; but I am anxious to know from some of your northern readers if this moth is usually taken in May, as well as at its recorded time of capture, as given in books upon Lepidoptera, *viz.* July and August. I may add that the moth only occurred in a very limited area in the middle of this beautiful ravine. I had expected to have taken many good things, but the weather was so cold and wet that there were scarcely any insects about.—[*Rev.*] *Windsor Hambrough*; 40, *Marine Parade, Worthing, July 20, 1876.*

Variety of Geometra papilionaria.—Before this month I never had the pleasure of taking this insect; but since the 13th I have caught five specimens, all at light. One of these, which I caught on the 18th, is straw-colour, and not green, with the apex of the fore wing rather rounder than usual; the pale transverse lines are very faint, and the hind wings hardly so deeply dentate as usual. Is this a common variety or not?—*H. H. Corbett*; *Ravenoak, Cheadleholme, Stockport, July 23, 1876.*

Eupithecia satyrata var. callunaria.—In August and September, 1875, I collected a number of larvæ of *E. satyrata var. callunaria*, by sweeping the flowers of *Calluna vulgaris* on the Ross-shire Moors, near Alness. Very few moths appeared this spring; one couple, however, paired, and I obtained fertile eggs, from which I reared a small brood of larvæ, which fed up on the flowers of *Achillæa myriophylla*, *A. macrophylla*, and *Ptar mica mongolica*. They were very much larger and brighter, and more variable in colour, than their Ross-shire progenitors, and differed in no appreciable way from the larvæ of the typical *E. satyrata*, which I take in this neighbourhood. Mr. Buckler, to whom I sent specimens, says they are true, genuine, unmistakable *E. satyrata*. I take it, therefore, that it is now finally proved that *E. callunaria* is nothing but a northern variety of *E. satyrata*. [*Rev.*] *H. Harpur Crewe.*

Rearing the Larva of Bombyx Rubi.—There has always been a difficulty in rearing these caterpillars, as they usually

die in the winter. This year I have succeeded; and I believe the reason is that a bramble plant was growing in their box, and the larvæ constantly, even in mid-winter, used to come out of their hiding-place during the night and feed upon the leaves, of which there are always a few remaining till the spring.—*E. K. Robinson; Eagle House, St. Leonards.*

The time of Appearance of Pseudo Bombyces.—In Newman's 'British Moths' the time of pupation of *Ptilodontis palpina*, *Notodonta ziczac*, *N. dictæa*, *N. dromedarius*, and one of the *Drepanulæ*—*Platypteryx falcula*, is given as September or October. I have found both last year and this that the greater number of larvæ of these species spin up in the beginning of July, reaching their perfect condition a few weeks after; and this not only in breeding-cages, but in a state of nature. *Noctua brunnea* and *N. triangulum*, which I have bred from eggs laid in June, have already become pupæ instead of hibernating.—*F. K. Robinson; Eagle House, St. Leonards.*

Treatment of Larvæ of Chelonia villica and Pericallia syringaria during Hybernation; and of the Pupæ of Burrowing Larvæ.—Can any reader of the 'Entomologist' inform me the best mode of treatment of larvæ of *C. villica* and *P. syringaria* during hybernation? Mine have almost invariably died off or been attacked by fungus. Also, how to keep those pupæ which burrow underground? I have tried both damp and dry earth, and by the former mode lost many through rot or fungus; and by the latter they have become so dry as not to be able to escape from the pupal envelope. When damping them I kept them in a wooden cage, with a depth of earth about four inches, and a layer of moss above, and damped them about once a fortnight; by the latter mode I kept them in a friable earth, with moss above, and in a wooden box, as when damping.—*F. Stewart; New Cross.*

Acidalia emarginata, &c.—I took a nice series of this somewhat local species during the last week of July, and until the 8th of August: judging from their brightness and the perfect condition of the cilia, I should say the insects had but very recently emerged. Is not this unusually late for them? I should be obliged for information as to the food-plant of the larvæ. *Colias Edusa* and *C. Hyale* have both been captured here this month.—*Joseph Anderson, jun.; Chichester.*

Cidaria reticulata and *Hadena rectilinea* Larva at Windermere.—Yesterday I took a specimen of *Cidaria reticulata* at Windermere. In 1856 the late T. H. Allis and I took several specimens; from that time to the present (twenty years) I have gone every year, and to no purpose. It must be a rare insect. I must have gone at least fifty journeys, and it is over fifty miles to the lake side from Preston; then I have to row myself across, another mile: so this specimen has been hardly earned. The plant on which it is said to feed (*Noli-me-tangere*) I have this time found in plenty. A week or two ago I found a queer larva on the same plant, which puzzled Mr. Buckler; but from the last note I had from him it appears to be *Hadena rectilinea*. I suspect as there is bilberry near, that the moth has dropped eggs just where she alighted.—*J. B. Hodgkinson*; 15, *Spring Bank, Preston, August 11, 1876.*

Lithosia sericea.—Last month I captured a few specimens of this insect. I should be glad to hear if anyone has met with this species in Cheshire this season? Newman's 'British Moths' gives Cheshire and Lancashire as the only counties where it has been observed. I have often enquired, but so far have failed to hear of anyone who has found the insect in Cheshire.—*R. Kay*; 2, *Spring Street, Bury, Lancashire, August 12, 1876.*

Hydræcia petasitis.—A brother collector, having noted a very likely place for *H. petasitis*, we agreed to attempt to find the pupa by digging. During the past week we have visited the place twice, for about an hour and a half on each occasion. The first time we each dug up about five dozen pupæ, and on the second occasion some three dozen, in addition to finding a few larvæ of the same species. We also found one imago at rest, which we considered very early.—*Id.*

PS.—I am pleased to be able to add that the imagos began to emerge on the 12th, and have appeared daily since; almost invariably emerging during dusk and night.—*R. K.*

Cossus ligniperda at Sugar.—Observing that Mr. H. T. Dobson has called attention to *C. ligniperda* as a "sugar visitor," I wish to state that scarcely a season passes without my capturing one or two specimens of this insect at sugar. Last July I caught two in one evening on sugared trees; but it has struck me as somewhat remarkable that every specimen thus caught is a female. This fact has given rise to a doubt

whether sugar attracts *C. ligniperda* in the same way that it does most of our Noctuæ. I am curious to know if males are ever found at sugar. Perhaps collectors will kindly favour us with their experience in this matter. I wish further to state with regard to this species that I have succeeded in rearing two fine male imagos from three larvæ found two years ago. I fed them on chips of fresh willow and sawdust, mixed with small blocks of the same wood. I kept them in a large flower-pot covered with glass. I mention this because *C. ligniperda*, like all internal feeders, is considered rather difficult to rear.—*W. McKrae; Christchurch School, Hants, August 18, 1876.*

Cossus ligniperda at Sugar (Entom. ix. 183).—I have observed that *Cossus ligniperda* occasionally visits the sugar-bait. It may interest Mr. H. T. Dobson to know that I have on two occasions taken it: one specimen in August, 1871, and a fine female on July 20th of the present year. Both these were apparently feasting on the sugar with gusto.—*R. Laddiman; Upper Hellesdon, Norwich.*

Ephyra orbicularia and Acronycta auricoma.—On the 4th inst I was much pleased to find a beautiful specimen of *E. orbicularia* had emerged in one of my breeding-cages. I had beaten out the larva, but did not recognise it in that stage, never having seen it. *A. auricoma* I captured at sugar on the 18th inst. I have not taken either of these insects here before.—[Rev.] *P. H. Jennings; Longfield Rectory, Gravesend, August 21, 1876.*

Agrotera nemoralis near Herne.—I took a single *Agrotera nemoralis* in the Blean Woods, near Herne, on the 29th of May last; and have since ascertained that the woods are worked very regularly by persons interested in keeping the locality quiet, and that *Nemoralis* is one of the objects sought. This announcement may interest some of your readers.—*Fras. G. Whittle; 20, Cambridge Terrace, Lupus Street, S.W., August 23, 1876.*

Cnephasia lepidana Bred.—The last week in July, being at Witherslack, after *Elachista serricornella*, with my friend J. H. Threlfall, we came across a quantity of columbine in seed: we gathered some, and up to this time I have bred from it five specimens of *Cnephasia lepidana*; they are of the second brood. This cannot be its usual food-plant, as it does

not grow where the insect usually occurs.—*J. B. Hodgkinson* ; 15, *Spring Bank, Preston, August 3, 1876.*

Pachnobia alpina.—Can any of the readers of the 'Entomologist' suggest a food-plant for the larva of this species? The moths have been taken in considerable numbers this season, and timely information as to the food-plant may save the lives of many larvæ; it seems a pity to lose so good an opportunity of working out the life-history of this hitherto extreme rarity: 1876 may well be called the *P. alpina* year, as 1872 is that of *V. Antiopa*. One entomologist who knows the district where the captures have been made, perhaps better than any other, always prophesied that some day or other it would turn up in numbers. Like many other so-called rarities it only wanted hunting for; but Highland collecting is very different work to that of the woods and downs of Kent or Surrey.—*E. Howard Birchall*; *London, August 26, 1876.*

Entomological Pins.—I am glad to see the subject of pins mooted in the 'Entomologist.' We can hardly expect to reach perfect uniformity in regard to their use, but we may reasonably hope to obtain something more than we at present possess. I quite agree with Mr. Carrington that Messrs. Tayler & Co. might safely cease making several of the sizes they now place upon their list. I agree with Mr. Carrington as nearly as possible in the pins I use, with this exception, that I do not consider No. 6 large enough for all Sphingæ, and he appears to recommend it for all, without exception. I use No. 12 for those which require a pin larger than No. 6. For all who do not collect Tortricæ and Tineæ, I think the only other sizes required are No. 8, No. 15, and No. 18; No. 8 for almost all Noctuæ, and many butterflies; No. 15 for almost all Geometræ; No. 18 for small Geometræ, and most Pyrales. Nos. 8 and 15 are so nearly the same in length that their close proximity in the cabinet will only be marked by a keen observer. Mr. Greene, in the 'Insect-Hunter's Companion,' says, "No. 7 I consider indispensable." I imagine he only considers it so for a purpose he immediately proceeds to notice. Whilst on this subject there is another which presents itself, and which is next of kin, *i. e.* "pinning." At present pins are seen leaning fore or aft, to the right or to the left; and what a marring effect this has. I will not

venture to broach any suggestions of my own, but give the readers of the 'Entomologist' the benefit of another extract from Mr. Greene's most useful book:—"Insert the pin exactly in the centre of the thorax. The head of the pin must slope a very little forwards towards the *head* of the insect; this will not be noticed when the moth is set. The pin should be clear of the moth on the *under* side three-eighths of an inch. It is of *great* importance that the pin (the upper part of course) should not lean on either side." I can add nothing to this good advice. I only say—follow it strictly.—[Rev.] P. H. Jennings; *Longfield Rectory, Gravesend, August 21, 1876.*

Erratum.—In the article, "Agrotis tritici and Agrotis aquilina," in the August number of the 'Entomologist' (Entom. ix. 169), owing to an unfortunate error the two figures were transposed. Thus the figure named "Agrotis tritici" should have been named "Agrotis aquilina," and *vice versâ*.—*Ed.*

Answers to Correspondents.

Callimorpha Hera.—I have lately taken here two or three moths which seem different from any I have found in Great Britain. Perhaps some of your readers who have foreign insects may be able to give me the name through your magazine. It is about the size of *Chelonia villica* or *Callimorpha dominula*. It seems to me a species of *Arctia*.—*H. C. Hodges; Lannion, Bretagne, France, August 8, 1876.*

[The moth is *Callimorpha Hera*. It was figured in the 'Entomologist,' volume vi., page 33; and a description is there given of the larva and of the perfect insect. Other information is also given, from which the following extracts may be of interest:—"It is many years since Captain Russell announced the capture of several specimens of *Hera* in Wales. * * The announcement, however, like many others to the same purport, was disregarded, I believe, from an impression that the larvæ had been imported from the Channel Islands. This has certainly been the case in some instances; and therefore every instance of capture is open to the suspicion, seeing that, like *Clostera anachoreta*, the species has failed to establish a permanent footing in Britain." "In 1855 Mr. J. J. Reeve took a very good specimen at

Newhaven." "In the autumn of 1868 Miss Hore, a lady residing at Patcham, near Brighton, took a specimen at light." "In 1871 Mr. D'Orville, of Alphington, near Exeter, took a specimen at sugar, with which he had baited a corymb of the common tansy." "This beautiful species occurs throughout the central countries of Europe, extending abundantly into the Channel Islands; also in Western Asia, as Asia Minor and Palestine. It may now be safely added to the British list.—*Edward Newman.*" This was written in March, 1872. 'British Moths' was completed in 1869; but the numbers containing the "tigers" were published, without the author's knowledge or consent, many years earlier.—*Ed.*]

Buff-coloured Metrocampa margaritata, &c.—I am inclined to think Mr. T. H. Ormston Pease's buff-coloured *Metrocampa margaritata* (Entom. ix. 161) was merely a faded specimen. Many of the green species of Lepidoptera seem liable to fade to this tint, and being tolerably perfect in other respects are often very deceptive. I remember ten years, or more, ago, taking a *Pseudopteryx cytisaria* of this colour, which stood for several years in my collection as a good variety, until I detected the error, when of course the wretched thing was at once turned out.—*Geo. T. Porritt; Huddersfield, July 10, 1876.*

C.—*Zygæna filipendulæ.*—Master Robertson has just caught a number of specimens of *Z. filipendulæ* at Dulwich. Is it not unusual for this insect to occur so near London?

[*Zygæna filipendulæ* used to occur in many localities nearer London than Dulwich. These have disappeared as the suburbs have steadily extended; but even yet there are several, one being in the grounds of the Crystal Palace, where they occur not unfrequently.—*Ed.*]

Miss Bayley.—*Transmission of Lepidoptera by Post.*—Can you kindly tell me which is the best method of transmitting imagos and larvæ by post? Cross pinning is recommended for the former; but it seems to me that the insects run a great chance of being rubbed. For larvæ, the difficulty would be to give them air.

[For the guidance of Miss Bayley and other readers we offer a few notes on the best way of succeeding in the transmission of entomological specimens by post without injury. Probably the most important matter is in the choice of postal boxes for sending away perfect insects. Those usually

sold by the dealers are too slight, and frequently carelessly made at the joints, although nicely finished and good looking. It is unwise to have postal boxes made too large; better to send two boxes, than risk the whole number of insects sent by placing them in one large box. Postal boxes should not exceed three inches by two and a half inches, the top and bottom being each three-quarters of an inch deep; all inside measurements. Of course have smaller sizes. They should be made as follows:—For all sizes, up to that above suggested, the sides of the box should be of quarter-inch deal; the ends the same, or even one-eighth thicker; let in the ends by half-cutting the sides to contain them; secure with wire nails and glue. The top and bottom to be of half to three-quarters inch cork, rough on the outside; this should be secured with glue and light sprigs. When dry the edges are to be filed down to a slight square bevel. The hinge may be of canvas or, better still, of American cloth, with the smooth side out, glued over one side of the closed box. Lastly, have a strong pair of pegs (strong pin points will do) to act as catches on the front edges of the box. When completely dry this box will be found strong enough to bear the weight of a man standing on it. It is a mistake to save weight of box or of surrounding packing, for postage is cheap enough now. Place the insects to be sent away securely in the box; a little—not too much—cotton-wool under each body,—too much is apt to prize up and off the body; then lay over the body a little more cotton-wool, and cross pin over that. It will be found by practice that then the insects are never rubbed. When completed, before sending away, place a piece of paper between the top and bottom of box; this will be secured by the pegs when the box is closed. In case a body should come loose, this will prevent it injuring all the insects in the box. Having done this, tie the box tightly round with thin string, so as to support it; surround the box with a liberal supply of cotton-wool, wrapping all with *black calico*; tie on a stamped and addressed loose label, and fear nothing for the safety of the contents. In this manner we know an instance of upwards of four thousand specimens of *Lepidoptera* (perfect insects) having been sent away in three months in boxes under that size, and *not a single* breakage occurred. We believe the postal officials are, as a rule, much more sinned against than sinning. In sending larvæ by post

simply put them in quarter or half pound empty mustard tins, with two or three punctures, one-eighth of an inch in diameter, in the lid and bottom of box; when wrapping with a piece of brown paper let the ends of the paper extend an inch over the ends of the box, but have the paper ends *open*, as in book postage; tie on an addressed label, with the string sealed to the paper to keep it fast. This has been found a very simple and successful method, especially when plenty of food is put in with the larvæ.—*Ed.*]

H. Wigglesworth.—*Work on Hymenoptera.*—Could you inform me of a good work on British Hymenoptera for a beginner? One with plates preferred.

[Mr. Smith's 'Bees of Great Britain' and 'British Fossorial Hymenoptera' complete the Aculeata. The volumes are price six shillings each, and are published by the Trustees of the British Museum. There is no monograph of the British Ichneumonidæ; but there is one of the Tenthredinidæ in hand.—*Ed.*]

Extracts from the Proceedings of the Entomological Society of London.

MAY 3, 1876.

Sir Sidney Smith Saunders, C.M.G., Vice-President, in the chair.

Varieties of, and Rare British Lepidoptera.—The Rev. J. Hellins sent for exhibition various British Lepidoptera, recently submitted to M. Guenée for his opinion and determination. The collection included a dark variety of *Acronycta myricæ* from Mr. Birchall; certain *Acidalia*æ, sent by Mr. Hellins and Mr. G. F. Mathew, apparently to be referred to *A. manconiata*; several extraordinary aberrations referred to *Melanippe rivata*, *Oporabia*, sp.?, *Coremia ferrugata*, &c., from Mr. Dale and Mr. Mathew; an example of *Polia Chi*, *var. olivacea*, from Major Hutchinson; several *Eupithecia*æ, from Dr. Buchanan White, including the *var. Oxydata* of *E. subfulvata*; and an insect which Dr. White proposed to name *Septentrionata*, not known to M. Guenée. The most important of all was a *Noctua*, bearing some resemblance to *Xanthia circellaris* (*Ferruginea*), not known to M. Guenée, taken at Queenstown, flying over bramble-blossoms, in July or August, 1872, by Mr. Mathew.

Concerning this insect it was remarked that it had been shown to Dr. Staudinger (now in London) by M. Guenée, and it was also unknown to him as European.

Corozo Nuts destroyed by a Caryoborus.—Mr. Douglas exhibited specimens of the Corozo nut (*Phytelephas macrocarpa*), the vegetable-ivory of commerce, of which the interiors were entirely eaten away by a species of *Caryoborus* (one of the Bruchides). A specimen of the beetle was shown with nuts, from the London Docks, which had been recently imported from Guyaquil.

Ravages of Locusts in Spain.—The Secretary read a letter he had received from the Foreign Office Department, enclosing a despatch from Her Majesty's Minister at Madrid relative to the steps taken to check the ravages of the locust in Spain. It appeared that considerable apprehension had been felt in many parts of Spain that the crops of various kinds would suffer greatly this year from the locust; and the Cortes had already voted a large sum to enable the Government to take measures to prevent this calamity; and by a circular addressed to the Provincial Governors by the Minister of 'Fomento,' published in the Official Gazette, they were directed to make use of the military forces, stationed within their respective districts, to aid the rural population in this object. It was stated that thirteen provinces were threatened with this plague.

JUNE 7, 1876.

Prof. J. O. Westwood, M.A., F.L.S., &c., President, in the chair.

The Destruction of Corozo Nuts by a Caryoborus.—Mr. Douglas made some further remarks on the "Corozo nuts," known as vegetable ivory, exhibited by him at the last meeting, which were attacked by a beetle belonging to the genus *Caryoborus*. The attention of the officials of the Dock Company had been drawn to the serious loss of weight that would be found when the nuts were to be delivered, and they were anxious to ascertain if there was any mode of arresting their depredations, and whether the beetles lived and bred among dried nuts, or entered the kernel in an earlier stage. It was suggested that the mischief originated in the parent beetles laying their eggs in the nuts when still in a green or soft state, and as there were several larvæ in each nut the

interior was completely destroyed. The metamorphosis took place inside the nut. Mr. M'Lachlan, in connexion with the above, exhibited another species of palm (*Copernicia conifera*) from Rio Janeiro, forwarded to him by Professor Dyer, which were also infested with a species of *Caryoborus* (*C. bactus*, *Linn.*). In this case each nut served as food for a single larva only, which bored in it a cylindrical hole of considerable size and depth.

Fungus on Insects.—The President exhibited the larva of an Australian species of *Hepialus* (he believed from Queensland), bearing a fungus with four or five different branches issuing from the back of the neck and the tail. Also a fungus growing from the back of a *Noctua* pupa.

Mimicry in South African Insects.—Mr. M'Lachlan, on behalf of Dr. Atherston, of South Africa, exhibited a pair of very singular Orthopterous insects (belonging to the *Acrydiidæ*), which, in colour and in the granulated texture, so exactly mimicked the sand of the district as to render it almost impossible to detect it when in a quiescent state. The name of the insect was uncertain, but it was supposed to approach the *Trachyptera scutellaris*, *Walker*. Also some singular oval, flattened cases, open at each end, and from six to eight lines in length, formed of silk, to which was externally fixed a quantity of fine light brown sand. The cases were found under stones in sandy districts, and were stated by Mr. Charles O. Waterhouse to belong to a beetle of the genus *Paralichas* (one of the *Dascillidæ*). Also the cases of a species of *Oiketicus* of peculiar structure: the inner lining of the tube was, as usual, composed of toughened silk; but to this was attached, externally, a quantity of fine sand, and outside this a number of small angular pebbles, only the tail-end bearing a few rather long twigs and species of grass-stems. Thus the cases differed from those of most species in which substances exclusively vegetable were attached externally, the addition of the pebbles making the cases (which were nearly two inches in length) unusually heavy.

Singular Forms of Coleopterous Insects.—The President read descriptions and exhibited drawings of two very singular forms of Coleopterous insects from Mr. A. R. Wallace's private collection. For the first, which belonged to the family *Telephoridæ*, he proposed the generic term *Astychina*, remarkable for the form of the two terminal joints of the

antennæ, which were modified in one sex into what appeared to be a prehensile apparatus, different from anything in the insect world, but of which some analogous forms were found to occur in certain Entomostracous Crustacea. The other belonged to the family Cleridæ, and was named Anisophyllus, differing from all known beetles by the extremely elongated branch of the ninth joint of the antennæ.

JULY 5, 1876.

Prof. Westwood, M.A., President, in the chair.

Psyllidæ taken near Lee, Kent.—Mr. Douglas exhibited the following Psyllidæ, taken by himself near Lee, Kent:—*Psylla* —?: on birch trees; possibly *P. Betulæ*, *Linn., Flor.* *Psylla spartifoliella*, *Först.*: on broom bushes. *Aphalara renosa*, *Först.*: new to the British Fauna; now first identified as living on *Achillea millefolium*. *Rhinocola aceris*, *Linn.*: on maple trees (*Acer campestre*). *Rhinocola ericæ*, *Curtis*: on heather.

Twigs of Horse Chestnut attacked by a Larva.—The President brought for exhibition twigs of horse-chestnut, from Oxford, that had been attacked by some kind of larva, which had eaten away the inside of portions of the stem, causing the buds to drop off. He was in doubt whether the insect was *Zeuzera Æsculi*, or some other; but he would be glad to know if the destruction to trees had been noticed elsewhere.

Species of Coccus.—The President exhibited two species of *Coccus*, one of them on camellia leaves in his greenhouse, which he had previously described in the 'Gardener's Chronicle,' under the name of *C. Camelliæ*, and which had afterwards been observed by Dr. Verloren in his greenhouse in Holland. The female, which is one line in length, discharges a white waxy matter, having the appearance of the excrement of a young bird. The other species had been sent to him by the Rev. T. A. Preston, of Marlborough, on a species of *Euphorbia*, obtained from Dr. Hooker, of Kew. The leaves were covered with small scales, which, on close examination, were observed to have two small spines attached; and these proved to be the caudal extremities of the males. These insects emerge from the pupa backwards, and in consequence they make their appearance with the wings drawn forwards over the head.

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No. 160.]

OCTOBER, MDCCCLXXVI.

[PRICE 6d.

Ephyra pendularia, var. By FREDERICK BOND, Esq., F.Z.S.



EPHYRA PENDULARIA, var.

THIS very beautiful variety of *Ephyra pendularia* was exhibited by Mr. Miller at the meeting of the Entomological Society, held on the 7th of October, 1861, and was said to have been bred from a larva found near London, feeding on the exterior of the bedeguar, or mossy gall of the rose. This was probably a mistake, the larva having very likely fallen from a birch tree. I understood at the time that the larva was never seen actually feeding on the bedeguar. The moth is now in my collection.

FREDERICK BOND.

Staines, Middlesex, September 8, 1876.

Remarks on Colias Edusa and Colias Hyale.

By J. JENNER WEIR, Esq., F.L.S., F.Z.S.

ALTHOUGH I have collected the Lepidoptera of this country for at least thirty-six years I have never had opportunities for observing the habits of our two species of the genus *Colias* in England; but this summer having been unusually hot, I was induced to make a journey to my native town, Lewes, more particularly in hope that they might be plentiful; and I devoted the greater part of the month of August mainly to observing and capturing the two species in question.

I took my first specimen of both species on the 7th, and my last on the 28th, of August; I found them in about the proportion of five of *C. Edusa* to three of *C. Hyale*. The localities in which I took both species were in Oxsettle Bottom, near Lewes, and in a clover field of twenty-five acres in extent, at Beddingham, about three miles from the town, which field had been once mown, and the second crop left for seed. The habit of both species appeared to me to be for the males to fly very rapidly and wildly across the localities frequented, and rarely, in the case of the clover field, passing beyond its limits. The females were generally resting or flying languidly from flower to flower; but upon seeing the males they usually flew upwards to attract their attention; and I did not find that any of the males discovered the females when the latter were at rest.

During the whole of the period of my observations the two species were constantly emerging from the chrysalis, and nearly all the specimens taken were in fine condition. The males of *C. Edusa* varied but little in colour; the shade of orange in most was precisely the same, and but few were slightly lighter. None of the females, although but just out, were so brilliant an orange as those in my collection, taken near Brighton some years ago; and although I did not capture one of the variety *Helice*, still two of the females were scarcely orange in colour, but rather of a dark yellow colour; and one had the orange suffused with black, in the same manner as a specimen in Mr. Bond's collection, figured in Newman's 'British Butterflies.'

All the males of *C. Hyale* were of a rich yellow colour, the tint varying very slightly, but some were not nearly so black at the tips of the wings as usual; this remark applies to perfectly fresh examples. The females of *C. Hyale* were in some cases nearly white; but I took one specimen of this sex quite as yellow as the males usually are; and I am disposed to think that the ordinary colouration of the females in *C. Hyale* is the reverse of that which obtains in *C. Edusa*, the lighter variety *Helice* being rare in the latter species, and the darker variety in the former.

I find that all the continental specimens I possess of *C. Hyale*—taken by myself in Saxony, Bohemia, Tyrol, and Switzerland, and received from Russia—are coloured exactly

the same dark yellow in both sexes. The brightest specimen I possess was taken in Tyrol, in September, 1874.

I trust the remarks I have made may elicit further communications on the colouration of the females of *C. Hyale*, as I feel, in common with the views entertained by my lamented friend, the late Editor of the 'Zoologist' and 'Entomologist,' that many of us have too hastily assumed that the yellow specimens of *C. Hyale* were all males, and the white all females.

J. JENNER WEIR.

6, Haddo Villas, Blackheath.

Descriptions of Oak-galls. Translated from Dr. G. L. MAYR'S 'Die Mitteleuropäischen Eichengallen' by E. A. FITCH, Esq.

(Continued from p. 197.)

57. *Andricus testaceipes*, Hart.—

This gall is formed by a swelling of the petiole, or a part of the midrib of the leaves of *Quercus sessiliflora*, in May. The larva-cell is situated in the centre; in many cases, however, the gall-parenchyma contains several dispersed inner galls, each containing a larva of *Andricus noduli*. The question, which still remains unanswered, is whether such petiolar galls were originally produced by *A. testaceipes*, and *A. noduli* has only introduced its eggs, or whether the galls are primarily produced by *A. noduli* alone. Although I found these galls by the hundred during the months of August and September, I could never solve this problem. *A. noduli*, inquilines and parasites, I have bred from them, but no *A. testaceipes*.

Fig. 57.



ANDRICUS TESTACEIPES.
The spherical galls on the leaf
are those of *A. curvator* (56).

A. petioli, Hart.—This species is, in fact, *A. noduli*, according to typical specimens in the zoological cabinet at Vienna. Most Hymenopterists have taken the specimens of *A. noduli*, bred from these swellings of the petiole, for

A. testaceipes, a typical specimen of which is in the Vienna zoological cabinet.—*G. L. Mayr*.

The inquilines and parasites referred to are *Synergus apicalis*, *Hart.*, *Ceroptres arator*, *Hart.*, and *Megastigmus dorsalis*, *Fabr.* I have often found these galls on the petiole and midrib, but always took them for *A. noduli*. I have never bred their inmates.—*E. A. Fitch*.

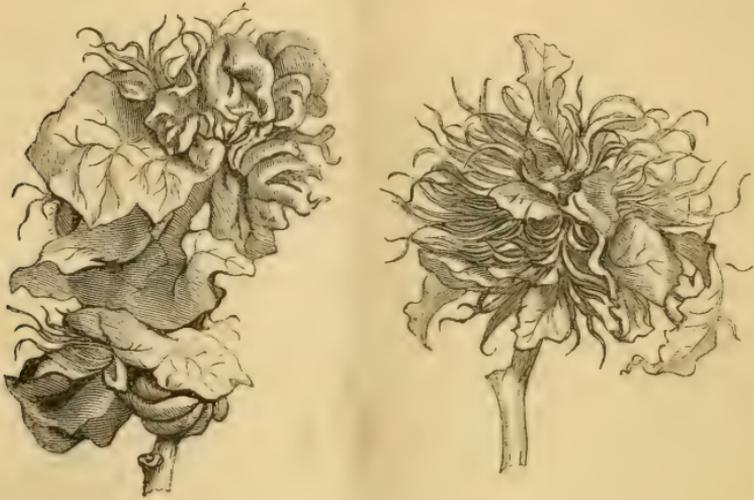


Fig. 58.—*ANDRICUS MULTIPLICATUS*.

58. *Andricus multiplicatus*, Gir.—At the end of May this gall appears on the Turkey oak. It forms at the end, rarely on the side, of the twig a coma, outwardly consisting of rudimentary crippled leaves. This coma rests on and surrounds an irregular, hard, very pilose disk: at the top of this disk there is, hidden by the rudimentary leaves, a number of small, irregularly placed, oviform, yellowish brown inner galls, each of which contains a larva. This interesting gall undoubtedly attains its peculiar shape through the parenchyma being pierced when still in the bud, which prevents the development of the axis; this, together with the thickened and comated parenchyma, forms the disk. The yellow gall-makers are produced in July; but the one-year

old galls may be found on the trees, and some even adhere after they have lost all the leaves. They then exhibit the opened, unprotected inner galls, surrounded by prickly projections.—*G. L. Mayr.*

The gall of this species occurs only on *Quercus cerris*, consequently is not known as British. From it *Ceroptres Cerri*, *Mayr*, and *Megastigmus dorsalis*, *Fabr.*, may be bred in July of the same year; the latter commonly. *Synergus evanescens*, *Mayr*, is another inquiline occurring in the following April; and *Callinome regius*, *Nees*, a parasite. Dr. Giraud says "the caterpillars of *Grapholita amygdalana* live frequently in these galls, feeding on the exterior substance, and even on the cellules when they are young enough." This Tortrix has also been bred from galls of *Lignicola* or *Kollari*.—*E. A. Fitch.*

*The peculiar Relations of Plants and Insects as exhibited in Islands.** By ALFRED R. WALLACE, Esq., F.L.S., &c.

EVER since Mr. Darwin showed the immense importance of insects in the fertilisation of flowers great attention has been paid to the subject, and the relation of these two very different classes of natural objects has been found to be more universal and more complex than could have been anticipated. Whole genera and families of plants have been so modified as first to attract, and then to be fertilised by, certain groups of insects; and this special adaptation seems in many cases to have determined the more or less wide range of the plants in question. It is also known that some species of plants can be fertilised only by particular species of insects, and the absence of these from any locality would necessarily prevent the continued existence of the plant in that area. Here, I believe, will be found the clue to much of the peculiarity of the floras of oceanic islands, since the methods by which these have been stocked with plants and insects will be often quite different. Many seeds are, no doubt, carried by oceanic currents; others probably by aquatic birds. Mr. H. N. Moseley informs me that the albatrosses, gulls, puffins, tropic

* Part of the President's Address, in Section D (Biology), at the recent Meeting of the British Association.

birds, and many others, nest inland, often amidst dense vegetation; and he believes they often carry seeds, attached to their feathers, from island to island for great distances. In the tropics they often nest on the mountains far inland, and may thus aid in the distribution even of mountain plants. Insects, on the other hand, are mostly conveyed by aerial currents, especially by violent gales; and it may thus often happen that totally unrelated plants and insects may be brought together, in which case the former must often perish for want of suitable insects to fertilise them. This will, I think, account for the strangely fragmentary nature of these insular floras, and the great differences that often exist between those which are situated in the same ocean, as well as for the preponderance of certain orders and genera. In Mr. Pickering's valuable work on the 'Geographical Distribution of Animals and Plants,' he gives a list of no less than sixty-six natural orders of plants *unexpectedly* absent from Tahiti, or which occur in many of the surrounding lands, some being abundant in other islands,—as the Labiatae at the Sandwich Islands. In these latter islands the flora is much richer, yet a large number of families which abound in other parts of Polynesia are totally wanting. Now much of the poverty and exceptional distribution of the plants of these islands is probably due to the great scarcity of flower-frequenter insects. Lepidoptera and Hymenoptera are exceedingly scarce in the eastern islands of the Pacific; and it is almost certain that many plants which require these insects for their fertilisation have been thereby prevented from establishing themselves. In the western islands, such as the Fijis, several species of butterflies occur in tolerable abundance, and no doubt some flower-haunting Hymenoptera accompany them; and in these islands the flora appears to be much more varied, and especially to be characterized by a much greater variety of showy flowers, as may be seen by examining the plates of Dr. Seeman's 'Flora Vitiensis.'

Darwin and Pickering both speak of the great preponderance of ferns at Tahiti; and Mr. Moseley, who spent several days in the interior of the island, informs me that "at an elevation of from 2000 to 3000 feet the dense vegetation is composed almost entirely of ferns. A tree-fern (*Alsophila Tahitensis*) forms a sort of forest, to the exclusion of almost

every other tree; and, with huge plants of two other ferns (*Angiopteris evecta* and *Asplenium nidus*), forms the main mass of the vegetation." And he adds, "I have nowhere seen ferns in so great proportionate abundance." This unusual proportion of ferns is a general feature of insular, as compared with continental, floras; but it has, I believe, been generally attributed to favourable conditions, especially to equable climate and perennial moisture. In this respect, however, Tahiti can hardly differ greatly from many other islands, which yet have no such vast preponderance of ferns. This is a question that cannot be decided by mere lists of species, since it is probable that in Tahiti they are less numerous than in some other islands where they form a far less conspicuous feature in the vegetation. The island most comparable with Tahiti in that respect is Juan Fernandez. Mr. Moseley writes to me:—"In a general view of any wide stretch of the densely-clothed mountainous surface of the island, the ferns—both tree-ferns and the unstemmed forms—are seen at once to compose a very large proportion of the mass of foliage." As to the insects of Juan Fernandez, Mr. Edwyn C. Reed, who made two visits, and spent several weeks there, has kindly furnished me with some exact information. Of butterflies there is only one (*Pyrameis carie*), and that rare—a Chilian species, and probably an accidental straggler. Four species of moths of moderate size were observed—all Chilian, and a few larvæ and pupæ. Of bees there were none, except one very minute species (allied to *Chilicola*); and of other Hymenoptera, a single specimen of *Ophion luteus*—a cosmopolitan Ichneumon. About twenty species of flies were observed, and these formed the most prominent feature of the Entomology of the island.

Now, as far as we know, this extreme entomological poverty agrees closely with that of Tahiti; and there are, probably, no other portions of the globe equally favoured in soil and climate, and with an equally luxuriant vegetation, where insect-life is so scantily developed. It is curious, therefore, to find that these two islands also agree in the wonderful predominance of ferns over the flowering plants—in individuals even more than in species; and there is no difficulty in connecting the two facts. The excessive minuteness and great abundance of fern-spores cause them

to be far more easily distributed by winds than the seeds of flowering plants, and they are thus always ready to occupy any vacant places in suitable localities, and to compete with the less vigorous flowering plants. But where insects are so scarce, all plants which require insect fertilisation, whether constantly to enable them to produce seed at all or occasionally to keep up their constitutional vigour by crossing, must be at a great disadvantage; and thus the scanty flora which oceanic islands must always possess, peopled as they usually are by waifs and strays from other lands, is rendered still more scanty by the weeding out of all such as depend largely on insect fertilisation for their full development. It seems probable, therefore, that the preponderance of ferns in islands (considered in mass of individuals, rather than in number of species) is largely due to the absence of competing phænogamous plants; and that this is in great part due to the scarcity of insects. In other oceanic islands—such as New Zealand and the Galapagos, where ferns, although tolerably abundant, form no such predominant feature in the vegetation, but where the scarcity of flower-haunting insects is almost equally marked—we find a great preponderance of small, green, or otherwise inconspicuous flowers, indicating that only such plants have been enabled to flourish there as are independent of insect fertilisation. In the Galapagos—which are, perhaps, even more deficient in flying insects than Juan Fernandez—this is so striking a feature that Mr. Darwin speaks of the vegetation as consisting in great part of “wretched-looking weeds,” and states that “it was some time before he discovered that almost every plant was in flower at the time of his visit.” He also says that he “did not see one beautiful flower” in the islands. It appears, however, that Compositæ, Leguminosæ, Rubiaceæ, and Solanaceæ, form a large proportion of the flowering plants; and, as these are orders which usually require insect fertilisation, we must suppose either that they have become modified so as to be self-fertilised, or that they are fertilised by the visits of the minute Diptera and Hymenoptera, which are the only insects recorded from these islands.

In Juan Fernandez, on the other hand, there is no such total deficiency of showy flowers. I am informed by Mr. Moseley that a variety of the magnoliaceous winter's bark

abounds, and has showy white flowers, and that a bignoniaceous shrub, with abundance of dark blue flowers, was also plentiful; while a white-flowered liliaceous plant formed large patches on the hill-sides. Besides these there were two species of woody Compositæ with conspicuous heads of yellow blossoms, and a species of white-flowered myrtle also abundant; so that, on the whole, flowers formed a rather conspicuous feature in the aspect of the vegetation of Juan Fernandez.

But this fact—which at first sight seems entirely at variance with the view we are upholding of the important relation between the distribution of insects and plants—is well explained by the existence of two species of humming-birds in Juan Fernandez, which, in their visits to these large and showy flowers, fertilise them as effectually as bees, moths, or butterflies. Mr. Moseley informs me that “these humming-birds are *extraordinarily abundant*, every tree or bush having one or two darting about it.” He also observed that “nearly all the specimens killed had the feathers round the base of the bill and front of the head clogged and coloured yellow with pollen.” Here, then, we have the clue to the perpetuation of large and showy flowers in Juan Fernandez; while the total absence of humming-birds in the Galapagos may explain why no such large-flowered plants have been able to establish themselves in those equatorial islands.

This leads to the observation that many other groups of birds also, no doubt, aid in the fertilisation of flowers. I have often observed the beaks and faces of the brush-tongued lorries of the Moluccas covered with pollen; and Mr. Moseley noted the same fact in a species of *Artamus*, or swallow-shrike, shot at Cape York, showing that this genus also frequents flowers and aids in their fertilisation. In the Australian region we have the immense group of the *Meliphagidæ*, which all frequent flowers; and, as these range over the islands of the Pacific, their presence will account for a certain proportion of showy flowers being found there, such as the scarlet *Metrosideros*,—one of the few conspicuous flowers in Tahiti. In the Sandwich Islands, too, there are forests of *Metrosideros*; and Mr. Charles Pickering writes me that they are visited by honey-sucking birds, one of which is captured by sweetened bird-lime, against which it

thrusts its extensile tongue. I am also informed that a considerable number of flowers are occasionally fertilised by humming-birds in North America; so that there can, I think, be little doubt that birds play a much more important part in this respect than has hitherto been imagined. It is not improbable that in Tropical America, where this family is so enormously developed, many flowers will be found to be expressly adapted to fertilisation by them, just as so many in our own country are specially adapted to the visits of certain families or genera of insects.

It must also be remembered, as Mr. Moseley has suggested to me, that a flower which had acquired a brilliant colour to attract insects might, on transference to another country, and becoming so modified as to be capable of self-fertilisation, retain the coloured petals for an indefinite period. Such is probably the explanation of the Pelargonium of Kerguelen's Land, which forms masses of bright colour near the shore during the flowering season; while most of the other plants of the island have colourless flowers, in accordance with the almost total absence of winged insects. The presence of many large and showy flowers among the indigenous flora of St. Helena must be an example of a similar persistence. Mr. Melliss, indeed, states it to be "a remarkable peculiarity that the indigenous flowers are, with very slight exceptions, all perfectly colourless;" but although this may apply to the general aspect of the remains of the indigenous flora, it is evidently not the case as regards the *species*, since the interesting plates of Mr. Melliss's volume show that about one-third of the indigenous flowering plants have more or less coloured or conspicuous flowers, while several of them are exceedingly showy and beautiful. Among these are a Lobelia, three Wahlenbergias, several Compositæ, and especially the handsome red flowers of the now almost extinct forest-trees, the ebony and redwood—species of *Melhania* (Byttneriaceæ). We have every reason to believe, however, that when St. Helena was covered with luxuriant forests, and especially at that remote period when it was much more extensive than it is now, it must have supported a certain number of indigenous birds and insects, which would have aided in the fertilisation of these gaily-coloured flowers. The researches of Dr. Hermann Müller have shown us by what

minute modifications of structure or of function many flowers are adapted for partial insect- and self-fertilisation in varying degrees, so that we have no difficulty in understanding how, as the insects diminished and finally disappeared, self-fertilisation may have become the rule, while the large and showy corollas remain to tell us plainly of a once different state of things.

Another interesting fact in connection with this subject is the presence of arborescent forms of *Compositæ* in so many of the remotest oceanic islands. They occur in the Galapagos, in Juan Fernandez, in St. Helena, in the Sandwich Islands, and in New Zealand; but they are not directly related to each other, representatives of totally different tribes of this extensive order becoming arborescent in each group of islands. The immense range and almost universal distribution of the *Compositæ* is due to the combination of a great facility of distribution (by their seeds), with a great attractiveness to insects, and the capacity of being fertilised by a variety of species of all orders, and especially by flies and small beetles. Thus they would be among the earliest of flowering plants to establish themselves on oceanic islands; but where insects of all kinds were very scarce it would be an advantage to gain increased size and longevity, so that fertilisation at an interval of several years might suffice for the continuance of the species. The arborescent form would combine with increased longevity the advantage of increased size in the struggle for existence with the ferns and other early colonists; and these advantages have led to its being independently produced in so many distant localities, whose chief feature in common is their remoteness from continents and the extreme poverty of their insect life.

As the sweet odours of flowers are known to act in combination with their colours, as an attraction to insects, it might be anticipated that where colour was deficient scent would be so also. On applying to my friend Dr. Hooker for information as to New Zealand plants, he informed me that this was certainly the case, and that the New Zealand flora is, speaking generally, as strikingly deficient in sweet odours as in conspicuous colours. Whether this peculiarity occurs in other islands I have not been able to obtain information, but we may certainly expect it to be so in such a marked instance as that of the Galapagos flora.

Another question which here comes before us is the origin and meaning of the odoriferous glands of leaves. Dr. Hooker informed me that not only are the New Zealand plants deficient in scented flowers, but equally so in scented leaves. This led me to think that perhaps such leaves were in some way an additional attraction to insects, though it is not easy to understand how this could be, except by adding a general attraction to the special attraction of the flowers, or by supporting the larvæ which, as perfect insects, aid in fertilisation. Mr. Darwin, however, informs me that he considers that leaf-glands bearing essential oils are a protection against the attacks of insects where these abound, and would thus not be required in countries where insects were very scarce. But it seems opposed to this view that highly aromatic plants are characteristic of deserts all over the world, and in such places insects are not abundant. Mr. Stainton informs me that the aromatic Labiatae enjoy no immunity from insect attacks. The bitter leaves of the cherry-laurel are often eaten by the larvæ of moths that abound on our fruit-trees; while in the Tropics the leaves of the orange tribe are favourites with a large number of Lepidopterous larvæ; and our northern firs and pines, although abounding in a highly aromatic resin, are very subject to the attacks of beetles. My friend Dr. Richard Spruce—who, while travelling in South America, allowed nothing connected with plant-life to escape his observation—informs me that trees whose leaves have aromatic and often resinous secretions in immersed glands abound in the plains of tropical America, and that such are in great part, if not wholly, free from the attacks of leaf-eating ants, except where the secretion is only slightly bitter, as in the orange tribe, orange-trees being sometimes entirely denuded of their leaves in a single night. Aromatic plants abound in the Andes up to about 13,000 feet, as well as in the plains, but hardly more so than in Central and Southern Europe. They are, perhaps, most plentiful in the dry mountainous parts of Southern Europe; and, as neither here nor in the Andes do leaf-eating ants exist, Dr. Spruce infers that, although in the hot American forests where such ants swarm, the oil-bearing glands serve as a protection, yet they were not originally acquired for that purpose. Near the limits of perpetual snow on the Andes

such plants as occur are not, so far as Dr. Spruce has observed, aromatic; and, as plants in such situations can hardly depend on insect visits for their fertilisation, the fact is comparable with that of the flora of New Zealand, and would seem to imply some relation between the two phenomena, though what it exactly is cannot yet be determined.

I trust I have now been able to show you that there are a number of curious problems, lying as it were on the outskirts of biological inquiry, which well merit attention, and which may lead to valuable results. But these problems are, as you see, for the most part connected with questions of locality, and require full and accurate knowledge of the productions of a number of small islands and other limited areas, and the means of comparing them the one with the other. To make such comparisons is, however, now quite impossible. No museum contains any fair representation of the productions of these localities; and such specimens as do exist, being scattered through the general collection, are almost useless for this special purpose. If, then, we are to make any progress in this inquiry, it is absolutely essential that some collectors should begin to arrange their cabinets primarily on a geographical basis, keeping together the productions of every island or group of islands, and of such divisions of each continent as are found to possess any special or characteristic fauna or flora. We shall then be sure to detect many unsuspected relations between the animals and plants of certain localities; and we shall become much better acquainted with those complex reactions between the vegetable and animal kingdoms, and between the organic world and the inorganic, which have almost certainly played an important part in determining many of the most conspicuous features of living things.

ALFRED RUSSEL WALLACE.

Entomological Notes, Captures, &c.

Vanessa Antiopa at Lea Bridge Marshes.—I had the good fortune to capture a splendid female specimen of *V. Antiopa* on the 27th August; it appeared as though only just emerged from pupa. It was on a willow tree, sucking the sugar left

from the previous night; as the tree smelt very strong of rum and sugar it would, no doubt, be a good plan to sugar for them. The specimen is at present in possession of Mr. W. Craft.—*Henry Ashpole; Hyde Road, Hoxton.*

Vanessa Antiopa in Dumfriesshire.—I have just had given to me a live specimen in fair condition of *V. Antiopa*, which was captured to-day in the gardener's cottage at Mabie, about five miles from Dumfries.—*Robert Service; Maxwelltown, Dumfries, September 22, 1876.*

Papilio Machaon in Sussex.—I was very much surprised to see a fine female specimen of *Papilio Machaon* flying in a secluded valley branching off from Oxsettle Bottom, near Lewes. I captured her for the sake of making quite certain of the species, but released her in hopes she might found a colony there. I cannot find that *P. Machaon* has been reared by anyone at Lewes for the last twenty years. The spot in which she was taken is rarely visited by naturalists, except during the period *Procris globulariæ* appears; and the quiet of the place may be inferred from the fact that I saw those shy birds, *Œdicnemus crepitans*, almost every day on which I visited the locality.—*J. Jenner Weir; 6, Haddo Villas, Blackheath.*

Apatura Iris in Huntingdonshire.—I spent a few days in search of *A. Iris* in the middle of July last, and in woods near Huntingdon took the considerable number of twenty-seven specimens—twenty-one males and six females. My two best days were the 18th and 19th of July, which produced eighteen specimens. I tried carrion, in the shape of several dead hedgehogs, which I distributed about the woods, but only captured one in this way—a fine male. All the rest I took (mostly on the wing) with my net, fixed on an eighteen-foot ash pole. I write this thinking it may interest some of your readers to know that *A. Iris* is still to be taken in some plenty in our Midland Counties.—*Harold Conquest; West Lodge, St. Ann's Road, Stamford Hill, N., September 5, 1876.*

Colias Hyale and C. Edusa.—I should like to add one or two remarks on Mr. Fitch's interesting notes respecting these species being double-brooded; they may serve to encourage other collectors to give us their experience. Many years ago three of us were collecting in the Isle of Thanet; we all worked hard every day at the clover and lucerne

fields, the weather all the time being very fine and warm. This was early in June. We never caught a glimpse of either *C. Hyale*, *C. Edusa*, or its *var. Helice*, for some days; after which, in the same fields, *C. Hyale* and *C. Edusa* made a sudden appearance, *C. Edusa* being quite common; *C. Hyale* was scarce. But all the *C. Edusa* were miserable specimens, and the *C. Hyale* were much rubbed. Does this not seem to give one the idea that they had been hibernating, and were merely waiting for the early summer's sun to induce them to leave their winter retreats?—*H. Ramsay Cox; Thornleigh House, Forest Hill, September 11, 1876.*

Sphinx Convolvuli in Gloucestershire.—On the 7th September a very fresh specimen of *S. Convolvuli* was taken in my garden, attracted as usual by the petunias.—*V. R. Perkins; Wotton-under-Edge.*

Sphinx Convolvuli near St. Ives.—A *Sphinx Convolvuli* was brought to me in perfect condition, caught in a cottage in this parish, on the 22nd of August, 1876.—[*Rev.*] *J. H. White; Hemingsford Grey, St. Ives.*

Sphinx Convolvuli at Salisbury.—I took a very fine and perfect specimen of *Sphinx Convolvuli* on a lamp-post, in this town, on the 7th of this month.—*Henry Neale; 22, St. Martin's Church Street, Salisbury, September 23, 1876.*

Rare Lepidoptera in the Isle of Wight.—The season has been a very uncertain one, but many good things have been taken; amongst them—*Triphæna subsequa*, *Diphthera orion*, *Leucania vitellina*, *Laphygma exigua*, a specimen of the very rare *Noctua flammata*, *Agrotis cinerea*, *A. lunigera*, *A. obelisca*, *Aporophila australis*, *Heliophobus hispida*, *Luperina cespitis*, *Pterophorus spilodactylus*, *Sphinx Convolvuli*, *Colias Edusa* and its *var. Helice* common, and a few specimens of *Colias Hyale*; also many others. Mr. Buckmaster and Mr. Blackburn have taken *Leucania albipuncta*. I hope next month to give you a longer list, as there is every prospect of a fine autumn.—*H. Rogers; Roseberry House, Freshwater, Isle of Wight, September 19, 1876.*

Chærocampa celerio at Brighton.—A specimen of *Chærocampa celerio* was taken at Brighton on the 13th of this month by my brother, who brought it to me in splendid condition. It is now on the setting-board.—*C. Hamlin; 47, Viaduct Road, Brighton, September 25, 1876.*

Larva of Acronycta Alni near Derby.—A larva of *A. Alni* was taken here last month by my young friend Master Godfrey Fitz Herbert.—[Rev.] *Hugh A. Stowell; Derby.*

Acronycta Alni near Retford.—A fine larva of this rare moth was taken by me at Grove Wood, near East Retford, on the 13th of August last. It was feeding upon hazel.—*E. H. Stenton; 14, Grove Street, East Retford, September 1, 1876.*

Clostera anachoreta.—Being informed that some entomologists doubt this moth being indigenous to Britain, I wish to state for their information that I found the pupa, though I did not know I had done so until the imago made its appearance in my pupæ cage on the 8th of May last. A friend of mine (Mr. Harbour), of this town, also found two imagos, which he picked up from the pavement in the street, rather the worse for wear. I did not know of its rarity, or I should have sent this before for the benefit of your readers.—*S. Norman; 11, Duke Street, Deal, August 21, 1876.*

Leucania albipuncta, Eremobia ochroleuca, and Sphinx Convolvuli, at Deal.—I had the pleasure of taking two specimens of *Leucania albipuncta* on sugar, at the Deal sand-hills, on Wednesday, August 23rd. The pair were not in such good condition as I should have wished, but were tolerable specimens nevertheless. The night was dark and windy, and moths were very abundant on the sugar, which was applied to a row of palings. I took *Eremobia ochroleuca* the same night; and also obtained a living specimen of *Sphinx Convolvuli*, which had been taken in the locality. I sugared for *L. albipuncta* in vain next night, which was the last of my stay at Deal.—*F. Andrewes; Grey Friar's House, Reading, September 20, 1876.*

Leucania albipuncta at St. Leonard's.—A very good specimen of *Leucania albipuncta* was taken here at sugar on Friday last, by Mr. C. Haggis, a friend of mine. I took one myself last year on the same tree, and within two days of the same date.—*John T. Sarll; Beauvoir House, Hollington Park, St. Leonard's-on-Sea, July 25, 1876.*

Dianthæcia irregularis.—I made four journeys this year for the purpose of finding the larva of this insect, and swept all the *Silene Otites* I could find at Tuddenham, Icklingham, and Lockford. I obtained less than a score of caterpillars,

everyone of which was the victim of an Ichneumon. Neither did I find any larvæ of *Anticlea sinuata*, as usual, on the *Galium verum* at these places.—[Rev.] A. H. Wratishaw; School Hall, Bury St. Edmunds, September 4, 1876.

Cucullia schropulariæ.—May I be permitted to ask, through the medium of the 'Entomologist,' whether there is any well-authenticated instance of the recent occurrence of *Cucullia schropulariæ* in this country? I have frequently had "true *C. schropulariæ*" offered to me by correspondents, but they have invariably proved to be *Cucullia verbasci*. In Newman's 'British Moths' it is said that the perfect insects of the two species are hard to distinguish from each other; but, in my opinion, nobody who knows both could easily mistake the one for the other. It is, however, extremely difficult to distinguish between *Cucullia schropulariæ* and *Cucullia lychnitis*. The late Mr. Doubleday himself sent me a pair of the former species, which he had received from a correspondent in France as types; and I confess that had I taken them myself I should have mistaken them for *Cucullia lychnitis*. I believe some people labour under the delusion that all the larvæ found on *Schropularia nodosa* are true *Cucullia schropulariæ*; but it is not so, as *Cucullia verbasci* also feeds on that plant, as well as on *Schropularia aquatica*. I should be very glad if any competent entomologist can give reliable information on the subject, as I have never met with *Cucullia schropulariæ* myself; nor have I, during the time I have been a collector, ever seen any trustworthy record of its occurrence in Britain.—W. H. Harwood; 8, West Stockwell Street, Colchester, Sept. 16, 1876.

Selidosema plumaria, &c., near Alverstoke.—Spending a few days at Alverstoke, on the Solent, last month, I was surprised to find *S. plumaria* occurring along the coast from that village westward, as far as my rambles extended,—some three or four miles: only males of course, and all more or less wasted. This is a new, or at least unrecorded, locality for the species; I had previously associated it with heaths. At the same place I took a few *Spilodes palealis* and *Phycis Davisella*. To these I may add *Pyrallis glaucinalis*, as I see by Mr. Jenner-Fust's list that it had not in 1868 been noted from sub-province 5. *Aspilates citraria* is, I fancy, supposed to be one of those species of which the males are

much more easily procured than the females. While the males occurred to us almost entirely by day, we found the females in great numbers at the gas-lamps at night, but hardly a male amongst them.—[Rev.] *Hugh A. Stowell; Breadsall Rectory, Derby, September 21, 1876.*

Swarm of Ants.—About a fortnight ago a swarm of ants—fourteen yards broad, and which took half an hour to pass—were observed by a neighbouring clergyman, whilst fishing in the Ouse in the next parish: thousands fell into the river, and were eagerly preyed on by the roach and dace. They were passing in a south-east direction.—[Rev.] *J. H. White; Hemingford Grey, St. Ives, Hunts, September 5, 1876.*

[Swarms of ants commonly take place about the middle of August,—a little earlier or later, according to the season. I have observed that these swarms take place usually after rain has fallen, and the air is moist and warm. The species that usually compose these large swarms belong to the division of stinging-ants—Myrmicidæ; and I should be inclined to believe that the swarm seen by the clergyman was composed of one of the following species:—*Myrmica scabrinodis*, *M. ruginodis*, or *M. lævinodis*.—*Frederick Smith.*]

Journalist's Entomology.—Single strength helpless against multitudinous weakness, a nation powerless against a scourge of animalculæ, is by this time an old spectacle. “The strong man, Kwasind,” was he not pelted to death by “the little people” on the river Taquamenaw? And the Abderites, had they not to desert their fatherland by reason of frogs? A fluffy little fly once devastated the pine forests of the Hartz; and a moth of a certain kind laying its eggs among the hops will still drive Kent into fits. A fly with a partiality for turnips has set all the farmers of bucolic England swearing; and very lately indeed a beetle that preferred potatoes convulsed the markets of the country. The “Oidium,” I see now, has appeared in strength in South Australia; and, unless the colony can defeat the insect, the cultivation of the vine will be retarded for many years to come. After all, though, it is an old story. It was “the little foxes” that ravaged the prophet’s vineyard.—*The ‘World.’*

[The above cutting from the ‘World,’ of September 6th (p. 13), is too rich to be lost. If we mistake not its author was, until recently, chairman of a Royal Natural History Society “Limited”!—*Ed.*]

*Extracts from the Proceedings of the Entomological Society
of London.*

AUGUST 2, 1876.

Sir Sidney S. Saunders, C.M.G., Vice-President, in the chair.

Ravages of Locusts in Spain.—A letter was read from T. V. Lister, Esq., of the Foreign Office, transmitting, for the information of the Entomological Society, a copy of a despatch from Sir John Walsham, Her Majesty's Chargé d'Affaires at Madrid, relative to the plague of locusts, together with a box containing specimens of the insect, and a number of earthen egg-cases, each containing from thirty to forty eggs. The despatch stated that the Official Report, showing the progress of the plague and the steps taken to exterminate the insect, had not yet been published, but a copy would be sent to the Society in a few weeks. It was said that the damage done by the locusts this year was considerably less than that of last year, owing to the number of soldiers which the Government had been enabled to employ since the war was over to assist the inhabitants of the districts, where the plague existed, in destroying the insects. The insects sent were stated to be specimens of *Locusta migratoria*; but on examination they were ascertained to be the *Locusta albifrons*, *Fab.* (*Decticus albifrons*, *Savigny*).

Dragonfly infested by Red Parasite.—Mr. M'Lachlan exhibited a series of thirteen examples of a dragonfly (*Diplax meridionalis*, *Selys*), recently taken by him in the Alps of Dauphiné, between Grenoble and Briançon (the exact locality being near the village of La Grave, at the base of the Aiguille du Midi), remarkable for the extent to which nearly all were infested by the red parasite described by De Geer as *Acarus libellulæ* (perhaps a species of *Trombidium*). Of the thirteen examples captured casually only one was free from parasites, the number of them on the others being respectively 7, 8, 9, 15, 17, 19, 28, 47, 51, 73, 96, and 111, or a total of 481 on twelve individuals. They were firmly fixed on the nervures towards and at the base of the wing, almost invariably on the under side; but whatever might be the number on any particular dragonfly it was always divided nearly symmetrically on the two sides of the insect,—those much infested having a very pretty appearance, from the wings looking as if spotted with blood-red. He had no

doubt that the Acari must have attained their position by climbing up the legs of the dragonfly when at rest: probably they did not quit it till the dragonfly died, or perhaps they died with it, so firmly were they fixed. He remarked that the history of the Acari was involved in much obscurity, for it appeared by no means certain that all those existing could ever gain access to dragonflies; just as in the case of the bed-bug and the human-flea, where there must be myriads that never have an opportunity of tasting human blood. He further noticed that, at the meeting of this Society on the 1st of August, 1864, he exhibited a dragonfly from Montpellier similarly attacked, and it was recorded as *Diplax striolata* (Tr. Ent. Soc., 2nd series, vol. ii., Proc. xxxvi.). This was an error, the insect being *D. meridionalis*, which seemed to be particularly subject to attack.

Nematus gallicola, Steph.—Mr. Smith read the following note:—"This is one of the commonest species of sawfly found in Europe; it is the maker of the well-known red galls so plentiful on leaves of different species of willow. The galls are, as Mr. Cameron observes in his communication to the 'Scottish Naturalist,' somewhat local, but they are extremely abundant in many situations. I have on many occasions collected large quantities of leaves, more or less covered with galls, and have bred many hundreds of the flies—all proving on examination to be females. Mr. Cameron observes, in the paper alluded to, 'The male is quite unknown to me; and this appears to have been also the case with Hartig.' Last spring I collected, in the London district, a quantity of the galls, placing them in a large flower-pot half-filled with garden mould. The larvæ soon quitted the galls, and buried themselves in the mould for the purpose of undergoing their transformations. About a month after this the flies began to issue forth, probably to the number of from five to six hundred: among this number I had the satisfaction of finding two males. This sex closely resembles the female; but has a narrower body, longer antennæ, and the tip of the abdomen is pale; the abdomen is also narrower, and not, as in the female, widened towards the apex. This season I have repeated my experiment, and have obtained a single male out of several hundreds of flies. Mr. Cameron further observes: 'In all probability they, like *Cynips lignicola*) Kollari and other *Cynipidæ*, propagate without the aid

of the male sex.' This observation was undoubtedly made in ignorance of the discovery made by Mr. Walsh in 1868. In the 'American Naturalist' for that year, the author records the fact of having himself bred both sexes of *Cynips spongifica* from galls of the black oak of North America. These galls resemble those of *Cynips Kollari*, being globular, rather larger than the European galls, but of the same hard woody consistency externally, and of the same spongy substance inside. Mr. Walsh adds: 'By the forepart or middle of June both male and female gall-flies eat their way out of a certain number, say about one-fourth part; the remainder are not developed until about two months later.' In a private communication from Mr. Walsh, I learnt that he had, like myself, bred hundreds of the gall-flies from galls collected late in the autumn, all these proving to be females; and that it was not until he made collections of galls in the summer, when a partial development of flies takes place, that he obtained the male, this sex being as one to many hundreds of females. At length he bred three males, one of which he kindly forwarded to me, and which I exhibited at a meeting of this Society. Following up Mr. Walsh's method of collecting the galls of *Cynips Kollari* early in the season,—that is, just at the time when they are becoming hardened, and before any flies have escaped from the fresh galls,—I have tried, but hitherto without success, to obtain males of *Cynips*; but I advise all who are interested in the matter to pursue the same plan, always remembering that these mysteries of Nature are only unfolded at intervals, and then only to favoured votaries. With respect to the obtaining of males of *Nematus gallicola*, I believe that anyone may collect, even early in the season, thousands of the galls of that insect without obtaining a male; but, in all probability, by persevering season after season, his efforts will, as in my own case, be crowned with success; but I feel assured that unless the galls are gathered before any of the flies have escaped he will have little or probably no chance of success. The same care must also be taken in collecting the galls of *Cynips Kollari*; collecting them early, just at the time when they harden and become woody, for it is out of the flies first developed that the male may be expected to be found. My having bred thousands upon thousands of flies without obtaining a male should prove a stimulus to others, for that a male exists I

think Mr. Walsh has determined beyond question. The impregnation of a single female may possibly be sufficient to render her progeny, and their descendants, for several generations, equally fertile; and the same may possibly be the history of *Nematus gallicola*. The male bred by Mr. Walsh is said not to belong to the restricted genus *Cynips*, but to one not represented in Europe. This may be the case; but in all essential generic characters it agrees in a remarkable manner: 'Spongifica,' like *Cynips* proper, has thirteen-jointed antennæ; the neuration of the wings is the same, and no difference is perceptible in the construction of the legs; the differences that are perceptible are in its abdomen being less compressed, and it is glabrous; there may be some other minor differences; the form of the thorax is apparently the same as that of *Cynips*. The question, 'Has *Cynips* a male?' remains, in the opinion of those who have attentively studied the group, unanswered; but surely more differences must exist between 'Spongifica' and the members of the restricted genus *Cynips* than a less compressed abdomen, and the absence of the downy pile that is observable on the sides of the abdomen of *Cynips* Kollari and its allies." A discussion ensued, in which Messrs. Dunning, M'Lachlan, E. A. Fitch, and others, took part; it appearing to some of the Members that there was still a considerable amount of uncertainty as to the precise generic rank of the presumed male *Cynips*.

Habits of a Lepidopterous Insect parasitic on Fulgora candelaria.—The President, who was unable to be at the Meeting, forwarded a paper, entitled: "Notes on the Habits of a Lepidopterous Insect parasitic on *Fulgora candelaria*, by J. C. Bowring; with a Description of the Species, by J. O. Westwood;" accompanied by drawings of the insect in its various stages. This curious insect, resembling a *Coccus*, had been brought to this country twenty-six years ago by Mr. Bowring; and on his return to India he had succeeded in rearing it to its perfect state, proving it to be the larva of a Lepidopterous insect, the general appearance of which induced the Professor to place it among the *Arctiidæ*. The larvæ were found attached to the dorsal surface of the *Fulgora*, and as they grew had a cottony covering, which also occurred in the pupa state (a period which appeared to be of very variable duration). The evidence appeared to prove that the larvæ fed on the waxy secretion of the

Fulgora, and the cocoon of the pupa was formed of the same substance. Prof. Westwood had previously noticed this extraordinary insect at the meeting of the British Association at Oxford in 1860, under the name of *Epipyrops anomala*.

SEPTEMBER 6, 1876.

J. Jenner Weir, Esq., F.L.S., in the chair.

Remedies for Attacks of the Harvest-bug.—Mr. Weir mentioned that, on a recent visit to the South Downs, he had suffered much annoyance from the attack of the harvest-bug, as many as eighty pustules appearing on each foot. Several remedies were suggested, especially rubbing the affected parts with brandy and water; but Mr. Smith stated that on one occasion when he was in the Isle of Wight, and exposed to their attacks, he had found that by taking a dose of milk of sulphur he was effectually relieved from all annoyance.

Enemies to Horse-chestnut Shoots.—Professor Westwood communicated a note with reference to some shoots of horse-chestnut, which he had exhibited at the July meeting of the Society, as having been destroyed, apparently by some Lepidopterous larvæ or wood-boring beetles; but he had since received from Mr. Stainton some shoots that had been forwarded to him by Sir Thomas Moncrieffe, which had been destroyed by squirrels in precisely the same manner. Sir Thomas had himself seen the squirrels at work splitting the shoots with their teeth and extracting the pith. Mr. Smith remarked that he had found the common buff-tip moth (*Pygæra bucephala*) very destructive of late to the Spanish chestnut, a tree on which the insect is not usually found.

Cræsus septentrionalis Bred.—Mr. Smith exhibited a series of sixty specimens of a sawfly (*Cræsus septentrionalis*), which he had bred from larvæ found feeding on young shoots of the alder, growing on the banks of the Sid, near Sidmouth, South Devon. The specimens of the fly were all bred in a single flower-pot, nine inches in diameter.

Mutilla europæa Parasitic on Bombus muscorum.—Mr. Smith also mentioned the fact of *Mutilla europæa* having been found parasitic on *Bombus muscorum*, by Miss M. Pasley, in an Orchard at Shedfield Grange, near Wickham, Hants. He also remarked on a coincidence somewhat remarkable, that on the day previous to his receiving Miss Pasley's communication, Professor Edward Brandt, of St.

Petersburgh, had informed him that he had found *Mutilla europæa* in a nest of *Bombus muscorum*; this being the first instance that had come to his knowledge of the parasite infesting the nests of that species of humble-bee.

Death of Mr. Edwin Brown.—We regret to have to record the death of Edwin Brown, of Burton-on-Trent, who has long been widely known for his great and varied knowledge of Natural History. His first contributions to scientific literature appeared in the year 1843, in the pages of the first volume of the 'Zoologist,'—quadrupeds, birds, insects, and shells, being the subjects,—thus early foreshadowing that breadth of study which he developed in later life. He continued to send various short papers to the 'Zoologist,' and afterwards contributed many and valuable papers to the Northern Entomological Society and the Midland Scientific Association. In 1863 appeared his chief work, the 'Fauna and Flora of the District surrounding Tutbury and Burton-on-Trent,' which formed a considerable part of the 'Natural History of Tutbury, by Sir Oswald Mosley, Bart., and Edwin Brown.' In 1865 and 1866 he read papers on Geology before the British Association; but for some years past his spare time was devoted almost entirely to Coleoptera, of certain sections of which he had formed magnificent collections. Unfortunately his published writings bear but small proportion to his vast store of information. Mr. Brown was a fellow of the Royal Geographical and of the Geological Society. He was born in the year 1818, and died at Tenby, of an apoplectic fit, on the 1st September, 1876.

Death of Mr. Blackmore.—We also have to record the death of Trovey Blackmore, son of the late Charles Philip Blackmore, who died at his residence, The Hollies, Wandsworth, somewhat suddenly, on the 3rd of September, 1876, in his forty-first year. As an entomologist Mr. Blackmore chiefly devoted his attention to Coleoptera. His writings consist of communications upon the Entomology of Algiers—in which country, his constitution being naturally delicate, he generally passed the winter—in the scientific serials of the day. He was also engaged upon a series of articles in the 'Miller,' on "Insects Injurious to Grain."

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Pachnobia hypoborea. By JOHN T. CARRINGTON.



PACHNOBIA HYPOBOREA (male and female).

As the year 1876 will hereafter be known amongst Lepidopterists as the "Alpina year,"—on account of the large number of specimens captured during the past season in the Highlands of Scotland,—some account of this species may be of interest. Before entering upon the history of its occurrence in Britain, I will explain its nomenclature.

Dalman was the first known entomologist who noticed this moth. He gave it the name of *Hypoborea* in MS.

Zettersdedt, in 1840, published his 'Insecta Lapponica,' in which this moth was first described. He adopted Dalman's MS. specific name, and placed it in the genus *Hadena*.

Humphrey and Westwood, in 1843, in their 'British Moths,' figure this species under the name of *Agrotis alpina*. The specimen from which this figure was made was that taken by Mr. Douglas on Cairn Gower, Perthshire, in 1839.

In 1847 the late Mr. Doubleday published the first edition of his catalogue of British Lepidoptera: there this species is called *Tæniocampa hypoborea*, with ? after Dalman, and with *alpina*, *Westwood*, as a synonym.

M. Guenée describes and figures it in 1852, in vol. i. (p. 342, pl. iv.) of his 'Species Général des Lépidoptères, Noctuelites,' as *Pachnobia alpina*; *Pachnobia* being a generic name of his own creation.

In the last edition of Doubleday's catalogue this species stands as *Pachnobia alpina*, *Westwood*, with *Carnica*, *Heer*, as synonym. The name *hypoborea* does not appear; why I know not.

Carnica is the name under which Hering describes this species, in 1869, in the 'Stettiner entomologische Zeitung.' *Heer*, given as the nomenclator by Guenée, is clearly a misprint of *Hering*.

Glacialis is the name used by Herrich-Schäffer, in 1849, to describe and figure this insect in his 'Systematische Bearbeitung der Schmetterlinge von Europa.' He gives four fine figures of this local red variety on plate 82, vol. ii.

Stainton, in his 'Manual of British Butterflies and Moths,' published in 1857, shortly, but clearly, describes it as *Pachnobia alpina*.

Dr. Staudinger, of Dresden, in his 'Catalog der Lepidopteren des Europæischen Faunengebiets,' 1871, does not refer to *Alpina*; but his species, No. 1098, is *Agrotis hypoborea*, *Zett.* As synonyms he gives *Aquilonaris*, *Zett.*, *Alpicola*, *Zett.*, *Iveni*, *Huber Hor.*; with *Carnica*, *Hering*, and *Glacialis*, *H.-S.*, as varieties.

Newman, in his 'Natural History of British Moths,' describes it under the name of *Pachnobia carnica*.

Carnica, *Her.*, and *Glacialis*, *H.-S.*, appear to refer to the same—the red—variety found in Central Europe.

The reader will observe that this moth has had the following generic names:—*Hadena*, *Agrotis*, *Tæniocampa*, and *Pachnobia*. A careful examination of a long series of Scotch and continental examples leads me to conclude that this insect is not closely allied to any member of the three former genera, neither in structure, superficial appearance, nor habits in any stage. Therefore, until otherwise proved,

I propose to retain Guenée's generic name. It should stand in future—

PACHNOBIA, Gn.

HYPOBOREA, Zett.

Being most closely allied to some members of the genus *Tæniocampa*, I propose to let it remain where it now stands in the British list of Lepidoptera; so that the only alteration necessary in our cabinets will be to remove the label *ALPINA*, and place it as a synonym below the new label *HYPOBOREA*.

The history of the British examples of this species is shortly as follows:—In 1839 Mr. Douglas took the first example of this moth, as above stated. In 1854 the late James Foxcroft took another, I believe, at Rannoch, in Perthshire. Then for a long period no captures were recorded in Britain. In 1870 Mr. T. Eedle took a specimen at rest on Schiehallion, a mountain in Perthshire: this specimen is, I believe, in the collection of my friend Dr. Battershell Gill, of Regent's Park. A fourth was bred from a pupa shaken out of moss, while hunting for Coleoptera, by Mr. Allin: this occurred in Braemar, in Aberdeenshire. This was followed by a capture of one, a female, by myself in the Breadalbane district of Perthshire, where it was flying in sunshine between two and three a. m., on July 10th, 1874. The same year Mr. Eedle again took a worn one near the site of his former capture. During the summer of 1875 I searched very diligently and constantly for this species on the very ground where it has been taken this year; also where I took mine in 1874. In this search I was accompanied by Dr. Buchanan White, of Perth, and Duncan Robertson, the schoolmaster of Camghouran, whom I had trained as a Lepidopterist. None of us saw any trace of it, although constantly on the look out for the then great rarity.

In the early part of August this year, Mr. Robertson sent me a moth for identification, which had been bred from a pupa shaken from moss upon one of the mountains south of Loch Rannoch. I at once saw my old friend *Pachnobia*. I wrote to him and told him to work for it, and he did so, taking a fine series. A little later I heard that Mr. Wheeler, of Norwich, with a friend, were at Rannoch, and had taken several specimens. Mr. Meek, too, was there, with two professional collectors; they also got some. So that amongst

these and others there was a goodly number taken, most of which I have had the good fortune to see.

Mr. Wheeler has especially shown great kindness in lending for use in the 'Entomologist' his fine series of eight specimens, two of which, male and female, I selected for figuring, and they appear at the head of this article.

In examining these *Pachnobia hypoborea*, I find the first notable character is the wonderful variety of the markings; I have scarcely seen two alike, and certainly not three. In Mr. Wheeler's series, independently of those figured, is one which represents the true variety *carnica*; it is nearly like Herrich-Schäffer's figure 421, in fact is devoid of all the conspicuous dark markings, with the reddish ground colour of *Noctua festiva*. Other specimens are of a deep rich red colour, with a bloom upon them like that upon a newly bred specimen of *Agrotis agathina*. But by far the most handsome specimen is one I have seen which has a ground colour of bright blue: this was taken by Mr. Robertson.

As regards their comparison with continental examples, those from Finmark are very constant in the markings, while those from Central Europe are quite as variable as those from North Britain; in fact, were the two series mixed, it would be impossible to separate them, unless differently set.

Dr. Staudinger, in his 'Catalog,' says this species occurs in Lapland, Alpine Norway, the Swiss Alps, Mountains of Silesia, and Hungarian Alps. He adds, in a short note in *E. M. M.*, p. 90, vol. xiii., "In 1860 I took this insect (in company with my friend Dr. Wocke), not unfrequently, in Finmark, in July; and we found pupæ, and also larvæ, at the end of May, in moss. Since then the species has been found on the Dovrefjeld in the centre of Norway, on the Riesengebirge (Silesia), and on the Alps of Switzerland and Tyrol. On the Alps of Carinthia it has a reddish (instead of bluish) coloration, and this form was described by Hering as *carnica*. * * * I saw in the Museum at Pesth a specimen, taken by the younger Frivaldsky in the Carpathian Mountains, which is intermediate between the two forms. * * * The species has a wide distribution on the Continent."

Mr. Wheeler, in a private letter, says:—"I think (writing of *P. hypoborea*) it is generally, though sparingly, distributed over the Perthshire mountains, above the level of 2000 or

2200 feet; what the upper limit may be I do not know. By day it hides closely amongst the rocks and heath, and at night the male flies wildly; the female I never saw on the wing at all." He also says he and his friend never took more than one or two on any night.

I think it probable that there will be few years in future without a recorded capture of *Pachnobia hypoborea* in Scotland; but I am not inclined to think it will be again taken in such number as has been the case this season, which was exceptionally hot and dry in the Highlands.

JOHN T. CARRINGTON.

Descriptions of Oak-galls. Translated from Dr. G. L. MAYR'S 'Die Mitteleuropäischen Eichengallen' by E. A. FITCH, Esq.

(Continued from p. 221.)

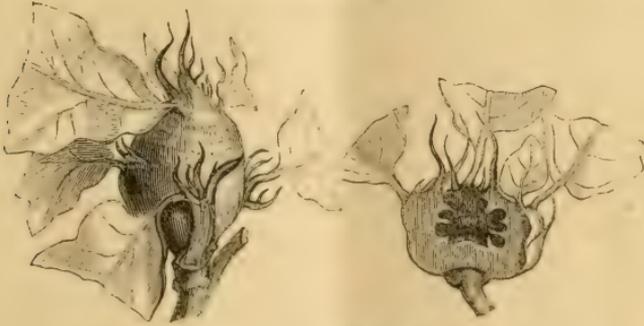


Fig. 59.—ANDRICUS CYDONIÆ (and in section).

59. *Andricus Cydoniæ*, Gir.—I hardly think I am wrong in closely connecting the development of the gall of this species, which also occurs on the Turkey oak, with that of the preceding one, and in stating that the principal difference between the two consists in the galls of *A. multiplicatus* having a rather flat disk surrounded by the crippled leaves, while those of *A. Cydoniæ* have a jug-shaped disk, from the top of which the more or less crippled leaves shoot. The gall appears either in the place of an axillar bud or at the end of a twig. It is either spherical or swollen into the shape of an egg, of the average size of a hazel-nut, green, and thickly covered with short gray hairs, which are either simple or twisted; on the basal half are several scattered

bud-scales on raised fleshy bases, which are developed into leaves towards the apex of the gall; a bunch of crippled, densely-crowded leaves grows out of and completely fills the mouth of the cup. The vertical section generally shows distinctly that the axillar part of the bud has not been developed in a longitudinal direction, but has been transformed into a cup, from the interior of which emanate the undeveloped leaves; and we further see that inner galls are sometimes formed from such leaves, and sometimes are developed from the axis, which proves that, strictly speaking, the gall of this species neither belongs to the true leaf- nor to the true bud-galls. The wall of the gall is at first sappy, but gradually hardens and becomes dry. It is difficult in some cases to distinguish this gall from that of *A. multiplicatus*. The flies emerge during the first fortnight of June.—*G. L. Mayr.*

Dr. Giraud, who found this gall on *Quercus cerris* at the end of May, but rarely, thus distinguishes it. Near *A. multiplicatus*, but “elle est toujours plus précoce, sa forme est mieux déterminée et elle n’est pas couvert des nombreux plis de la feuille qui distinguent cette dernière.” One inquiline and one parasite are recorded from it by Dr. Mayr in *Synergus thaumacera*, *Dalm.*, and *Megastigmus dorsalis*, *Fabr.*, both of which occur in the summer. Another Turkey-oak species not occurring in Britain.—*E. A. Fitch.*

60. *Andricus nitidus*, Gir.—Of this species I have but one

Fig. 60.



ANDRICUS NITIDUS.

specimen, collected by Von Haimhoffen, which I have had figured for want of a better, though it differs somewhat from the usual shape. According to Giraud the gall adheres to a side vein on the under side of the leaves of *Quercus cerris*, has a very short and slender pedicel, is spherical (the specimen figured is oviform), with a diameter of from four to six millimetres, is light green, and clothed with very short but thick matted hairs. The wall of the gall is moderately thick, of a spongy substance, and surrounds the larva-cell. It appears in October, and falls in about three weeks, but preserves its freshness for some time when on the ground: it gradually becomes gray,

and at last brown. Dr. Giraud obtained the fly in the following August.—*G. L. Mayr*.

From galls of this species Mayr bred eight specimens of *Synergus variabilis*, *Mayr*, from April to June of the second year, and one male of *Sapholytus Haimi*, *Mayr*, in June of the second year; but no parasite is recorded.—*E. A. Fitch*.

Life-histories of Sawflies. Translated from the Dutch of Dr. S. C. SNELLEN VAN VOLLENHOVEN by J. W. MAY, Esq.

(Continued from p. 8.)

NEMATUS CONSOBRINUS, *Voll.*

Imago and larva undescribed.

Nematus niger, subnitidus, ore, scapulis, pedibus anticis et posteriorem coxis pro parte pallide flavis, pleurarum macula, abdomine subtus, segmentorum margine supra et pedum posteriorum femoribus et tibiis fulvis.

For a long time I considered that the sawfly larva, which in our country feeds on the leaf of the gooseberry and often strips whole rows of bushes, was the same species as the *Nematus* which treats the currant bushes in the same way, and whose life-history I described in the second volume of this publication ('*Tijdschrift voor Entomologie*,' vol. ii. p. 69, pl. 4; *Nematus ventricosus*, *Klug.*, '*Zoologist*' for 1862, p. 8079). It was only after I had made a drawing, some years ago, of the full-grown larva that I began to think that for a mere variety the difference was rather great; and I then determined, if possible, to rear the insect, so as to be able to see in how far the imago corresponded with that of *N. ventricosus*.

After having reared some larvæ, taken in a garden at Leyden, but without any good result, I received some others from Haarlem, through the kindness of my friend Ritsema, and from these I obtained, in the spring of 1871, a sufficient number of imagos, which enabled me to satisfy myself that the newly-reared species from the gooseberry differs specifically from that, with which we are already well acquainted, living on the currant. I could find no description, either in Hartig or Stephens, nor in St. Fargeau or Dahlbom, agreeing

with my insect, so that I was obliged to bethink me of a name; and, in consideration of its near relationship to *Nematus ventricosus*, I called it *Nematus consobrinus*. The points of difference between the two species are shown in plate 10, and will appear from the following description.

After I had already been in possession of full-grown larvæ, some very young examples were sent to me on the 21st of May, 1870, from Haarlem (fig. 1): they had shining black heads and black thoracic legs; the body was sordid pale green, having a few, but rather large, black spots on the back and sides. The full-grown larvæ are represented at figures 2 to 6; the description is as follows:—Head shining green, with numerous little black spots on the vertex, placed in curved rows, and reaching to the clypeus; each of these spots bears a hair. Eyes in round black spots at each side of the head. Body cylindrical, with twenty feet; colour saggreen, with yellow and bluish green. The 1st segment is almost entirely yellow, as are also the large folds of the skin, or rather protuberances, on the sides of the 2nd and 3rd segments (faint); segments 4 to 10, and almost the whole of the 11th, are also yellow. The penultimate segment and the first half of the terminal segment are bluish, the other half of the latter being yellow. The dorsal line is very narrow, and somewhat bluer green than the ground colour. The segments have transverse rows of little, black, shining, wart-like spots, each bearing a hair. On either side of, and close to, the anus is a yellow spine, having a black tip.

The larvæ were in considerable numbers together; they were very voracious, and stripped a branch pretty speedily; their usual posture was that shown at fig. 3, or even a little more bent,—sickle-shape. About the 26th of May they changed their skin for the last time, when all the little wart-like projections or points, and all the hairs, disappeared. The head was now pale green, smooth and shining, but the eyes were still situate in round black spots; the jaws were brown. The body was of the same green tint as before, the dorsal line being blue and thicker; also there was more orange-yellow on the whole of the 1st segment, as also on the folds above the thoracic legs, and on large spots at the sides; the entire 11th segment was of this colour, as also the 12th, or last, at the anus.

From this time they scarcely took any more food, and descended to the ground; shortly after they spun up, some just below the surface and some above, among leaves. The cocoons were of two different sorts (figs. 8 and 9),—one of a chestnut-brown colour and very shining, as though varnished; the other straw-coloured, and less shining. With regard to this difference among the cocoons I simply attribute it to the greater or less vigour and healthy condition of the larvæ, the strongest larvæ producing the darkest-coloured cocoons.

Dahlbom mentions in his 'Conspectus' a *Nematus Grossulariæ* (the same as our *N. ventricosus*) and a *Nematus grossulariatus*; the latter was identical with his *Grossulariæ*, but constructed a single yellow cocoon on a twig, and not, as the other, a double cocoon of a black or brown colour in, or just on the surface of, the ground. It is evident that *Grossulariatus* was only a sickly example of *Grossulariæ*.

The cocoons spun by my larvæ were all single; both the brown and the yellow. One would have thought that larvæ which had become pupæ at the end of May would have produced imagos by June, and a second generation in July and August; however, this was not the case; and I found afterwards that the larvæ which I had got to spin up belonged to the second generation of that year. I never succeeded in rearing the perfect insect, except in March, 1871, from larvæ which had spun up at the end of May, 1870; and the imagos of that month paired and laid eggs, whence larvæ were produced, which would again have been full grown in May. From this it appears that the species in question has two early broods, and no summer or autumn brood. Between the 18th and the 22nd of March I obtained ten females and one male. They *all* differed from *Ventricosus* in the coloration of thorax, abdomen, and coxæ. The following is a description of the female, taken from a living specimen (see figs. 10 and 11):—Head dark brown, approaching black; the margins of the eyes, however, being yellowish. Eyes black. Trophi sordid white, with the exception of the tips of the mandibles, which are black. Antennæ entirely black. Dorsum of the thorax black, with a brown reflection; the pronotum, however, being yellow. Pectus black; only on the pleuræ, which are very shining, is an oval space of a red-brown colour, gradually

fading into black, giving an appearance similar to polished tortoiseshell. Wings yellow at their insertion; radius pale as far as the stigma; the latter, together with nervures, dark gray; membrane of the wing iridescent. Abdomen brown-yellow, having on the dorsum six black transverse lines (basis of the segments), diminishing in thickness towards the anus. All the coxæ black at the base, or with a black line towards the outer side; femora red-yellow; tibiæ yellow, the posterior pair being one-half blackish. Anterior tarsi having the ends of the joints brownish; posterior tarsi rather dark.

The only male I possessed was black on the upper side, the ventral surface and the legs being yellow. The antennæ were pretty robust, somewhat hairy, and entirely black. The head was black, with the exception of the trophi; and in these again the extreme points of the mandibles were black. The thorax was black, with the exception of the pronotum (yellow); scutellum black. The insertion of the wings was yellow; the principal nervures and the stigma deep brown. The dorsum of the abdomen was black, the margins of a brownish orange tint; the under side was also of this colour, but on the upper side the margins of the segments were yellowish. Legs yellow; the four anterior tarsi pale brown at the tips; the posterior coxæ had a black smear at the base; the posterior tibiæ for one-half and the posterior tarsi sordid brown.

It will be seen on comparison that there is a very great difference in the imagos between the present species and Klug's *Ventricosus*. It may be said that in general this new species is much more darkly marked.

As my insects died without having paired with the only male which I had succeeded in rearing, I requested Mr. Ritsema, who had got me the last examples from Haarlem, to see if he could send me some eggs. With a readiness for which I cannot sufficiently thank him he brought me a female from the same bushes, which female while in confinement had laid eggs on leaves of twigs placed in water. There was not the least doubt that the insect belonged to the same species.

To my astonishment I observed that the eggs were not placed, as I supposed they would have been, in the nervures

of the leaves, but were simply, and thus without the help of the saw, stuck here and there on to the under side of the leaf (see fig. 13). The eggs were cylindrical, and rounded off at either end (fig. 14); they were very small, of a yellow colour, smooth and shining. In the most developed ones a difference of colour could be observed between the middle and the extremities; whilst the latter remained green the middle became paler in colour, but afterwards more confused with markings; in fact, at last one could make out through the walls of the egg a little head with two black eyes. From two of these eggs young larvæ were developed in my room; they crept about half-way out of the shell, but were not able to liberate the whole of the body. It appeared to me very singular that one of these half-born larvæ began to feed, and, considering the size of its body, managed to eat a pretty large hole out of the leaf. However, they both soon died; probably in consequence of the very abnormal condition in which they were.

Note.—It is possible that this species may be the undescribed *Nematus cylindricus* of Dr. Th. Hartig (see *Entom. Zeitung.*, vol. ii. p. 24, No. 39).

Are the Colours of Lepidoptera influenced by Electricity?

By J. JENNER WEIR, Esq., F.L.S.

THE following history of an attempt to produce varieties of *Chelonia caja*, by feeding the larvæ upon other than the natural food-plants, is translated from No. 154 of the 'Petites Nouvelles Entomologiques':—

"*Chelonia caja* may well be considered injurious. In the Gatinais, where the vine is much cultivated, *C. caja* is found almost exclusively in the vine districts. It usually feeds on dandelion, groundsel, milfoil, and other low plants which grow in the furrows; but in a dry spring, when the grass fails, and the peasants take all they can find for their cattle, the caterpillars remorselessly devour the buds and young shoots of the vine. The vine dressers are well acquainted with the caterpillar, and the mischief it does in some years is really serious, for it is so common that a couple of hundred may easily be collected in an hour.

“As is well known, *Chelonia caja* is one of the most variable of species. Variation amongst insects is a question not less interesting than evolution, and by what circumstances it is produced has not yet been satisfactorily ascertained. Without pretending to have solved the problem, I will briefly relate the result of some experiments I have made with this species, of which I have had *six thousand* under my care. I had an idea, in common with other entomologists, that the food of the larva might influence the colour of the perfect insect. I therefore made separate trials with walnut, horse-chestnut, sumach, box, celandine, carrot, and lettuce; and some I have reared in complete darkness. It will be easily understood why I chose food so diverse. With the walnut, chestnut, and sumach,—trees having a bitter-sweet flavour,—I hoped to produce melanite varieties; with the box, carrot and celandine, yellow varieties; with the lettuce, light varieties; and from those kept in total darkness I hoped to obtain complete albinism.

“These, however, are the results of my experiments:—The walnut, chestnut and sumach killed many larvæ; a few, however, reached the perfect state, but they were mis-shapen, half-abortive and crippled; in fact, only worthy of figuring in a museum of curiosities. The box was eaten for a few days, but the larvæ would then eat no more; and as I did not change the food they all died of starvation. The celandine was eaten greedily; the greater part of the larvæ formed chrysalids, but all perished in the cocoon except one, which not having sufficient strength to develop emerged a cripple, without indicating any kind of variety. As for the carrot, I found nothing worthy of recording. The lettuce only produced pale, dull, discoloured specimens. Those brought up in total darkness all perished in the third change. Such is the account of my experience: food-plants so diverse as to give fair expectation of good varieties produced none worth record. The few varieties which are in my cabinet were all from larvæ bred on the usual food-plants, *viz.* dandelion, chickweed, dock, groundsel, plantain, &c. I have, however, remarked that it was always during *storms*, when the air was charged with electricity, that the varieties emerged. Is it possible that electricity is a chief agent in the variation of Lepidoptera?”

This drew forth the following communication from M. E. Bellier de Chavignerie :—

“Under the title of ‘Simple Notes’ there have appeared, in ‘Les Petites Nouvelles Entomologiques,’ several interesting articles by M. le Marquis de Lafitole regarding observations about Lepidoptera, which he has made during several years. In one of these articles M. de Lafitole, in writing of *Chelonia caja*, gives an account of some experiments which he made in order to obtain varieties of this very variable species, and concludes by suggesting whether electricity is not one of the principal causes of variation among Lepidoptera.

“This opinion of M. de Lafitole on the influence which electricity may have in causing varieties, coincides with that expressed by me many years ago in a ‘Note on the Accidental Variation of Lepidoptera,’ published in the ‘Annales de la Société entomologique de France,’ 1858, p. 299, and to support it I related a very remarkable fact which I had witnessed. The note is as follows:—‘On the 15th of August, 1847, I was in a locality where *Lycæna Adonis* is found in abundance, in order to obtain a supply of its food-plant. The heat had been intense for several days, and a storm was evidently at hand. In fact, I had scarcely arrived at the hunting-ground, and had only time to pin my first five *Adonis*, when a violent storm burst and forced me hastily to return. What was my astonishment, on leisurely examining my captures at home,—the result of an excursion so suddenly interrupted,—to find that the colour of my five *Adonis*, which had emerged but a few hours, was a beautiful lilac, instead of the bright blue which is so noticeable in all the *Lycænidæ*. It was in vain that I frequently revisited the same locality; never again did I see this curious aberration. It would have been interesting to know whether all the *Adonis* which emerged on the 15th of August, 1847, in the same locality, under the influence of an atmosphere highly charged with electricity, were affected in the same way as the five specimens that I took on that day.’

“My reason for recording this incident—which is, alas! thirty years old, and which the labours of M. de Lafitole have brought to mind—is to draw the attention of entomologists to the subject, and to advise them to direct their investigations to, and to increase their experiences in, the

important part played by the electric fluid in the creation of varieties. Here is still a vast field for exploration."

With reference to the above notes I can scarcely deem it probable that electricity can be a "chief agent in the variation of Lepidoptera;" it is quite possible, however, that so delicate a blue as that of *Lycæna Adonis* might be affected by the moisture of the atmosphere during a storm. I once took some specimens of *Procris globulariæ* but just emerged, and then of a beautiful green colour; I placed them in a damp box, and was surprised, when proceeding to set them, that they were all of a dark bronze colour, but when they became dry they resumed the bright green colour. Still as the colour of Lepidoptera often does not arise from a pigment, but varies, apparently, according to the direction in which the light falls upon the scales, the same effect might be produced during a storm in the mode in which the scales overlapped each other. I once took, and still possess, a specimen of *Lycæna Icarus*, in which one of the wings, as compared with the other three, is decidedly of a more lilac colour. I have also seen specimens of *Procris statices*, which were of a bronze colour; but whether they emerged green I am not able to say. I believe that most of the cases, if not all, in which an attempt has been made to produce varieties of Lepidoptera, by feeding the larvæ on different kinds of food, have yielded but a negative result.

J. JENNER WEIR.

6, Haddo Villas, Blackheath,
October 13, 1876.

Description of the Larva of Eurymene dolabraria.—Length an inch and a half; head notched and rounded on the crown, rather smaller than the 2nd segment. When at rest, with the mouth tightly pressed to the legs, the first three segments much resemble a miniature dog's head, the head of the larva representing the dog's nose, and the protuberances of the 3rd segment the ears and crown of the animal's head. Head reddish brown, assuming a mottled appearance on the cheeks; 2nd and 3rd segments blackish brown, each increasing in size, the 3rd considerably so, especially at the sides, giving the larva when at rest the singular appearance mentioned above. Body, beyond the 3rd segment, with the exception

of the 9th, nearly uniform in size; dorsal surface reddish brown; the 4th segment has four very small black dots, arranged transversely on the 5th, 6th, 7th and 8th segments; these dots are arranged in pairs, the hinder pair being rather farther apart than the other two; the 9th segment bears a rounded protuberance of a colour slightly darker than that of the four preceding segments, and bounded anteriorly by a black band; the 10th, 11th and 12th segments are of much the same shade as the main portion of the body, and have the four black dots nearer together longitudinally; the anterior pair on the 9th segment are situated just behind the black band; the posterior pair behind the protuberance. The lateral skinfold is of a lighter shade of brown than the dorsal surface; the spiracles black, surrounded by a light-coloured ring. The claspers and anal flap are of the dark reddish brown of the 2nd and 3rd segments; on the ventral surface the 5th and 6th segments are marked with two large black spots, situated in close proximity to each other; the spots on the 7th, 8th and 9th segments are smaller and farther apart; the light shade of the lateral skinfold is continued on the posterior half of the ventral surface of the 5th, 6th, 7th and 8th segments, in the anterior portion of which the spots are situated. I am indebted to Mr. J. G. Ross, of Bathampton, and Mr. Peters, of Crawley, for a supply of this larva.—[*Rev.*] *P. H. Jennings; Longfield Rectory, Gravesend.*

Entomological Notes, Captures, &c.

Pyrameis Huntera in *South Devon*.—A very beautiful specimen of this insect was taken by Miss Caroline L. Pole Carew on the 20th September, at Antony, near Torpoint. I had the great pleasure of seeing it on her setting-board this afternoon. On reference to 'Morris's British Butterflies' I see a record of one taken at Withybush, Haverfordwest, South Wales, in July or August, 1828.—*G. C. Bignell; 6, Clarence Place, Stonehouse, September 23, 1876.*

[The above notice of the capture of *Pyrameis Virgeniensis*, *Dru.* (= *Huntera*, *Fabr.*), is interesting, as showing how insects from far distant localities frequently occur as foreign visitors to this country. There are several previous records

of the occurrence of this butterfly in Britain; chiefly from our southern coast. Its natural home is the eastern part of North America; it has no other permanent habitat. There, in some districts, it is as common as its ally *P. cardui* is here. On receiving this communication I wrote for further information to Mr. Bignell. He replies:—"I have made every enquiry, and cannot trace any plant or anything which has been imported from America into the extensive grounds where *P. Huntera* was taken. The Plymouth docks are—in a direct line—about four miles off; so that it may have been imported in one of the many troop-ships which lie there." *Virgeniensis* was first described by Drury, in his 'Illustrations on Natural History,' in 1773; and in 1775 Fabricius described the same species, under the name of *Huntera*.—*John T. Carrington.*]

Vanessa Antiopa in the Isle of Wight.—On the 14th of October *Vanessa Antiopa* was captured here by a fisherman. Unfortunately the insect was destroyed before I saw it, and I only saw the remains.—*Talbot K. Crossfield; Shanklin College, Isle of Wight.*

Colias Edusa at Handforth.—*Colias Edusa* has been seen in some numbers at Handforth, a village in Cheshire, about eleven miles south of Manchester, by a friend of mine while out rabbit-shooting. He saw many, and caught one male, which he brought to me this morning. This is a very unusual occurrence in this neighbourhood.—*H. H. Corbett; Cheadle Hulme, near Stockport, September 20, 1876.*

Colias Edusa var. *Helice* in South Wales.—I had the pleasure of taking a rather fine female specimen of *C. Edusa* var. *Helice* on September 4th, at a small village called Pendine, about fifteen miles from Tenby. As I had no net at that moment, I immediately gave chase with my hat, and succeeded in capturing it. When it was on the wing I mistook it for *C. Hyale*; but to my great delight it was otherwise. *C. Edusa* is very plentiful in this locality, and I have reared a good many.—*A. E. Wileman; Langharne Villa, Chertsey Road, Bristol, September 8, 1876.*

Colias Edusa.—About a week ago Mrs. Boley captured a female specimen of *Colias Edusa*, which, on being confined under a glass shade with some sprigs of lucerne, laid a few eggs. Some of these eggs have just hatched, and the larvæ

have commenced feeding. I had always understood that eggs of this species were laid in the spring by hibernated females.—*W. A. Luff; Guernsey, September 18, 1876.*

Colias Edusa.—The contributions you have lately published respecting *Colias Edusa* and *C. Hyale* embolden me to offer for record an instance of eggs of this species being laid before winter. On the 12th of August I captured a fine fresh female *C. Edusa* at rest: she laid in confinement ten eggs, exactly corresponding to the description in 'British Butterflies.' From these there emerged on the 18th August several larvæ; only two, however, lived for more than two or three days. These two fed well and grew fast till the 9th of September, when one died during a change of skin; the other, however, lived and grew fast till the beginning of this month, when it was killed by accident. At this time it was probably within ten days of changing, and still feeding fast.—*J. R. Phelps Farquharson; Windsor, October 12, 1876.*

Ravages of Pieris Brassica.—The larva of this insect has appeared near here in very great abundance this year. A turnip field near this town has suffered greatly from its ravages, the foliage of the turnips in many parts of the field being entirely eaten off.—*W. D. Cansdale; Witham, Essex, September 23, 1876.*

Lycæna argiolus.—I am pleased to be able to record a new food-plant for this species. Mrs. Boley, a lady much interested in rearing Lepidoptera, induced a female of *Lycæna argiolus* to deposit its eggs by enclosing it under a glass shade with some ivy blossom and other flowers. It took no notice of the ivy, but laid its eggs on blackberry (*Rubus*) blossom. The young larvæ are now feeding on the pollen of these flowers.—*W. A. Luff; Guernsey, September 18, 1876.*

Sphinx Convolvuli in Orkney.—In the autumn of last year *Sphinx Convolvuli* was abundant at Swanbister, on the south coast of the Mainland of Orkney, about half-way between Kirkwall and Stromness. The first I took was on the evening of the 12th August, 1875; and I saw several every night until the 16th or the morning of the 17th, when I left Orkney for the south. A week afterwards my niece, Miss Irvine Fortescue, in a letter, said—"The large moths have been in the garden in numbers every evening since you left." I caught ten specimens flying over honeysuckle and single

pheasant's-eye Pinks, mostly at the former. They appeared about eight p.m., and ceased flying about nine; but after packing up on the morning of the 17th I went out about one a.m., and heard the "whirr" of the moth. So I lighted a lantern, and in a few minutes caught four specimens. They were in fine condition when caught, but got much damaged in transit, as I had no means of packing them with me. I have no doubt they were bred in Orkney; but on what can the larvæ have fed? There is no *Convolvulus* in Orkney, so far as I know; for though Neill gives *C. arvensis* as an Orkney plant, no one has found it there since.—*J. T. Boswell; Balmuto, near Kirkcaldy. [From the 'Scottish Naturalist.']*

Sphinx Convolvuli at Clifton.—On the 13th of October I took a specimen of *Sphinx Convolvuli* in the conservatory attached to Granby House.—*W. K. Mann; 14, Wellington Terrace, Clifton, Bristol.*

Sphinx Convolvuli at Winchester.—I took a very fine specimen of *Sphinx Convolvuli*, while hovering over a bed of geraniums, in this city, during the first week of September.—*E. F. Johns; Winton House, Winchester.*

Deilephila Galii near Norwich.—On the 11th of August Mr. James Stally captured a fine specimen of *Deilephila Galii* at Lakenham, Norwich.—*John Parker; 6, Surrey Terrace, September 30, 1876.*

Deiopeia pulchella and Sphinx Convolvuli near Christchurch.—Some of your readers may be interested to know that *Deiopeia pulchella* has appeared this season in the neighbourhood of Christchurch. On the 6th of October, while walking with my pupils on the sand-hills between Christchurch and Bournemouth, I caught two fine specimens of this beautiful insect, evidently only recently emerged from the chrysalis. Unfortunately one made its escape, but the other is now on my setting-board. A few days previously one of the boys gave chase to another near the same place, but falling among the ferns he lost sight of it. I think this is the first instance of three having appeared at the same place during the same season. I have also to record the capture of a fine specimen of *Sphinx Convolvuli* on the 2nd of October, by one of my pupils.—*W. McRae; Christchurch School, Hants, October 11, 1876.*

Deiopeia pulchella at Bournemouth.—My pupils and

myself have had the good fortune to take within the last few days five specimens of this insect. They were all captured on the moorland close to the sea, either at rest or kicked up by the feet in walking. I hear also that another one has been taken in this locality.—[Rev.] *E. Brackenbury*; *Saugeen, Bournemouth.*

Deiopeia pulchella at Brighton.—A fine specimen of *D. pulchella* was captured by my son Charles on the 3rd inst., between five and six p.m., on the Race Hill.—*N. McArthur*; 3, *Toronto Terrace, Brighton, October 12, 1876.*

Deiopeia pulchella in Suffolk.—One of my pupils, Mr. C. J. Gross, found a fine *Deiopeia pulchella* in a stubble field at Rickinghall, in Suffolk, at the beginning of this week.—[Rev.] *A. H. Wratislaw*; *School Hall, Bury St. Edmunds, October 20, 1876.*

Deiopeia pulchella in the Isle of Wight.—Last year, on the 8th of July, I took a specimen of *Deiopeia pulchella*, which has not been hitherto recorded, in a field on the top of the cliff at Shanklin. Last Monday, October 16th, I had the good fortune to capture another specimen within about three hundred yards of the same spot. It was a female, and looked as if it had only just emerged from the pupa.—*Talbot K. Crossfield, Shanklin, Isle of Wight, October 19, 1876.*

Cucullia scrophulariæ.—I find that my remarks on this species, in the October number of the 'Entomologist' (Entom. ix. 233), have been in some measure misunderstood. I did not question the occurrence of the species in this country, but simply stated my own experience, and asked for well authenticated records of its *recent* occurrence. Nor did I wish to imply that Mr. Doubleday had no British specimens in his collection, but simply said that he kindly sent me two foreign specimens as types. On referring to his letter, however, dated March, 1870, I find that I had completely forgotten one well authenticated instance. This is what Mr. Doubleday says on the subject:—"Cucullia verbasci and *C. scrophulariæ* are as distinct as any two species of the genus; but I believe that few English entomologists are acquainted with the latter species, which appears to be very scarce in this country at the present time. The Rev. A. H. Wratislaw, of Bury St. Edmunds, found a brood of larvæ three years since, but he has not met with them again.

M. Constant says it is sometimes abundant in autumn, and then disappears for several years. I sent three or four larvæ to Mr. Buckler, and bred a few moths myself. The larva is quite different to that of *C. verbasci*, being shorter and with fewer markings. The moths appear the middle or end of May, a month or six weeks later than *C. verbasci*. I send for your acceptance a pair which M. Constant gave me. You will see that this species is more like *C. lychnitis* than *C. verbasci*. The larva of *C. verbasci* often feeds upon *Scrophularia aquatica*, but I believe *Schropulariæ* only feeds upon *Scrophularia nodosa*, which always grows in dry places."—*W. H. Harwood.*

Eupithecia Larvæ in Ireland.—Towards the end of August I was staying with friends near Queenstown. I had little or no opportunity of collecting, but one day I went out for about half an hour and beat the flowers, growing at the edge of the wood and between it and the sea, into an umbrella. The flowers were *Senecio Jacobæa*, *Angelica sylvestris*, *Solidago virgaurea*, and *Eupatorium cannabinum*. On the *Senecio* the larva of *Eupithecia virgaureata* was common, much more so than *E. absynthiata*, which occurred sparingly on this plant and the *Eupatorium*, together with *E. pumilata*, *E. coronata*, and *E. castigata*; on the *Angelica* there were plenty of small larvæ of *E. albipuncta*. The buds of *Clematis flammula* in the garden were much eaten by the larva of *E. isogrammata*. During a short visit to Killarney I found the larva of *E. satyrata* feeding upon the flowers of *Scabiosa succisa* in the wilder parts of the Gap of Dunloe.—[*Rev.*] *H. Harpur Crewe*; October 4, 1876.

Pyralis verticalis in Westmoreland.—In August I took this "pearl" at Witherslack; and I saw a specimen captured near here a short time ago. This is the first time I have known of its occurrence so far north. My mind always associated it with the neighbourhood of London: probably the railways bring specimens amongst us.—*J. B. Hodgkinson*; 15, *Spring Bank, Preston, September 11, 1876.*

Bees making Comb in a Hedge.—My neighbour Mr. Rowland, of Crestow, has just communicated to me the following singular circumstance. In the latter part of the month of June he had a swarm of bees, which, instead of settling in the immediate vicinity of the hive, flew away. As the swarm

was a small one, and its course of flight lay across some fields of tall mowing grass, he did not think it worth while to follow them. At the commencement of harvest the labourers on the farm discovered in a hedge, which lay in the line of flight of the wandering swarm, a mass of honeycomb, tenanted by a family of busily working bees. The mass consisted of three combs, the centre one about eight inches in length, flanked by two shorter ones on either side. There was a fair amount of honey in the comb. It was Mr. Rowland's intention to take the nest and present it to some museum, but unfortunately some cattle got into the field and destroyed it before he could carry his purpose into effect. The hedge in which the comb was built was in no way sheltered or protected.—[Rev.] *H. Harpur Crewe*; *Drayton-Beauchamp Rectory, Tring, October 5, 1876.*

Heliothis armiger.—Last autumn, while staying in the Isle of Wight, I found some larvæ feeding on the flower-heads of scarlet geranium. There was so much variety in their colour that I made no attempt at delineating them. The markings, which were almost suppressed in the brown specimens, were very distinct and ornamental in the green. They were so numerous that I supposed them to be the larvæ of a common moth, and did not keep more than half-a-dozen. I tried to feed them on other flowers, but they ate nothing but the flower-buds and petals of geranium. They were in the act of changing to the pupa state when I left the place, and in the journey were injured, so that only one has emerged. August 1st.—It proves to be *Heliothis armiger*. The pupa was light brown, the wing-cases greenish; in a few months it darkened in colour. The shell was so thin as to be almost transparent.—*H. M. Golding Bird*; 45, *Elgin Crescent, Kensington, October 13, 1876.*

Pachytylus migratorius (*the true Locust*) near Wells.—I have often had "locusts," so-called, sent to me; but they have generally proved to be the large green grasshopper (*Acrida viridissima*), or larvæ of the privet, or of the death's-head hawk-moth. But last week a specimen of the true locust (*Pachytylus migratorius*) was brought to me, found at Woodford, near this city, in a bean-field. The specimen is identical with some I have in my cabinet from Egypt and Australia, the wing-cases being of a speckled-brown colour,

and the true wings greenish; and it measures about four inches across the wings. It is the first specimen I have ever seen alive.—*H. W. Livett; Wells, Somerset, September 6, 1876.*

Answers to Correspondents.

J. Peters.—*Orgyia pudibunda* Double-brooded.—Can you inform me if it is an unusual occurrence for a second brood of *Orgyia pudibunda* to appear in one year? I took some larvæ in the hop gardens in Kent during September, 1875. Imagos emerged May 8th, 1876; female laid eggs on 9th of May; the young larvæ appeared June 15th (thirty-eight days). They went to pupa July 29th. The second brood emerged October 9th, one male and three females; on the 11th two more appeared, male and female. The latter deposited a batch of eggs. Will the latter hatch during the cold season, or will they remain until the spring?—*John Peters; 8, Belgrave Road, St. John's Wood, N.W., October 19, 1876.*

[It is not unusual; your eggs will probably not hatch until early spring.—*Ed.*]

L. Benson.—*Name of a Moth.*—I caught a moth on the bracken, on the 18th of July, which had evidently only just come out. The antennæ are brown, the head is green, and the body nearly white; the fore wings are green, with three transverse white lines, which are bordered with darker green; the hind wings are white. I cannot find it in Newman's 'British Moths.' Will you kindly tell me what it is?

[The moth you have taken is *Halias prasinana*. It is by no means uncommon. The reason you did not find it described in Newman's 'British Moths' is that it is a Micro-Lepidopteron,—a Tortrix.—*Ed.*]

E. G. Browne (Eton College).—The pupæ, of which you and a companion found two hundred and sixteen by digging at the roots of a row of eight elm trees, are probably those of members of the genus *Tæniocampa*, in large proportion. These will emerge in the spring.—*Ed.*

N. Manders (Marlborough).—*Eremobia ochroleuca* is not uncommon, and is generally distributed south of York. Wasps frequently kill and eat Lepidoptera in their imago and larval states. To rear *Liparis dispar* give the young

larvæ leaves of whitethorn, plum, or apple, and feed liberally until they become pupæ.—*Ed.*

Extracts from the Proceedings of the Entomological Society of London.

OCTOBER 4, 1876.

Sir Sidney Smith Saunders, C.M.G., Vice-President, in the chair.

Crymodes exulis, Sericoris irriguana, &c., near Loch Laggan.—Mr. Bond exhibited, on behalf of Mr. N. Cooke, of Liscard, near Birkenhead, a female variety of *Hepialus humuli*, pale in colour, and with the usual markings; three fine specimens of *Crymodes exulis*; fifteen very fine dark (some nearly black) specimens of *Epunda lutulenta*; and six specimens of the Tortrix, *Sericoris irriguana*. All the above were taken near Loch Laggan this season.

Callimorpha Hera near Dover.—Mr. Stevens mentioned that a specimen of *Callimorpha Hera* (the Jersey tiger-moth) has been taken at St. Margaret's Bay, near Dover.

Worm in Abdomen of Earwig.—The Secretary read a note from the Rev. Fitzroy Kelly Lloyd, of Pittenweem, N.B., enclosing for inspection a worm measuring two inches in length, extracted from the abdomen of an earwig. Mr. Pascoe said that it was one of the Nematode worms, and was probably a *Filaria*.

Weevil new to Britain.—Mr. Forbes exhibited a weevil (evidently not indigenous to Britain), taken alive amongst some orchids at Highgate, supposed to have been imported from Ecuador. Mr. Pascoe pronounced it to be a *Cholus*. He subsequently gave a diagnosis under the name of *Cholus Forbesii*.

Variation of Lepidoptera according to Food.—Mr. William Cole exhibited numerous bred specimens of *Ennomos angularia*, bred from eggs laid by the same female, showing slight differences according as the larva had been fed on oak, hawthorn, lime, or lilac, and comparing them with a number of specimens taken at large. In all cases the yellowish tint of the captured specimens was more decided.

Locality for Food-plant of Deilephila Euphorbiæ.—A letter was read from Mr. E. Higgins with reference to some

specimens of *Deilephila Euphorbiæ*, exhibited at a meeting of the Society on the 17th of September, 1873, which were then stated to have been captured in the larva state in the neighbourhood of Harwich. Some doubt was expressed at the time, as it was stated that the food-plant did not grow in that neighbourhood; but about the middle of September last he had visited Harwich, in company with Mr. E. W. Janson, and they were afterwards joined by Mr. Durand (from whom he had received the specimens of *D. Euphorbiæ*), who undertook to show them the place of capture; and they not only found the food-plant growing there, but in three other places nearly half a mile further on.

Descriptions of New Species of Cryptoceridæ.—Mr. F. Smith communicated "Descriptions of New Species of Cryptoceridæ, belonging to the genera *Cryptocerus*, *Meranoplus*, and *Cataulacus*," accompanied by a plate containing figures of all the species, twelve in number; thus raising the number of species described by him to forty-eight. The descriptions were preceded by some interesting particulars relative to the habits of these insects, especially of *Meranoplus intrudens*, which constructs its formicarium in the thorns of a species of *Acacia*, some four to five inches in length; and at a distance of about half an inch from the pointed end a small round hole was made by the ants, which served for ingress and egress to and from the nest. The thorns contained a kind of spongy pith, in which the channels and chambers of the nest were constructed.

New Part of the Society's Catalogue of British Insects.—'A Catalogue of the British Hemiptera-Heteroptera and Homoptera (*Cidaria* and *Phytophthires*),' compiled by Messrs. J. W. Douglas and John Scott, was on the table. This was the fifth Catalogue of British Insects published by the Society.

Haggerston Entomological Society.—The Annual Exhibition of the Haggerston Entomological Society will be held at 10, Brownlow Street, Dalston, on Thursday and Friday, November 9th and 10th, from Six to Eleven p.m.; and on Saturday, the 11th (special), from Six to Ten p.m. Admission on Thursday by tickets only, which can be obtained of the Secretary, 48, Hadley Street, Kentish Town, N.W.

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[PRICE 1s.

Danais Archippus in Sussev. By Rev. THOMAS E. CRALLAN.



LARVA OF DANAI8 ARCHIPPUS.

FOR some two or three years there have been rumours of the appearance in this neighbourhood of an unusual butterfly. The different people who have told me what they have seen have varied so much in their descriptions that it would be very difficult to believe that they had not seen as many different species, if it were not that persons not thoroughly familiar with the objects they attempt to describe are so very apt to give the most opposite descriptions of the same thing.

One lady saw a butterfly in her greenhouse, which she was sure was like some she had seen in India; but, neglecting to shut the windows before attempting to capture the insect, she had the mortification of seeing it escape. Another lady described to me a butterfly, which she had seen, as white, with a blue rim round its wings. I thought she had seen *Vanessa Antiopa*, and, being dazzled by sunlight, had transposed the colours. Then, another lady saw a butterfly drying its wings on the stem of a tree after emerging from the chrysalis, and described it as yellow, with black lines across its wings. Of course this was the appearance of the

under side, and was very puzzling, though, as it turns out, fairly accurate. Waiting till one of my party should pass that way, but occasionally looking at it, she allowed the day to slip away, and going to capture it in the evening—of course it was gone. Then my sister, who has been familiar with the habits and flight of our English butterflies from early days, and has observed those of insects in Southern Europe, brought me word that she had seen a butterfly unlike any English one she knew, and more resembling, in flight and general appearance, some which she had seen in the South of France. I was still too incredulous to make a search in the vicinity for the stranger, and did not come across it accidentally in my rambles. However, on the evening of October 17th, my housemaid brought me a collar-box, with the information that a young labourer, living about a quarter of a mile off, had caught a "bug" in a field at the back of his house at dinner-time, and thought I should like to have it. (Every insect is called a "bug," hereabouts.) From long experience I expected a larva of *Cossus ligniperda*, but on applying my ear to the box I heard a rustling of wings; and, opening it very carefully, beheld a fine specimen, almost perfect, of *Danais Archippus*.

We are an entomological household, and the excitement generated amongst us by the sight of so grand an insect fluttering in a gigantic cyanide bottle, to which it was at once transferred, may be more easily imagined than described. Upon setting the specimen the next morning I found a scratch across the corner of the left-hand upper wing, and a very slight rubbing of the upper surface, but that the lower wings were still wrinkled, showing that it had not long emerged from the chrysalis. Altogether, considering it had been caught in a hat, and kept seven hours in a box before it came into my hands, it may be considered in very good condition.

I have had the pleasure of showing the insect, soon after capture, to Mr. Jenner Weir and Mr. Douglas, of H.M. Customs, and of leaving a tolerably accurate drawing of it, natural size, with the former gentleman.

Considering the rumours mentioned above, I am inclined to hope this beautiful insect may have become naturalised in this district. I cannot understand this having been an

imported specimen, as we are forty miles from London, and sixteen or seventeen from Shoreham,—our nearest seaport,—to which, I think, no American ships come. If you can furnish any particulars as to larva, food-plant, chrysalis, and their respective seasons, which may help me in my search for it next year, I shall be much obliged.

THOMAS E. CRALLAN.

Hayward's Heath, November 6, 1876.

Danais Archippus. By J. JENNER WEIR, Esq., F.L.S.

THE specimen of *Danais Archippus*, which Mr. Crallan was kind enough to exhibit to me, and which forms the subject of the above communication, presents the appearance of a very fine female of the normal North-American type of the species. It had apparently but just emerged from the chrysalis, and there can be but little doubt that the larva had been reared in the neighbourhood. The accidental appearance of a North-American Lepidopteron in this country would, under ordinary circumstances, be of trivial importance, but there are reasons in the present case for attaching some value to the fact above recorded. *Danais Archippus* is a well-known American species, found as far north as Canada, and by Mr. Bates as far south as the Amazonian district (*vide* Trans. Linn. Soc., vol. xxxiii., p. 516). It has lately become naturalised in New Zealand and Australia, and Mr. Butler, of the British Museum, informs me it has been received from New Guinea; a specimen has also this year been taken near Neath, in Wales, as recorded in the 'Entomologist's Monthly Magazine,' 1876 (p. 107). It is, therefore, found distributed over a large part of the earth's surface, in three of the six Zoogeographical regions now generally recognised, *viz.* the Nearctic, Neotropical, and Australian; it is by no means improbable that the species may become also naturalised in this the Palæarctic region. It becomes, therefore, important that its earliest appearance in this country should be recorded. A full account of the insect is given by Mr. C. V. Riley, the State Entomologist of Missouri, in his Third Annual Report, 1871 (pp. 143—152), and a copy of his woodcut of the full-grown larva is given herewith, in

order that entomologists may recognise the species if found in England in that state. The perfect insect is so well known that it has not been thought worth while to figure it, particularly as it is so large that its wings would extend beyond the width of the letterpress of this magazine. The larva feeds on several species of *Asclepias*, viz. *A. tuberosa*, *curassavica*, *cornuti*, and *purpurascens*: no species of the *Asclepiadaceæ* is indigenous to this country; one genus of the order, *Periploca*, is often grown in the open air, and many of the genera under glass. Mr. Riley states that according to some authors the larva also feeds upon Dogbane (*Apocynum*): but one genus of the *Apocynaceæ* is indigenous here, viz. *Vinca*; both *V. major* and *minor* are common in Mid-Sussex in the woods and in gardens; but whether the larva would feed upon either of these plants must remain an open question at present. The oleander, another *Apocynaceous* plant, is also very commonly grown in Sussex, with slight shelter during the winter. The colour of the larva is black, white, and yellow. Mr. Riley states that the females certainly hibernate, and deposit their eggs in his district, St. Louis, early in May; the imago appears about the middle of June; eggs are then again deposited, and a second brood of the butterfly appears in October. It is quite possible that the larva may be found to feed here on some indigenous plants of quite different orders to those which it usually frequents, and this becomes the more likely, as it would form by no means an exceptional case; *Bombyx Mori*, for instance, can be reared by feeding it either on lettuce or mulberry,—plants belonging to orders as widely different as any two arranged amongst the *Exogens*.

J. JENNER WEIR.

6, Haddo Villas, Blackheath.

Descriptions of Oak-galls. Translated from Dr. G. L. MAYR'S 'Die Mitteleuropäischen Eichengallen' by E. A. FITCH, Esq.

(Continued from p. 247.)

61. *Andricus crispator*, Tschek.—This recently-discovered gall is found towards the end of May on the Turkey oak: many specimens are frequently crowded together on one leaf, so that it becomes quite crumpled, and forms an elongate

ball, which only shows the central and side veins, and the small galls of the size of a hemp-seed, while the parenchyma is completely wanting; the leaf-veins are curled at the top,



Fig. 61.—ANDRICUS CRISPATOR.

after the manner of fern fronds. Should the galls not occur in a mass the leaf becomes better developed, and the spherical galls may be seen projecting equally on each side of the leaf. If the galls appear on the upper side of the midrib, which frequently is the case, then the lower side of the vein swells, turns upwards and forms a curl. The galls occur between the crumpled and generally up-turned sides of the leaf in a central longitudinal furrow, which becomes formed in that manner: they are sappy, when recent, green or red in colour, and on the lower side scantily, on the upper side more thickly, covered with hairs. When mature the galls are hard and yellow; those galls which do not occur on the midrib are less conspicuous on the under side of the leaf. The section exhibits a hard inner gall, which is thoroughly united to the exterior gall substance. The dark-coloured males appear towards the middle of June (later in a cold summer), and after them the rufous females—*G. L. Mayr.*

Dr. Mayr bred two females of *Ceroptres Cerri* in the summer from fresh galls.—*E. A. Fitch.*

Observations upon the Larva of Stauropus Fagi.

By H. M. GOLDING BIRD.

As *Stauropus Fagi* is not a common insect some account of its larval state might be interesting to those who have had

no opportunity of watching it for themselves. Its peculiar form has been carefully described by Mr. Newman, and so often figures in groups of caterpillars that any description of mine would be superfluous.

About a score of eggs were laid by a worn female taken at sugar; one of the young larvæ was given to me. It was very small and very miserable looking when it came into my hands; it had ceased eating previous to moulting. In two days, that is, by the 21st of August, the mask fell from the face, and then it began the hard task of extricating itself from its old skin. The operation lasted about half an hour, the larva stopping every now and then for a few minutes' rest before resuming its struggles. I had never before had an opportunity of seeing this species moulting, and as it had used its long legs just before in walking (though certainly with very little vigour) I was not prepared to see them cast with the old skin; but soon two new pairs were perceived doubled up against the sides of the larva; and this accounts for the great difficulty Fagi found in freeing itself, as the comparative stiffness of the legs prevented its working backwards and forwards, after the wriggling fashion of other larvæ. The legs did not all get free till the skin had been pushed back to the 6th segment, and then even the flattened tail made its way out with comparative ease. It next proceeded to devour the cast skin, all but the head—which was either too tough, or else was not worth seeking, as it had fallen to the bottom of the cage—and one leg; these were the only relics of the grand struggle.

After a day's rest it began to eat beech, oak, and a little birch. I sketched it in its various stages, and observed that the two caudal horns are not alike in colour, one being rust-red and the other metallic-blue; this was more noticeable as the larva increased in size. It ate sometimes during the day, but was more often at rest, with the body curved round, so that the last segment touched the 1st, the long legs folded one over the other, and holding on to the twig by the four pairs of claspers. On Thursday, the 31st, it ceased eating; and by Sunday morning had again changed its skin.

After a few hours' rest Fagi seemed a different creature; began to feed with a voracity which I have seen in no other larva,—not even in *Chelonia caja*. All day long it was

eating: twelve or thirteen bites it took at the leaf to complete the curve; the last to see it at night and the earliest morning visitor found it feeding,—and on nothing but beech; the largest and juiciest leaves were daily put fresh into the cage; oak was always there, but not touched. It grew rapidly, as one might expect, till the head, which seemed large out of all proportion, looked but a sorry balance for its enormous tail; in fact, the posterior segments seemed almost too heavy to drag about; and on one occasion Fagi assumed a comical appearance by resting this imposing tail on a bed of moss, while it lost no time in eating as if for a wager. In the day-time the cage was kept out of doors; and if Fagi could be said to eat more greedily at one time than another, it was when the wind was so high as to blow the leaves about in the cage.

Instead of being alarmed when disturbed it either continued placidly eating or else curved its tail over its back, and pugnaciously threw out its long legs, as if to resent the interference. A small larva of *Orgyia fascelina* was feeding in the same cage, and happened once to be resting on a twig too near to Fagi for its own comfort, for, coolly enough, Fagi struck at it with one of its long legs, and sent the unlucky larva to the floor of the cage.

Fagi enjoyed life so thoroughly as a larva, it seemed as though it meant to remain one all its days; but on September 19th its appetite failed, and the next morning had for the first time forsaken its food, and was sitting disconsolately on the floor of its cage. It soon set about seeking a suitable winter dwelling, and in its ramble (to show that its strength was in no way diminished) crawled under a small saucer, tolerably heavy with earth and moss. Presently it began to draw together a large beech leaf and an oak by little columns of white silk, and by evening the leaves were entirely closed; so no more was to be seen of Fagi; and I wait for its appearance in another form next summer.

Other larvæ in spinning move their heads to and fro between the two surfaces they wish to unite, carrying the silk in their mouths; but Fagi scarcely moved its head at all, guiding the silk from side to side by means of one of its legs. The operation was an interesting one.

Although in eating Fagi's long legs seemed almost to be

hindrances,—for it steadied the food by means of the first pair, which are similar to those in other larvæ,—yet from the force with which it hit *Orgyia fascelina*, and the delicacy with which it used them in spinning, it is clear that the muscular development is considerable. It is difficult to understand how, in moulting, the connection is transferred from the old pairs, so recently in use, to the new ones, which are packed away under the old skin. It is hardly likely that there should be two sets of muscles, which are brought alternately into play at the different moultings. This almost refutes itself, as it suggests a waste in the economy of Nature.

It has been said that there is something similar in the case of a crustacean which renews its claws after an injury. But I can see no parallel, for the crab or lobster has no new claw ready to take the place of the one that has been wrenched off; the muscles are simply off duty till, by a slow process, a new claw, very small at first, grows in the place of the lost one. Now Fagi has the two sets of legs at one and the same time; true that one set is not visible till the moulting begins, but then, with scarcely any interval, the active force is transferred from the old to the new, the new pair being considerably longer and stouter than the old.

Of course with the claspers they are simply drawn out of the skin, and the muscular action is in no way interrupted or suspended, whilst with the long pairs the actual jointed legs themselves are cast aside, and in some mysterious manner the muscles transfer their service to the new.

H. M. GOLDING BIRD.

45, Elgin Crescent, Kensington,
October 13, 1876.

Capture of Lepidoptera at Sallow-bloom.

By JOHN T. CARRINGTON.

THE afternoon of June 17th, last year, was like many more afternoons in the Highlands of Scotland,—it was wet; but, in despite of the rain, I started, accompanied by two friends, from Camghouran for a walk of about twelve miles, over the moor of Rannoch, to a solitary shepherd's cottage, rejoicing in the Gaelic name of Croachan Dhu, meaning in English "at the black burn." This district is probably the loneliest,

wildest, and most barren of the Highlands: here was the home of the wild tribe, so graphically described by Sir Walter Scott in his 'Legend of Montrose.' These "Children of the Mist" lived for years in these mountain fastnesses, secure from the harrowing attacks of the great M'Cullum More's little less fierce followers, until hunted down by them and Allan M'Aulay, whose deep-rooted revenge against them never let him rest. I could not help thinking over all this as I stood on an eminence, from which I could see upwards of twenty mountain peaks, none of less altitude than 3000 feet, many then clad with patches of snow. I marvelled at the many changes which had passed since the days when Ranald MacEagh, "Son of the Mist," and his son Kenneth trudged with brawny brown legs over perhaps the very ground now occupied by three peaceful "fly-catchers." But I must return to what I was going to say.

After a weary walk we reached the cottage; being received by a salute of barking collies, which to one of my friends, recently from London, was no source of pleasure. After refreshing ourselves with Miss Campbell's scones, oat-cake, and cream, we started work for the night: one contingent sugared high on the mountain-side, while the other two did the same on a mountain bog. Your readers will imagine the astonishment of all, as night drew near, to find the moths flying steadily in one direction, quite oblivious of the many patches of intoxicating sweets we had prepared. The next best thing to do was to find out what was the attraction. I need not ask my readers to guess what it was,—for who would think of sallow-blossoms at midsummer? But so they were; and an odd thing it seemed to find such a mixed company at the feast. Here is a list of them:—The genus *Hadena* seemed to replace our more familiar—at sallows—genus *Tæniocampa*, for in hundreds were *Hadena adusta*, *H. glauca*, *H. dentina*, *H. pisi* (in all sorts of variety), *H. contigua*, and *H. rectilinea*; *H. dentina* being in decided majority. In addition to these we took an occasional *Acronycta myricæ*, with *A. menyanthidis*, *Noctua plecta*, *Rusina tenebrosa*, a few *Ypsipetes ruberata*, and one *Notodonta dictæoides*. Excepting the absence of a single decently rare moth, the above list is decidedly interesting, as being such an odd mixture of species captured on a single night at sallow-

bloom. We quite thought we might take something new, or at least of value at these shallows; but nothing beyond those mentioned in this list was seen. At about two o'clock in the morning we had to beat a retreat on account of the steady rain, which began to knock off the satiated moths from the bloom. Our troubles did not end there, for when we got to Miss Campbell's hospitable house it by no means meant shelter. Whether it is that Highland lairds think their tenants so hardy that little comfort does for them, I know not; but this I do know, that we had to sleep with umbrellas over our bed, which only concentrated the drippings, instead of all being evenly wet.

The locality where we found these shallows (*Salix caprea* var. *sphacelata*) in flower was at an altitude of upwards of 1400 feet, in a cold wet bog. There is no cultivated land within six or eight miles; and, excepting this shepherd's cottage, no other house within the same distance.

On our return we examined the place by daylight, but found nothing worth taking—further than a series of *Ypsipetes ruberata*.

I have worked the neighbourhood before and since, but always left it with the same feeling of depression; possibly this was caused by want of success in capturing anything rare, added to the dreary solitude. The shepherd's sister told me that during winter she seldom went further than a few hundred yards from the cottage.

JOHN T. CARRINGTON.

September 13, 1876.

Entomological Notes, Captures, &c.

Entomology in Cornwall.—Few counties seem to have received so little attention from entomologists as Cornwall; this is the more remarkable, as the varieties of soil and numerous genera of plants found there make it a likely resort of many of our rarer Lepidoptera.

Being at St. Austell on a visit, in August last, I used the net in the immediate neighbourhood; without anything like hard work I obtained the following result:—*Colias Edusa* in large numbers, the proportion being one female to about five males; the colour of the males seems to vary more than those

I have seen from any other district. Of *C. Hyale* I got only two. *Argynnis Paphia* was seen in some abundance, though I was too late to take many in good condition. *A. Adippe* also occurred, but much worn. *Pyrameis Cardui* moderately plentiful, and in first-rate condition. *Lycæna Argiolus* swarmed on one particular ivy-hedge bordering on a wood, where I also took one *Thecla Quercus*.

I did not go after moths at all, but *Macroglossa stellatarum*, *Xanthia silvago*, and *Ptilodontis palpina*, came in my way, and were secured. For a fine specimen of *Sphinx Convolvuli* I am indebted to Mr. Brewer, the station master, who brought it to me alive in very good condition; I heard of another being taken in the town soon after. *Nonagria Typhæ* pupæ also occurred freely in reeds on the moors; they were easily found by splitting open the thick stems of plants that presented a faded appearance. I also took three nearly full-grown *Chærocampa Elpenor* larvæ feeding on *Fuchsia fulgens*. Two *Sphinx Ligustri* larvæ were found feeding on variegated holly.

Wasps have long been included in the list of enemies which an entomologist has to contend against; but I think they have rarely been guilty of so impudent an outrage as the following:—I was setting *Colias Edusa* at a table before an open window; a specimen I had just killed was lying before me; a wasp flew in, and almost immediately settling upon it, bit off the wings with an audible snap of its jaws, and then flew away with the body. It may be wondered why I allowed the wasp to proceed without molestation; but it did not strike me that it would spoil the insect until I heard it bite off the first wing, which rendered the specimen useless. So curiosity prevented me from disturbing it.

If any entomologist contemplates a visit to this neglected county next season, I would strongly advise him to arrange his expedition to terminate with August, as after that month it usually rains frequently.—*T. Hodge*; 33, *Almorah Road, Islington, N., October, 1876.*

Deiopeia pulchella and *Argynnis Lathonia* at Hastings.—*Deiopeia pulchella* has occurred at Hastings again this year: three specimens have been met with (two on October 18th, and one about a week before). They were all in excellent condition, and were taken at almost the same spot, a

distance of about two miles from the locality of last year. I have also seen a specimen of *Argynnis Lathonia*, taken here on the 14th of August, by Mr. S. Hume.—*E. A. Butler; University School, Hastings, November 7, 1876.*

Deiopeia pulchella at the Land's End.—This autumn, being at the Land's End, where I captured *Deiopeia pulchella* last year, I searched carefully for it up to the time of my leaving at the end of September, but without success. Since my return I have received three specimens in good condition, taken soon after my departure: one by Mr. W. A. Michael; the others by residents in the neighbourhood.—*Annie Michael; 27, York Road, Brighton, Nov. 23, 1876.*

Acherontia Atropos at Folkestone.—A large specimen of *Acherontia atropos* was brought to me by a friend, a few days ago, in excellent condition.—*J. J. Giles; Folkestone, October 21, 1876.*

Chærocampa Celerio.—Mr. W. Shaw, of Ayton, took a specimen of *C. Celerio*, in Berwickshire, in 1873. I think the capture of so scarce a species should be recorded, even if somewhat late.—*W. Prest; York.*

Chærocampa Celerio.—On the 29th of last September a fair specimen of *C. Celerio* was taken at rest on a clothes'-line, in a garden at Edwinstowe. It is now in my possession.—*Arthur Doncaster; Broom Hall Road, Sheffield, November 20, 1876.*

Acronycta Alni.—On the 21st of June last I had the pleasure of taking a perfect specimen of *A. Alni*: it was at rest on a wooden fence in this neighbourhood.—*Id.*

Scarcity of Lithosidæ.—It is well known that all the British species of *Lithosidæ* are more or less local; but has it been observed that during the past season the various species have been unusually scarce in their especial localities? Such has been my own experience. In 1875 one particular spot, near a wood, swarmed with *Lithosia stramineola* and its nearly (if not variety) *L. griseola*; but this season I have not seen a specimen of either. *Eulepia cribrum*, too, has been unusually scarce in its favoured haunts, as well as *Lithosia mesomella* and *L. complana*; neither has its commoner and more generally distributed relative, *L. complanula*, been taken in any numbers. *L. helveola* and *L. aureola* I have never found in plenty; but this season not a specimen of either has rewarded

my search. Whether they have been taken in any part of the forest, or whether *L. quadra* has turned up in the same locality, I am not prepared to say. It is true I have not had an abundance of leisure to devote to entomological pursuits, but I have spent sufficient time in the forest and elsewhere to prove that in this locality there has been a paucity of this particular class. There is a belt of tall fir trees skirting a young oak wood in one part of my forest hunting-ground, and in previous seasons I have seen *L. rubricollis* flying around the tops of those trees in countless numbers. This season, however, it has not been so; not that their occurrence in such a situation is at all a guarantee of a good day's "take," even if they are common, for their capture is a difficult matter. Fortunately they fly in the daytime, and are more easily seen than they would be at dusk. It would be interesting to know if this class of moths—the majority of which are lichen feeders—have been scarce in other localities; and, if such has been the case, what cause has effected it? Is it possible the continued drought in this neighbourhood has had anything to do with such a scarcity? Surely the heat has been sufficient to develop an unusual number of insects. However, lichens prefer a humid atmosphere and situation in which to grow; and the great heat and drought might have been detrimental to their growth. But even in this case I am not so sure that a scarcity of food could have been the cause of a scarcity of moths this season, as many of them were full-fed larvæ before the drought began; still it seems extraordinary that in a season when some insects are so common others should be unusually scarce. This, be it understood, is only an observation made in this immediate locality; and my experience may differ considerably from that of others at a distance.—*G. B. Corbin.*

Hybernia leucophearia.—Will any entomologist publish his geological experiences of *Hybernia leucophearia*? Here, on the lower greensand, it is about as common as *Vanessa Antiopa* or *Deilephila livornica*, yet generally it is considered as an insect more profuse than welcome. Within a few miles it occurs in plenty, *i.e.* on the London clay *north* of the Downs (gravel and sand), and Wealden (clay) on the *south*. My captures in the immediate neighbourhood have been as

follows:—One specimen previous to 1864, three in 1872, and one in 1874. I have only occasionally seen it in local cabinets.—*Sydney Webb; Redstone Manor House, Redhill, Surrey.*

Ennomos alniaria.—My friend the Rev. E. Austen, who lives a few miles from Dover, presented me last week with two specimens of *Ennomos alniaria*, which he reared from larvæ by beating. The food-plant was oak, birch, or willow; most probably one of the two former. The caterpillars spun up between leaves; the moths appeared about the 20th of September. This being his second season of larvæ rearing, he had no idea of the extreme rarity of his captures until the moths appeared.—*W. W. Blest; Broomscoft, Wateringbury, Kent, November 7, 1876.*

Dasyampa rubiginea at Hawley.—I have had the good fortune to take two specimens of *Dasyampa rubiginea* at ivy this season; one on the 12th October, and the second on the 13th. Both specimens are in perfect condition.—*H. Jones; Hawley, Farnborough Station, October 20, 1876.*

Catocala Fraxini.—My friend Mr. W. Shaw, of Ayton, Berwickshire, took a rather wasted specimen of this rare species at Netherbyres, in the same county, on the 9th September, 1876. He has kindly added the insect to my collection.—*W. Prest; York, November 1, 1876.*

Pionea margaritalis.—Last July a specimen of what I then thought was a variety of *P. forficalis* was caught in my garden at Mile End. However, upon comparing it with the *P. margaritalis* in the Doubleday collection, I find it is undoubtedly this latter species.—*D. Pratt; 398, Mile End Road, London, E., November, 1876.*

Spilodes palealis.—It may interest the readers of the 'Entomologist' to know that my friend Mr. Whitewick, of Bootle, captured a fine female specimen of *S. palealis* on the 12th of August, while beating for *Agrotis præcox* on the banks of the River Mersey. This is, I believe, the first instance of its capture near here.—*Thos. J. Roxburgh; 120, Harlow Street, Park Road, Liverpool, Nov. 20, 1876.*

Botys verticalis.—Mr. Hodgkinson seems surprised to find (*Entom. ix. 260*) *Botys verticalis* as far north as Witherslack. Its range is much further north, as it is reported to me by Dr. Trail from Aberdeen, and I myself have seen it at

Dunkeld. This is not a common species in Scotland.—*F. Buchanan White, Perth, November, 1876.*

Doubleday Collection.—As many of the readers of the 'Entomologist' are aware, the hours for visiting this Collection have hitherto been from 10 a. m. until 5 p. m. I beg to forward the following letter for publication in the 'Entomologist.'—*D. Pratt (Sec. to East London Entomological Society); 333, Mile End Road, E.*

"South Kensington Museum, London, S.W.,
November 1, 1876.

Bethnal Green Branch Museum.

Sir,—In compliance with the wish expressed by the members of the East London Entomological Society, in the letter received from you to-day, I beg to acquaint you that arrangements have been made for the Doubleday Collection, at the Bethnal Green Branch Museum, to be open for inspection until 9.30 p.m. on Tuesdays.—I am, Sir, your obedient servant,

P. CUNLIFFE OWEN, *Director S. K. M.*"

"*Valeria oleagina*:" *Correction of an Error* (Entom. viii. 164).—I have ascertained that the insect recorded by me as *Valeria oleagina* is *Mamestra persicariæ*. I regret having made so great a blunder.—*Benjamin Brown; Deard's End, Knebworth.*

[The footnote to the announcement shows that the specimen did not receive editorial sanction.—*Ed.*]

Pachnobia hyperborea and *Pyrameis Virginiensis*: *Errata.*—By an unfortunate error, detected when too late for alteration, these two specific names were incorrectly spelt in last month's number. They should be *hyperborea* and *Virginiensis*. I would suggest that the readers of the 'Entomologist' should at once correct these errors in their copies, to prevent further confusion.—*John T. Carrington.*

West London Entomological Society.—The fourth annual Exhibition of this Society will take place in the Church Room (adjoining St. Mark's Institute), George Street, Oxford Street, near Grosvenor Square, on December 7th and 8th, 1876, between the hours of 6 and 11 p.m.

Commencing with the Number for January, 1877,

THE ENTOMOLOGIST

WILL BE EDITED BY

JOHN T. CARRINGTON,

WITH THE ASSISTANCE OF

FREDERICK BOND, F.Z.S.

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JOHN A. POWER, M.D.

FREDERICK SMITH.

J. JENNER WEIR, F.L.S., F.Z.S.

F. BUCHANAN WHITE, M.D., F.L.S.

During the Year 1877 it is intended to publish in the 'ENTOMOLOGIST' an
EPITOME OF NOVELTIES AND RARITIES

which have occurred in the Entomological Fauna of Great Britain and Ireland since January, 1874,—the date of the last 'Entomologist's Annual.' Dr. Power has undertaken the Coleoptera; Mr. Carrington, the Lepidoptera; Dr. Buchanan White, the Hemiptera; Mr. Frederick Smith, the Aculeate Hymenoptera and Diptera; Mr. Fitch, the Galls; &c. To further this object it is requested that notice of all unrecorded occurrences of New and Rare Insects may be sent before the 10th December next.

It is also intended to publish frequently Biographical Notices of Eminent Naturalists, accompanied by

PHOTOGRAPHIC PORTRAITS.

The first of these will be a memoir of the late Mr. Henry Doubleday.

Every Number will contain one or more

WOODCUT ILLUSTRATIONS

of Economic Entomology, or other subject of interest. Mr. Bond, Mr. Stevens, and several other Entomologists, have kindly placed at the disposal of the Editor, for figuring, many

FINE VARIETIES OF LEPIDOPTERA.

Also, in the coming Volume of the 'ENTOMOLOGIST,' may be expected, besides numerous articles upon Lepidoptera; a List of the Coleoptera of the neighbourhood of Waterford, by Dr. Power, giving localities and other interesting information; and a valuable paper on the Mimicry existing between Hymenoptera and Diptera, besides occasional notes on the Anatomy of Insects, by Dr. Lowne. Mr. Fitch will continue his translations of Dr. Mayr's valuable work upon Galls; this series will be liberally Illustrated as heretofore. A continuance of Mr. May's interesting translations of Life-histories of Sawflies will likewise appear. There will also appear from time to time Reviews, with extracts, of new Entomological works.

EXCHANGE LISTS

of Entomological Specimens will be inserted, as now, free of charge.

SCIENTIFIC DISCUSSION

will receive every encouragement. The Editors avow their determination, in conducting the 'ENTOMOLOGIST,' to avoid all illiberal or personal allusions likely to promote an unpleasant feeling between contributors. They confidently appeal to all who are desirous of the success of the 'ENTOMOLOGIST' to give it not only their personal support, but also their warmest recommendation; remembering that its ultimate prosperity depends not only upon collective, but upon individual, effort.

Contributors are earnestly requested to send their communications as early in each month as convenient, addressed to *The Editors of the 'ENTOMOLOGIST,' care of T. P. NEWMAN, 32, Botolph Lane, London, E.C.*

LONDON, *December 1st, 1876.*

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